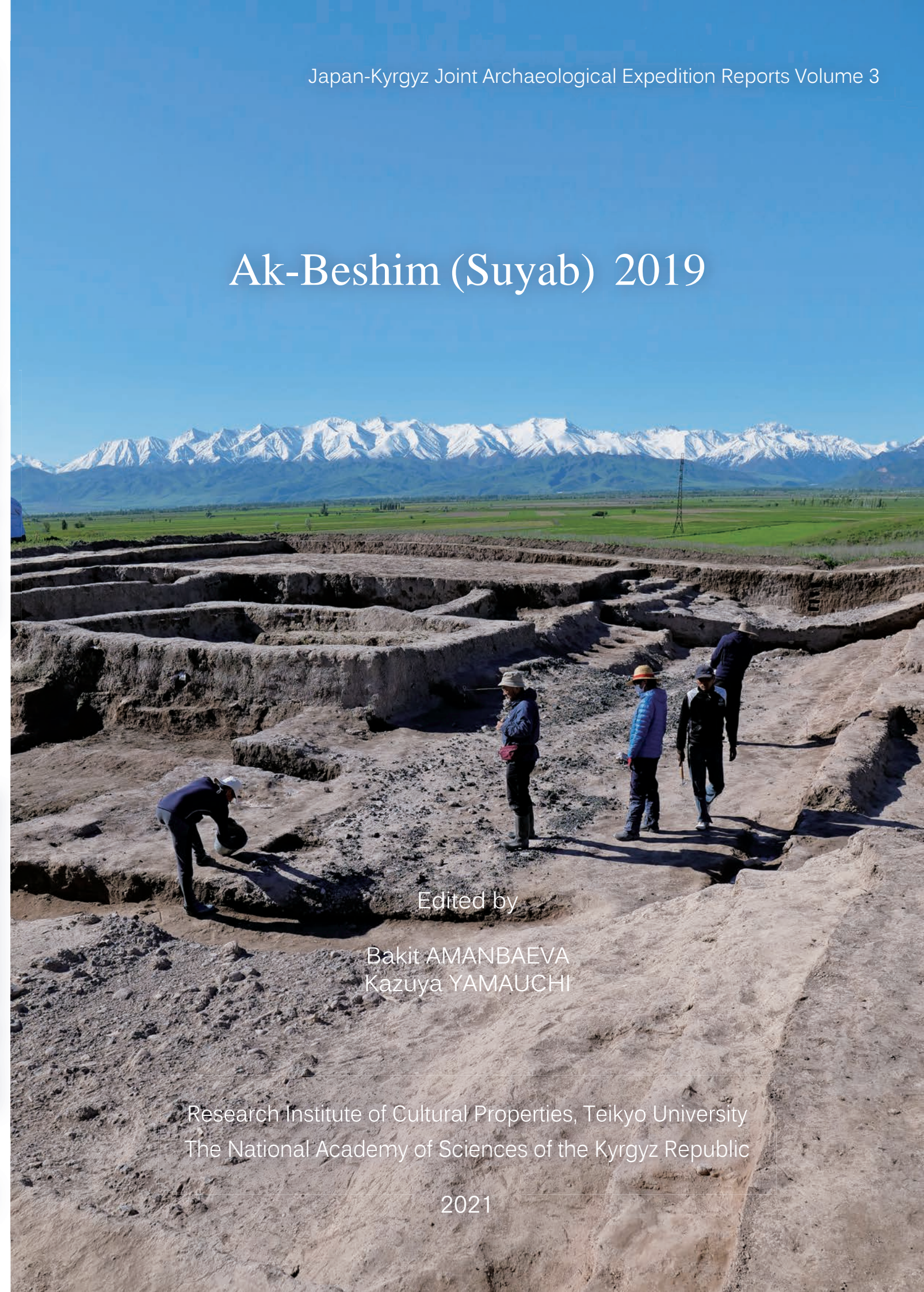


Ak-Beshim (Suyab) 2019

Japan-Kyrgyz Joint Archaeological Expedition Reports Volume 3 Ak-Beshim (Suyab) 2019

Research Institute of Cultural Properties, Teikyo University
The National Academy of Sciences of the Kyrgyz Republic

2021



Edited by

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Kazuya YAMAUCHI

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Date of Issue : March, 2021

Edited by : Bakit AMANBAEVA & Kazuya YAMAUCHI

Published by : Research Institute of Cultural Properties, Teikyo University
1566-2, Yokkaichiba, Isawa-cho, Fuefuki, Yamanashi, Japan 406-0032
Tel: +81(0)55-261-0015

The Institute of History and Cultural Heritage, National Academy of Sciences of the Kyrgyz
Republic

Printed by : Teikyo Service, Co., Ltd.

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The Institute of History and Cultural Heritage, National Academy of Sciences of the Kyrgyz Republic

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Preface

The National Academy of Sciences of the Kyrgyz Republic and the Research Institute of Cultural Properties, Teikyo University, have been implementing a joint research of Ak-Beshim archaeological site based on the agreement signed in 2016. The site is identified as the ancient city of Suyab and designated as one of the UNESCO World Heritage Sites situated on the north of the Kyrgyz Republic.

The First Investigation of 2019 (the 7th investigation from launch of joint research project in 2016) was implemented in a total of 29 days from April 20 (Sat) to May 17 (Fri), 2019. Following the investigation in 2018, we resumed the excavation of AKB-13 in the First Shahristan, AKB-15 in the Second Shahristan, and a newly excavated southeast wall of the First Shahristan (AKB-19) of the Ak-Beshim archaeological site. In parallel, we researched unearthed materials (earthenware, tile fragments, plant remains, animal bones, etc.). As the Second Investigation, we conducted sorting aiming at the drawings of the artifacts, and opening a conservation-related workshop for 30 days from August 7th to September 6th, 2019.

This excavation research greatly owes to the cooperation and the support from the associated organizations, such as the National Academy of Sciences, the Ministry of Culture, Information and Tourism of the Kyrgyz Republic, the Embassy of Japan in the Kyrgyz Republic, and the JICA Kyrgyz Republic Office. Here we express our sincere appreciation for them.

March 2021

Bakit AMANBAEVA (The National Academy of Sciences of the Kyrgyz Republic)

Kazuya YAMAUCHI (Research Institute of Cultural Properties, Teikyo University)

Foreword

1. This is the report of the joint research conducted by the National Academy of Sciences of the Kyrgyz Republic and the Research Institute of Cultural Properties, Teikyo University, in 2019.

The two institutes implemented excavation, ground penetrating radar survey, and analysis of plant seeds in April and May 2019, at Ak-Beshim archaeological site (the First Investigation). Then we organized artifacts, analyzed animal bones, and conducted conservation works on the artifacts in Bishkek City in August and September (the Second Investigation). In June, we implemented workshop focused on the analysis of plant seeds inviting a researcher from Kyrgyz to Japan. The radiocarbon dating of charcoal was also implemented back in Japan. This is the report of the results of those investigations. As for the analysis of animal bones and plant seeds, the report is only a summary at this point, and its official report will be presented later in published materials.

2. As the funding, we took advantage of the budget of Teikyo University Silk Road Scientific Investigation Team and the research funding of Teikyo University. We sincerely express our gratitude to Teikyo University, the President Yoshihito OKINAGA, and the participators of each department for their generous understanding and cooperation.
3. For the creation of the illustration of the remains, we outsourced the photographic images to Techno Planning Co.,Ltd., and the radiocarbon dating and the analysis of braided products to Paleo Labo Co., Ltd. The reading of the inscription on coins was instructed by Yutaka YOSHIDA (Graduate School, Kyoto University). The visual recording of the investigation and the creation of DVD with subtitles (Japanese-Russian) was produced by Daisuke FUKUDA (AD-DESIGN Co., Ltd.)

4. Assignment of writing, diagram drawing, editing etc. in this book is as follows:

1. Koichi KUSHIHARA 2. Kazuya YAMAUCHI 3. 3.7.1.: Seiji NAKAYAMA, Others: Koichi KUSHIHARA 4. 4.5.1.1.: Manabu UETSUKI, 4.6.3.1-2: Osamu HIRANO, Others: Hidekazu MOCHIZUKI, Koichi KUSHIHARA 5. Shunpei IWAI 6. Hidekazu MOCHIZUKI 7. Manabu UETSUKI 8. Seiji NAKAYAMA 9. Koichi KUSHIHARA 10. Maiko MIURA 11. Kazuya YAMAUCHI

Addendum

1. Koichi KUSHIHARA 2.,3. Paleo Labo Co., Ltd. AMS Age Measurement Group
4. Paleo Labo Co., Ltd. 5. Denis Sorokin (Translated by Kazuya YAMAUCHI, Hidekazu MOCHIZUKI) 6. Chie NAKAYAMA 7., 8. Koichi KUSHIHARA

Total editing: Kazuya YAMAUCHI, Koichi KUSHIHARA, Chie NAKAYAMA, Manabu UETSUKI

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Illustration compilation:

Chie NAKAYAMA, Yukari KUSHIHARA, Hidekazu MOCHIZUKI, Koichi KUSHIHARA

5. Ak-Beshim archaeological site was formerly called “Shahristan” or “Rabat”, but since 2016, Shahristan is called “the First Shahristan” (SH1), and Rabat(Suyab) is called “the Second Shahristan” (SH2).

Also, we named the excavated area as “AKB (Ak-Beshim) - (No.)” in chronological order of the investigations. Therefore, we call the excavated area in the First Shahristan (Main Street Section) as “AKB-13”, the center of the Second Shahristan as “AKB-15”, and the area at the southeast wall of the First Shahristan newly investigated in 2019, as “AKB-19”.

6. For the investigation of Ak-Beshim archaeological site and the preparation of this document, we were guided, instructed, and cooperated by the following. We would like to express our gratitude for them. (Omitting titles, in no particular order):

Teikyo University, The National Academy of Sciences of the Kyrgyz Republic, the Ministry of Culture, Information and Tourism of the Kyrgyz Republic, the Embassy of Japan in the Kyrgyz Republic, the JICA Kyrgyz Republic Office, the Teikyo University Museum, Satoru IJITSU (The Embassy of Japan in the Kyrgyz Republic), Mineyuki HORIKOSHI, Atsuro KODA (Above two: The Teikyo University Museum), Yutaka YOSHIDA (The Graduate School of Kyoto University), Masatoshi YAMAFUJI, Yukiko ISHIDA (Above two: The Nara National Research Institute for Cultural Properties), Ikue OTANI (Kyoto University), Kenichiro NIITSU (A graduate student of Tokyo University), Mayumi KATO, Tomoko ARAKI (Volunteers), Kotomi ASAYAMA, (NH Tabi Company).

7. The unearthed artifacts from Ak-Beshim archaeological site are archived and collected at the National Academy of Sciences of the Kyrgyz Republic. The drawings, photographs and other materials are archived in the Silk Road Academic Research Center, the Research Institute of Cultural Properties, Teikyo University.

8. The reduction scales of the features/artifacts on this report are as follows:

Pit: 1/40, Cross-section diagram: 1/60, 2D diagram: 1/60, 1/100, etc.

Earthenware/Tiles: 1/4, Small-sized items: 1/2, Coins: 1/1

9. The abbreviated names of features are as follows:

A: Alley B (Brick): Features made of burnt bricks (rain-permeable pavement, etc.)

D: Ditch Ms: Main Street

P: Pit (posthole, shaft, pit) R: Room

SM (Stone Mosaic): Decorative stone pavement Tr.: Trench

W: Wall

10. The abbreviations added to the drawings express the following materials.

Bo: Bone artifacts Br: Bronze

C: Coral I: Iron

P: Pottery (glazed/unglazed) R: Rubbing surface S: Stone artifacts

G: Glass

Screentones: Soot

11. The coding system in drawings, plates, list of artifacts, observation sheets are as follows.

e.g. "13-19-001" stands for district: AKB-13, excavation year: 2019, number of artifact: 001

Table of Contents

Preface		9. Radiocarbon dating and wood charcoal identification	
Foreword			138
1. The Background to the Investigation	1	9.1. Pit1 (P1)	138
2. Investigations in 2019	5	9.2. Pit3 (P3)	138
2.1. The First Investigation	5	9.3. Pit7(P7)	138
2.2. The Second Investigation	6	10. Conservation	139
3. Investigation of AKB-13	8	10.1. Conservation of Metal Products	139
3.1. Location of Excavation Area	8	10.2. Conservation of Earthenware	139
3.2. Objective of Investigation	8	11. Afterword	141
3.3. General Description of Investigation	8	References	143
3.4. Extended Area	8		
3.5. R2-2	11	Addendum	
3.6. Pits	11	1. Investigation Journal	147
3.7. Main Street (MS1)	13	1.1. The First Investigation in 2019	147
3.8. Wall between R4 and R5	15	1.2. The Second Investigation in 2019	148
3.9. Summary of AKB-13	15	2. Radiocarbon Dating	150
4. Investigation of AKB-15	43	2.1. Introduction	150
4.1. Location of Excavation Area	43	2.2. Samples and Methods	150
4.2. Objective of Investigation	43	2.3. Results	150
4.3. Summary of Investigation	43	2.4. Discussion	151
4.4. Trenches	43	3. Radiocarbon Dating and Wood Species Identification	155
4.5. Platform	47	3.1. Introduction	155
4.6. Pit	48	3.2. Samples and Methods	155
4.7. Roof tiles from roof tile belt	53	3.3. Results	156
4.8. Summary of AKB-15	53	3.4 Discussion	157
5. Investigation of AKB-19	125	4. Analysis of Braided Product from P3	160
5.1. Location of Excavation Area	125	4.1. Introduction	160
5.2. Objective of Investigation	125	4.2. Sample and methods	160
5.3. Summary of Investigation	125	4.3. Result	160
5.4. Artifacts from AKB-19	126	4.4. Discussion	160
5.5. Summary of AKB-19	126	5. Ground Penetrating Radar Survey (2019)	162
6. Ground Penetrating Radar Survey	132	5.1. Introduction	162
6.1. AKB-13	132	5.2. Investigation Points	163
6.2. AKB-15	132	5.3. Equipment Used	163
6.3. AKB-19	132	5.4. Point GPR2019-1	163
7. Zooarchaeological Analysis	133	5.5. Point GPR2019-2	170
7.1. Materials and Methods	133	5.6. Point GPR2019-3	171
7.2. Results	133	5.7. Point GPR2019-4	172
8. Archaeobotanical Analysis	135	5.8. Point GPR2019-5	173
8.1. Investigation Methods	135		
8.2. Summary of Results	135		

List of Figures

Fig.1.1 Location of Ak-Beshim Archaeological Site and the Surrounding Sites	1	Fig.1.4 General view of Ak-Beshim Archaeological Site and Districts	4
Fig.1.2 Full View of Ak-Beshim Archaeological Site (2019)	2	Fig.1.5 Excavation Location Number of Ak-Beshim Site	4
Fig.1.3 Aerial Photograph of Ak-Beshim Archaeological Site (1966)	3	Fig.3.1 Full View of AKB-13	9
		Fig.3.2 AKB-13 R2-2	10
		Fig.3.3 AKB-13 P1, 3, 5, 7-9	17

Fig.3.4 AKB-13 P11~13	18	Fig.3.47 Artifacts from AKB-13(4)	34
Fig.3.5 AKB-13 P10, 14	19	Fig.3.48 Artifacts from AKB-13(5)	35
Fig.3.6 AKB-13 The South Extended Area of MS1	20	Fig.3.49 Artifacts from AKB-13(1)	36
Fig.3.7 AKB-13 The North Extended Area of MS1	21	Fig.3.50 Artifacts from AKB-13(2)	37
Fig.3.8 AKB-13 MS1	22	Fig.3.51 Artifacts from AKB-13(3)	38
Fig.3.9 AKB-13 Wall Between R4 and R5	23	Fig.4.1 General View of AKB-15	44
Fig.3.10 AKB-13 (from North)	24	Fig.4.2 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(1)	55
Fig.3.11 AKB-13 (from above)	24	Fig.4.3 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(2)	56
Fig.3.12 Fifth Road Surface of MS1	25	Fig.4.4 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(3)	57
Fig.3.13 North of MS1	25	Fig.4.5 Cross-section of Tr.8, Sub-trench in Tr.8, AKB-15	58
Fig.3.14 Gravel-Paved Road of A1	26	Fig.4.6 Cross-section of the South-Wall of Tr.14,15, AKB-15(1)	59
Fig.3.15 Wall between R1 and MS1	26	Fig.4.7 Cross-section of the South-Wall of Tr.14,15, AKB-15(2)	60
Fig.3.16 R2-2	26	Fig.4.8 P1, 2, D1 of AKB-15	61
Fig.3.17 Earthenware Unearthed at R2-2	26	Fig.4.9 Stone Mosaic 1, 2, P3, 7 and their Vicinities in AKB-15	62
Fig.3.18 Row of Pahsa Bricks between R4 and R5(1)	26	Fig.4.10 P3 of AKB-15	63
Fig.3.19 Row of Pahsa Bricks between R4 and R5(2)	26	Fig.4.11 Full View of the Site	64
Fig.3.20 The Fourth Surface of MS1	26	Fig.4.12 AKB-15 (from above)	64
Fig.3.21 MS1	26	Fig.4.13 Tr.2	65
Fig.3.22 Row of Bricks on the North of MS1	27	Fig.4.14 North-Wall Cross-section of Tr.8	65
Fig.3.23 The North of MS1	27	Fig.4.15 Row of Roof Tiles in Sub-trench 8	65
Fig.3.24 Workers on the North Extended Area of MS1	27	Fig.4.16 North Sub-trench of Tr.8	65
Fig.3.25 The East of the South Extended Area of MS1	27	Fig.4.17 Cluster of Roof Tiles in Tr.10	65
Fig.3.26 The South Extended Area of MS1(1)	27	Fig.4.18 Row of Roof Tiles in Tr.10	65
Fig.3.27 The South Extended Area of MS1(2)	27	Fig.4.19 Row of Roof Tiles in Tr.10	65
Fig.3.28 Earthen Pot Discovered in the Extended Area on the Southeast End	27	Fig.4.20 Tr.13	65
Fig.3.29 P1	27	Fig.4.21 Tr.14, 15	66
Fig.3.30 P3	28	Fig.4.22 Tr.16	66
Fig.3.31 P4	28	Fig.4.23 Tr.18	66
Fig.3.32 P5	28	Fig.4.24 Tr.19	66
Fig.3.33 P7	28	Fig.4.25 Estimated Range of Platform-1	66
Fig.3.34 P10	28	Fig.4.26 Cross-section of Eastern Border of Platform-1	67
Fig.3.35 The Vicinity of P10	28	Fig.4.27 Southwest Corner of Platform-1	67
Fig.3.36 P11,12	28	Fig.4.28 Earthenware and Bones Unearthed in P1	67
Fig.3.37 The Vicinity of P13	28	Fig.4.29 Earthenware in P1	67
Fig.3.38 P13 in Half-Excavated	29	Fig.4.30 Cross-section of P1	67
Fig.3.39 P14	29	Fig.4.31 P1 after Excavation	67
Fig.3.40 The Vicinity of P14	29	Fig.4.32 Cross-section of P2	67
Fig.3.41 Horse Crania Bone Discovered in the East of MS1	29	Fig.4.33 P2 after Excavation	67
Fig.3.42 Workers on the South Extended Area of MS1	29	Fig.4.34 Cross-section of P3	68
Fig.3.43 Washing and sorting materials at the hotel	29	Fig.4.35 Earthenware Unearthed in P3	68
Fig.3.44 Artifacts from AKB-13(1)	31	Fig.4.36 Bones Unearthed in P3	68
Fig.3.45 Artifacts from AKB-13(2)	32	Fig.4.37 Bones and Earthenware Unearthed in P3	68
Fig.3.46 Artifacts from AKB-13(3)	33	Fig.4.38 P3 and SM	68
		Fig.4.39 P3 after Excavation	69
		Fig.4.40 P5	69

Fig.4.41	P6	69	Fig.4.94	Artifacts from AKB-15(16)	115
Fig.4.42	P7 and SM	69	Fig.4.95	Artifacts from AKB-15(17)	116
Fig.4.43	P7	69	Fig.5.1	General View of AKB-19	128
Fig.4.44	P7 after Excavation	70	Fig.5.2	Full View of AKB-19	129
Fig.4.45	P2 and D1 after Excavation	70	Fig.5.3	Construction Structure Observed on Cross-section of the South Wall in AKB-19	129
Fig.4.46	Roof Tile Belt	70	Fig.5.4	Artifacts from AKB-19	130
Fig.4.47	Roof Tile Belt	70	Fig.5.5	Artifacts from AKB-19	130
Fig.4.48	SM	70	Fig.7.1	Mammal Assemblage (NISP)	134
Fig.4.49	SM	70	Fig.7.2	Sheep Mandible Unearthed in P1	134
Fig.4.50	Southern End of SM1	70	Fig.7.3	Horse Skull Unearthed in P3	134
Fig.4.51	Eastern Side of SM1	70	Fig.7.4	Horse Mandible and Other Bones Unearthed in P3	134
Fig.4.52	Artifacts from AKB-15(1)	74	Fig.8.1	Plant Remains from AKB-15	136
Fig.4.53	Artifacts from AKB-15(2)	75	Fig.10.1	Filling the Lost Parts of Potteries	139
Fig.4.54	Artifacts from AKB-15(3)	76	Fig.10.2	Cleaning of Metal Products	139
Fig.4.55	Artifacts from AKB-15(4)	77	Fig.10.3	Copper Alloy Product before Treatment	140
Fig.4.56	Artifacts from AKB-15(5)	78	Fig.10.4	Copper Alloy Product after Cleaning	140
Fig.4.57	Artifacts from AKB-15(6)	79	Fig.11.1	3D Model of P3, AKB-15 (1)	142
Fig.4.58	Artifacts from AKB-15(7)	80	Fig.11.2	3D Model of P3, AKB-15 (2)	142
Fig.4.59	Artifacts from AKB-15(8)	81	Fig.App.2.1	Result of the Calendar Year Calibration	153
Fig.4.60	Artifacts from AKB-15(9)	81	Fig.App.2.2	Scanning Electron Microscope Photographs of a Carbonized Wood Discovered in Ak-Beshim Archaeological Site	154
Fig.4.61	Artifacts from AKB-15(10)	82	Fig.App.2.3	Carbonized Seed Discovered in Ak-Beshim Archaeological Site	154
Fig.4.62	Artifacts from AKB-15(11)	83	Fig.App.3.1	Result of the Calendar Year Calibration	158
Fig.4.63	Artifacts from AKB-15(12)	84	Fig.App.3.2	Scanning Electron Microscope Photographs of a Carbonized Wood	159
Fig.4.64	Artifacts from AKB-15(13)	85	Fig.App.4.1	Photographs and Micrographs of a Sample	161
Fig.4.65	Artifacts from AKB-15(14)	86	Fig.App.5.1	Investigation Points	162
Fig.4.66	Artifacts from AKB-15(15)	87	Fig.App.5.2	Point GPR2019-1	163
Fig.4.67	Artifacts from AKB-15(16)	88	Fig.App.5.3	Section GPR2019-1a	164
Fig.4.68	Artifacts from AKB-15(17)	89	Fig.App.5.4	Section GPR2019-1b	165
Fig.4.69	Artifacts from AKB-15(18)	90	Fig.App.5.5	Section GPR2019-1c	166
Fig.4.70	Artifacts from AKB-15(19)	91	Fig.App.5.6	Section GPR2019-1d	167
Fig.4.71	Artifacts from AKB-15(20)	92	Fig.App.5.7	Section GPR2019-1e	168
Fig.4.72	Artifacts from AKB-15(21)	93	Fig.App.5.8	Section GPR2019-1f	169
Fig.4.73	Artifacts from AKB-15(22)	94	Fig.App.5.9	Point GPR2019-2	170
Fig.4.74	Artifacts from AKB-15(23)	95	Fig.App.5.10	Point GPR2019-3	171
Fig.4.75	Artifacts from AKB-15(24)	96	Fig.App.5.11	Point GPR2019-4	172
Fig.4.76	Artifacts from AKB-15(25)	97	Fig.App.5.12	Point GPR2019-5	173
Fig.4.77	Artifacts from AKB-15(26)	98	Fig.App.5.13	Measurement Lines of Section GPR2019-1a	174
Fig.4.78	Artifacts from AKB-15(27)	99	Fig.App.5.14	Time Slice of Section GPR2019-1a:0~39cm Deep	175
Fig.4.79	Artifacts from AKB-15(1)	100	Fig.App.5.15	Time Slice of Section GPR2019-1a:19~58cm Deep	175
Fig.4.80	Artifacts from AKB-15(2)	101	Fig.App.5.16	Time Slice of Section GPR2019-1a:39~78cm Deep	176
Fig.4.81	Artifacts from AKB-15(3)	102			
Fig.4.82	Artifacts from AKB-15(4)	103			
Fig.4.83	Artifacts from AKB-15(5)	104			
Fig.4.84	Artifacts from AKB-15(6)	105			
Fig.4.85	Artifacts from AKB-15(7)	106			
Fig.4.86	Artifacts from AKB-15(8)	107			
Fig.4.87	Artifacts from AKB-15(9)	108			
Fig.4.88	Artifacts from AKB-15(10)	109			
Fig.4.89	Artifacts from AKB-15(11)	110			
Fig.4.90	Artifacts from AKB-15(12)	111			
Fig.4.91	Artifacts from AKB-15(13)	112			
Fig.4.92	Artifacts from AKB-15(14)	113			
Fig.4.93	Artifacts from AKB-15(15)	114			

Fig.App.5.17 Time Slice of Section GPR2019-1a:78~97cm Deep	176	Fig.App.5.36 Time Slice of Section GPR2019-2: 0~194cm Deep	185
Fig.App.5.18 Measurement Lines of Section GPR2019-1b	177	Fig.App.5.37 Measurement Lines of Section GPR2019-3a	186
Fig.App.5.19 Time Slice of Section GPR2019-1b:0~39cm Deep	178	Fig.App.5.38 Time Slice of Section GPR2019-3a:0~86cm Deep	186
Fig.App.5.20 Time Slice of Section GPR2019-1b:19~58cm Deep	178	Fig.App.5.39 Time Slice of Section GPR2019-3a:43~129cm Deep	187
Fig.App.5.21 Time Slice of Section GPR2019-1b:39~78cm Deep	179	Fig.App.5.40 Time Slice of Section GPR2019-3a:0~129cm Deep	187
Fig.App.5.22 Time Slice of Section GPR2019-1b:78~97cm Deep	179	Fig.App.5.41 Measurement Lines of Section GPR2019-3b	188
Fig.App.5.23 Measurement Lines of Section GPR2019-1c	180	Fig.App.5.42 Time Slice of Section GPR2019-3b:0~129cm Deep	188
Fig.App.5.24 Time Slice of Section GPR2019-1c:0~39cm Deep	180	Fig.App.5.43 Measurement Lines of Section GPR2019-4	189
Fig.App.5.25 Time Slice of Section GPR2019-1c:19~58cm Deep	181	Fig.App.5.44 Time Slice of Section GPR2019-4:0~52cm Deep	189
Fig.App.5.26 Time Slice of Section GPR2019-1c:39~78cm Deep	181	Fig.App.5.45 Time Slice of Section GPR2019-4:26~78cm Deep	190
Fig.App.5.27 Time Slice of Section GPR2019-1c:78~97cm Deep	182	Fig.App.5.46 Time Slice of Section GPR2019-4:52~104cm Deep	190
Fig.App.5.28 Measurement Lines of Section GPR2019-1d	182	Fig.App.5.47 Time Slice of Section GPR2019-4:78~129cm Deep	191
Fig.App.5.29 Time Slice of Section GPR2019-1d:0~39cm Deep	183	Fig.App.5.48 Time Slice of Section GPR2019-4:104~129cm Deep	191
Fig.App.5.30 Time Slice of Section GPR2019-1d:39~78cm Deep	183	Fig.App.5.49 Measurement Lines of Section GPR2019-5	192
Fig.App.5.31 Time Slice of Section GPR2019-1d:19~58cm Deep	183	Fig.App.5.50 Time Slice of Section GPR2019-5:0~19cm Deep	192
Fig.App.5.32 Time Slice of Section GPR2019-1d: 58~97cm Deep	183	Fig.App.5.51 Time Slice of Section GPR2019-5:10~29cm Deep	193
Fig.App.5.33 Time Slice of Section GPR2019-1d: 78~97cm Deep	184	Fig.App.5.52 Time Slice of Section GPR2019-5:19~39cm Deep	193
Fig.App.5.34 Time Slice of Section GPR2019-1e: 0~162cm Deep	184	Fig.App.5.53 Time Slice of Section GPR2019-5:29~49cm Deep	194
Fig.App.5.35 Time Slice of Section GPR2019-1f: 0~162cm Deep	184	Fig.App.5.54 Time Slice of Section GPR2019-5:39~49cm Deep	194

List of Tables

Tab.3.1 List of Unearthed Materials from AKB-13	30	Tab.3.7 Observation Sheet of Stone Tools from AKB-13	40
Tab.3.2 Observation Sheet of Earthenware from AKB-13	39	Tab.3.8 Observation Sheet of Glassware from AKB-13	40
Tab.3.3 Observation Sheet of Greyish Burnt Bricks from AKB-13	40	Tab.3.9 Weight of Unearthed Materials from AKB-13	41
Tab.3.4 Observation Sheet of Metal Objects from AKB-13	40	Tab.3.10 AKB-13 List of Contexts	42
Tab.3.5 Observation Sheet of Clay Objects from AKB-13	40	Tab.4.1 List of Unearthed Materials from AKB-15	71
Tab.3.6 Observation Sheet of Bone Tools from AKB-13	40	Tab.4.2 Observation Sheet of Earthenware from P1, AKB-15	117

Tab.4.3	Observation Sheet of Earthenware from P2, AKB-15	119	Tab.4.17	Observation Sheet of Stone Tools from AKB-15	123
Tab.4.4	Observation Sheet of Earthenware from P3, AKB-15	119	Tab.4.18	Weight of Unearthed Materials from AKB-15	123
Tab.4.5	Observation Sheet of Earthenware from P7, AKB-15	120	Tab.4.19	AKB-15 List of Contexts	124
Tab.4.6	Observation Sheet of Earthenware from D1, AKB-15	121	Tab.5.1	List of Unearthed Materials from AKB-19	131
Tab.4.7	Observation Sheet of Earthenware from Tr, AKB-15	121	Tab.5.2	Observation Sheet of Earthenware from AKB-19	131
Tab.4.8	Observation Sheet of Eave-end Tiles from AKB-15	121	Tab.5.3	Observation Sheet of Metal Products from AKB-19	131
Tab.4.9	Observation Sheet of Concave Tiles from AKB-15	121	Tab.5.4	Weight of Unearthed Materials from AKB-19	131
Tab.4.10	Observation Sheet of Convex Tiles from AKB-15	122	Tab.5.5	AKB-19 List of Contexts	131
Tab.4.11	Observation Sheet of Ridge Tiles from AKB-15	122	Tab.7.1	Taxonomic Distribution of Animal Remains	133
Tab.4.12	Observation Sheet of Inscribed Tiles from AKB-15	122	Tab.8.1	Ak-Beshim Archaeological Site Plant Remains Collection Location	137
Tab.4.13	Observation Sheet of Greyish Burnt Bricks from AKB-15	122	Tab.9.1	Result list of Radiocarbon Dating and Wood Species Identification	138
Tab.4.14	Observation Sheet of Metal Products from AKB-15	122	Tab.App.2.1	Measured Samples and the Treatment	150
Tab.4.15	Observation Sheet of Clay Objects from AKB-15	122	Tab.App.2.2	Results of Radiocarbon Dating and Calendar Year Calibration	152
Tab.4.16	Observation Sheet of Bone/Coral Artifacts from AKB-15	123	Tab.App.3.1	Measured Samples and the Treatment	155
			Tab.App.3.2	Results of Radiocarbon Dating and Calendar Year Calibration	156

1. The Background to the Investigation (Fig.1.1-1.5)

Ak-Beshim archaeological site, situated in the north of the Kyrgyz Republic, is a remain of a trading-city which existed in the 5th to 11th centuries. The site is one of the most famous archaeological sites in Central Asia and was listed in 2014 as a UNESCO World Heritage site as one of the cultural properties of the “Silk Roads: The Routes Network of Chang’an-Tianshan Corridor”.

The site is located about 45km east of Bishkek, the capital of the Kyrgyz Republic. This expansive site is situated on the east of the Chuy Valley which extends from east to west centering around the Chuy River, near Tokmok. Xuanzang wrote that he had visited this place in 630 A.D. in “Great Tang Records on the Western Regions”, and the Tang Dynasty constructed “Suyab Garrison” here as a militant stronghold to advance into the west in the latter half of the 7th century. It is said that the poet Li Po was born in this place in the 8th century.

In this archaeological site, investigations were implemented since 1939 by Russian and Kirghiz archaeologists. In 2011, the Tokyo National Research Institute for Cultural Properties started an investigation, and the joint research with the National Academy of Sciences of the Kyrgyz Republic and the Teikyo University Silk Road Scientific Investigation Team has been implemented since 2016.

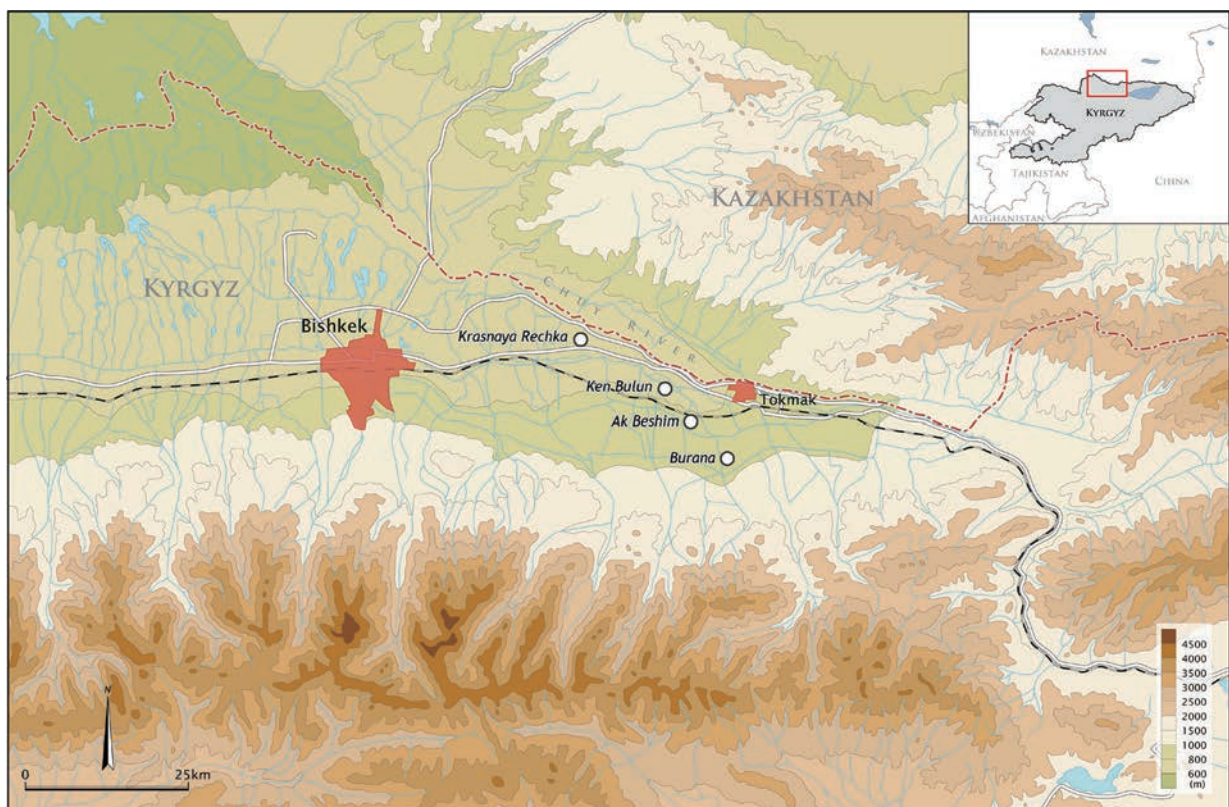


Fig.1.1 Location of Ak-Beshim Archaeological Site and the Surrounding Sites



Fig.1.2 Full View of Ak-Beshim Archaeological Site (2019)



0 100 200 300 400 500 600 700 800 900 1000 m

Fig.1.3 Aerial Photograph of Ak-Beshim Archaeological Site (1966)

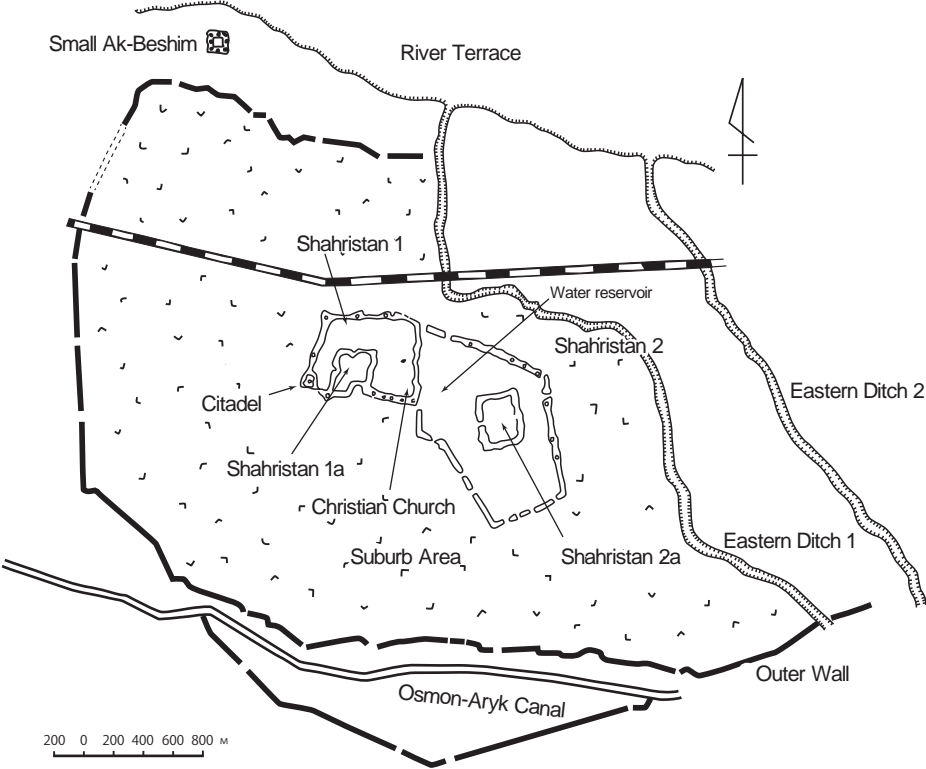


Fig.1.4 General view of Ak-Beshim Archaeological Site and Districts



Fig.1.5 Excavation Location Number of Ak-Beshim Site

2. Investigations in 2019

2.1. The First Investigation

2.1.1. Investigation Period : April 20th to May 17th, 2019

2.1.2. Investigation Participants

- Japan: Kazuya YAMAUCHI, Koichi KUSHIHARA, Seiji NAKAYAMA, Manabu UETSUKI, Chie NAKAYAMA, Hidekazu MOCHIZUKI, Osamu HIRANO (Above seven: the Research Institute of Cultural Properties, Teikyo University), Keiji IMAMURA (Teikyo University), Tomoaki MIHASHI (Graduate student, Teikyo University), Shunpei IWAI (Ryukoku University), Daisuke FUKUDA (AD-DESIGN Co., Ltd.), Mayumi KATO, Tomoko ARAKI (Volunteers)
- Kyrgyz: Bakit AMANBAEVA, Askat JUMABAEV (The National Academy of Sciences of the Kyrgyz Republic), Dosnazarov AKJOL (Student of Osh State University)
- Kazakhstan: Denis Sorokin (Archaeological expertise)

2.1.3. Investigation Schedule (For details of the investigation journal, see Addendum1.)

April 19: Departure from Japan (Participants from Japan)
 April 20: Arrival in Bishkek (Participants from Japan), moving to Tokmok
 April 21 - May 13: Excavation
 May 15: Moving to Bishkek
 May 17: Departure from Bishkek
 May 18: Arrival in Japan (Participants from Japan)

2.1.4. Investigation Items

- AKB-13: Resetting and expanding the excavation area. The investigation of the extended area of MS1 (Main Street). Confirmation of the features in the extended area. Investigation inside buildings. Reinvestigation of the vicinity of A1 and R2. Ground penetrating radar survey.
- AKB-15: Setting and the investion of Tr.12—Tr.18. Confirmation of the extent of platform and stratigraphy. Collecting of the tile fragments on the upper face of the tile belt and further close examination of the tile belt. Investigation of Pit1-7. Ground penetrating radar survey.
- AKB-19: Splitting of the south wall of the First Shahrstan.
- Washing, sorting, weighing of unearthed artifacts.
- Washing, sorting, and investigation of plant remains.
- Washing, sorting, and investigation of animal remains.

2.1.5. Investigation Methods

- Ground penetrating radar survey: We conducted a ground penetrating survey to make a reference for setting trenches and excavating in AKB-15. In the vicinities of AKB-13 and AKB-15, we also conducted ground penetrating radar surveys in several locations for future investigations.
- Excavation: We investigated the trenches of AKB-15 and AKB-19, confirmed the features, and observed stratigraphy of the cross-section. In AKB-13, we investigated layer by layer and recorded the results before excavating lower layer.
- Collection of artifacts: The context method was adopted for collecting artifacts. The sequential numbers of points, remains and layers were entered on context sheets, and artifacts were collected in groups. Also, the XYZ data of the unearthing position of important artifacts were recorded using a light-wave survey equipment whenever necessary.
- Diagramming: In order to make an overall plane figure of the excavation area, we created an

orthography based on the aerial data by drone shootings and pole shootings at the site. For the points to make necessary references for cross-section drawings, we used a light-wave survey equipment. We also used an archeological site investigation software (“Iko-kun”) and took in the data necessary for the diagramming by connecting the light-wave survey equipment to the PC.

- Investigation of unearthed artifacts: We washed, classified and weighed the artifacts on site in parallel with the excavation. The artifacts were classified as earthenware, glazed ware, bones, tiles (eave-end tile, concave tile, convex tile, ridge tile), bricks, stone tools, wall clay, etc., then they were weighed in grams and stored in vinyl or net bags.
- Plant remains: As for the seeds, we conducted sampling, washing and extraction of them at each point of remains in the first investigation. In Pit3 of AKB-15, washing of a huge amount of sampled soil was impossible in the duration of first investigation. Therefore, Askat JUMABAEV (The National Academy of Sciences of the Kyrgyz Republic) continued the work at Bishkek. He brought the samples extracted to Japan in June 2019, which were identified in the Research Institute of Cultural Properties.

2.2. The Second Investigation

2.2.1. Investigation Period : August 7th - September 6th, 2019

2.2.2. Investigation Participants

- Japan: Kazuya YAMAUCHI, Manabu UETSUKI, Koichi KUSHIHARA, Chie NAKAYAMA, Osamu HIRANO, Maiko MIURA, Masako IWASAKI. Mayuki SANO (Above: The Research Institute of Cultural Properties, Teikyo University), Yohei KAKINUMA (Teikyo University),
- Kyrgyz: Bakit AMANBAEVA (The National Academy of Sciences of the Kyrgyz Republic), Dosnazarov AKJOL (Student of Osh State University), Moldokmatov Aibek (Student of Kyrgyz National University), Dzhumabekova Aisulu, Kubanychbekoba Mahabat (Students of Kyrgyz-Turkish Manas University)

2.2.3. Investigation Schedule (For details of investigation journal, see Addendum1.1.)

August 6: Departure from Japan (Participants from Japan).

August 7 - 11: Classification, measurement and jointing of artifacts.

August 12 - 30: Actual measurement.

August 30 - September 3: Photographing and making rubbed copy of artifacts.

September 6: Departure from Bishkek.

September 7: Arrival in Japan (Participants from Japan).

2.2.4. Investigation Items

- Classification, weighing and jointing of unearthed artifacts. Selection and annotation for the report of artifacts.
- Drawing, photographing, and making rubbed copy of unearthed artifacts. Creation of observation table.
- Analysis of animal remains.
- Conservation of unearthed artifacts (jointing, filling with artificial wood, removal of rust from metal products, etc.)
- Workshop concerning conservation of artifacts and drawing (technical instruction for local students).

2.2.5. Investigation Methods

- Earthenware: Classification and weighing were not completed in the first investigation, so we worked on them prior to the second investigation. Then we worked on jointing, selected and extracted the materials to be reported, and conducted drawing and photographing. The annotation was only for the drawn artifacts, which were stored in the order of drawing. Artifacts not drawn were also stored in bags, and all of them were stored in the warehouse in the premise of the National Academy of Sciences.
- Animal remains: Jointing, classification, identification and measurement were conducted, but some analyses were not completed and are planned to be resumed.

3. Investigation of AKB-13

3.1. Location of Excavation Area (Fig.1.5)

AKB-13 is an excavation area near the south gate of the First Shahrstan. The area is around the center in the east-west direction, and around the south in the north-south direction. It also situates on the south of the intersection of the streets running east-west and north-south.

3.2. Objective of Investigation

- To expand the excavation area to make the area aligned to the direction of streets and buildings.
- To reexamine the features investigated so far to clarify the function of each of the features, and study the city structure based on the results.
- To extend the street area in the north-south direction, and utilize the features for tourism, as an open-air museum.

3.3. General Description of Investigation

AKB-13 (Fig.3.1), which has been excavated since 2016, is a 20×30m area configured by the Tokyo National Research Institute for Cultural Properties. The grids were set up in azimuth direction, so the excavation area and the grids were not in the same direction with the detected main street and the buildings. Therefore, we decided to reset and enlarge the excavation area to turn to west by 20° according to the direction of the features detected, for the whole area investigated so far to be included in the excavation area.

As a result, the dimensions of the excavation area became 35m (east-west) ×29m (north-south) =1015m², about two times larger than the original area. In the investigation of the extended areas (northwest: A, northeast: B, southeast: C, southwest: D), we removed the overall surface soil of about 30cm, and confirmed the distribution of the features of the detected cultural layers of the top layer, and partially investigated the wall and the floor of the west side of the room R2-2.

At the main street (MS1), we dug down to the south and north extended areas to the slag road surface, and investigated the structures of the pits on both sides of the main street and the brick work. In the former excavation area, we dug down the slag road surface of the main street which was already exposed for one layer partially to examine the lower layer. We also reexamined an alley A1(R1's lower layer) crossing with MS1 to confirm its intersection condition.

3.4. Extended Area

3.4.1. Northwest Extended Area (Fig.3.1)

On the north of A1(R1), small scale of slag accumulation was confirmed right under the surface soil. We detected some walls of the rooms extending in the east-west and the north-south directions, but we only confirmed the features on the confirmation surface, and we could not clearly comprehend the configuration of the buildings nor the structure of the rooms.

At the extended part of MS1, we investigated three road surfaces from the top surface, and fully examined the extension of slag of the fourth surface.

On the east of MS1, we confirmed a wall of sun-dried bricks and a part of a step, seemingly a sufa, but the building structure was unclear.

3.4.2. Northeast Extended Area (Fig.3.1)

We removed the surface soil of about 30cm, but could not fully examine the area to confirm features.

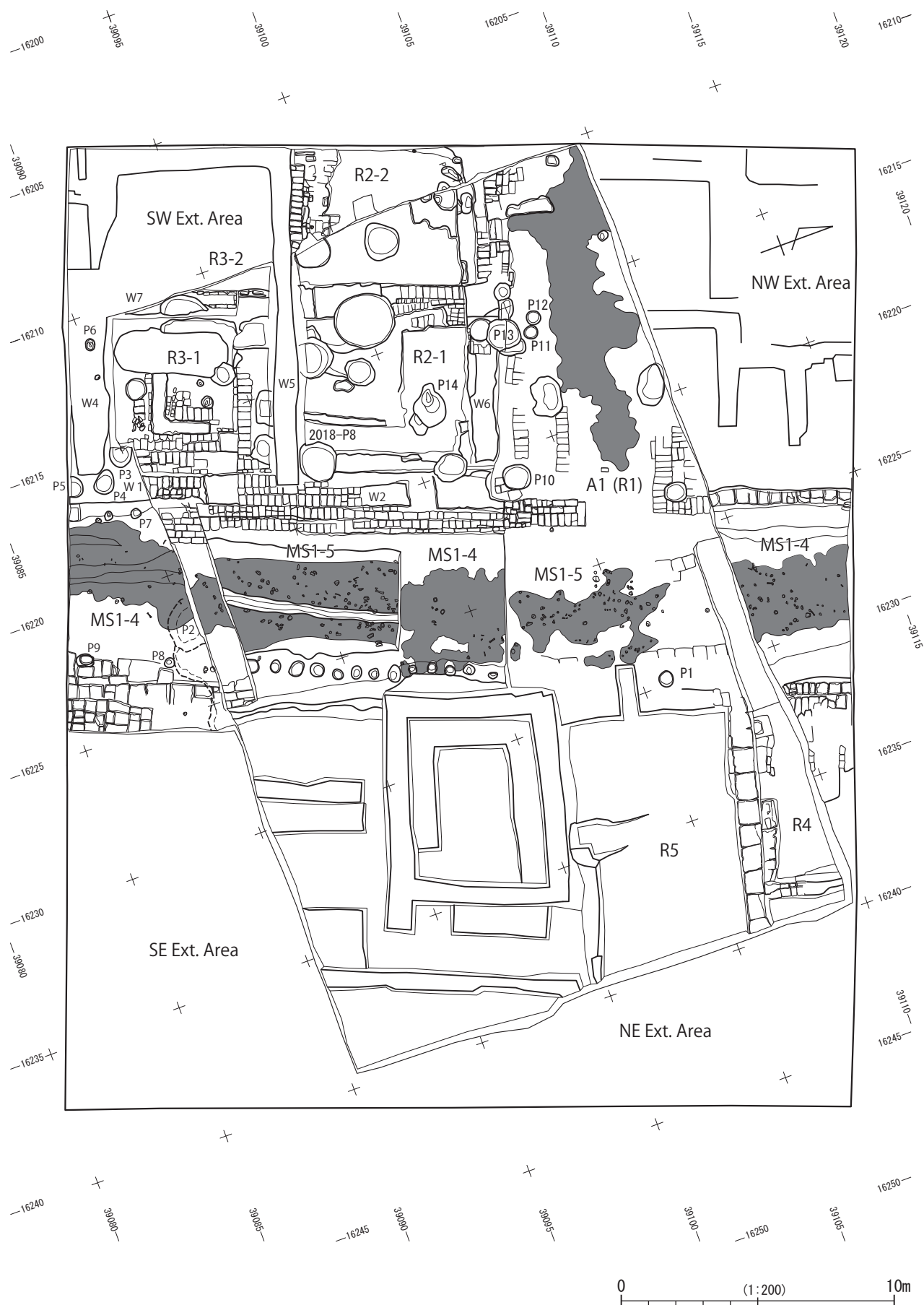


Fig.3.1 Full View of AKB-13

3.4.3. Southeast Extended Area (Fig.3.1)

At the extended area of MS1, we investigated from the upper layer (MS1-1) to the slag face of the fourth road surface (MS1-4). Its east side was not horizontal, and slightly rising towards the south-east end. It is presumed that in this vicinity a wall of a building on the north of the extended area linearly extends further south, but in this investigation, it could not be confirmed.

Directly under the surface soil near the southeast corner of the extended area, a cooking pot was unearthed in a upright position. It was presumed that a building associated with this pot had existed, but we could not confirm a room structure.

3.4.4. Southwest Extended Area (Fig.3.1)

On the west of R2-2, the floor surface of the top layer was confirmed at the depth of minus 80cm

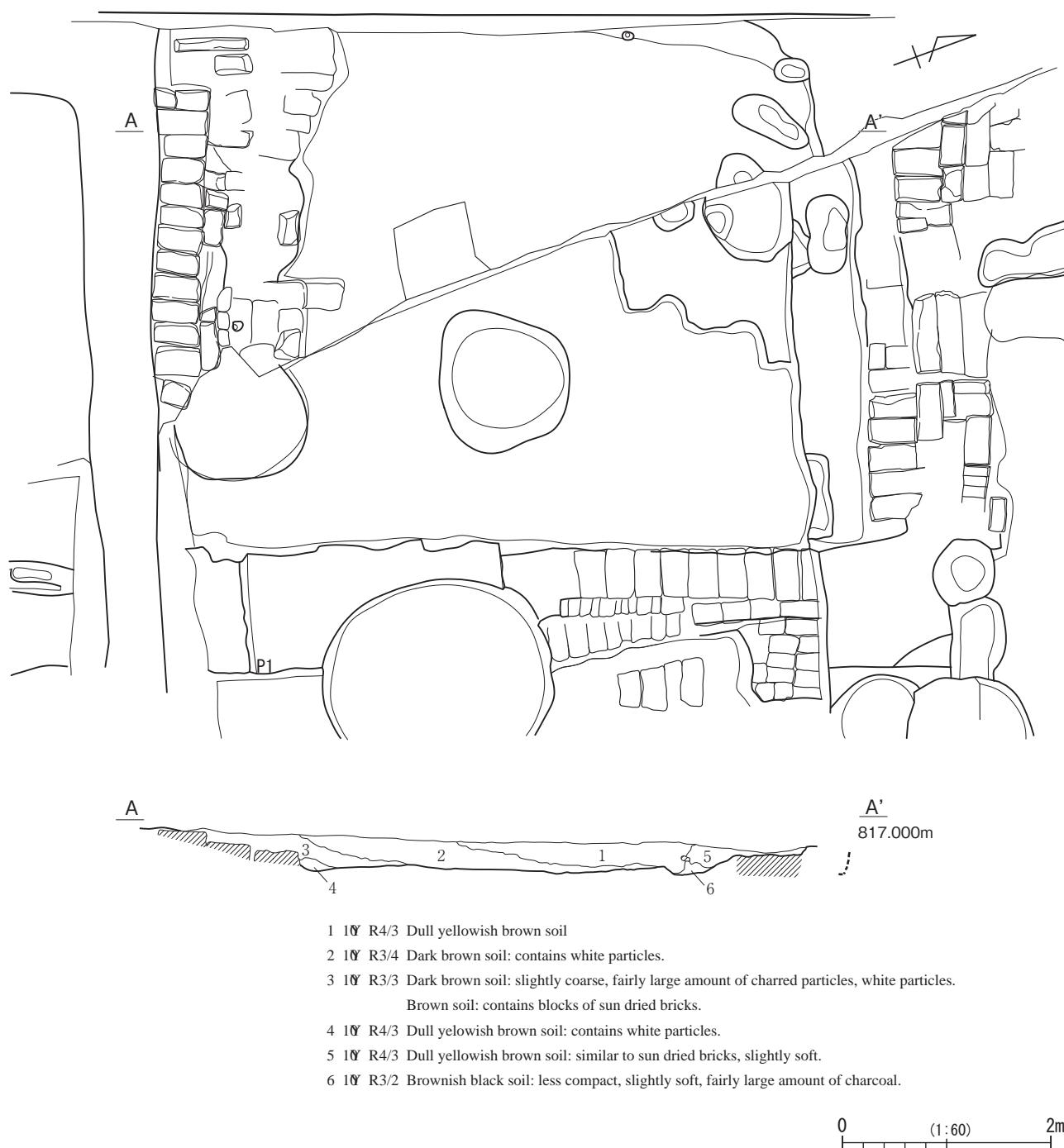


Fig.3.2 AKB-13 R2-2

under the ground surface, along with the west, south and the north walls of a room. (Fig.3.1)

From the west of R3-2 continued a wall, W5, shared by R2. W5 goes along with the western wall of the excavation area, turns at right angle towards the south, reaching W4. The area surrounded by these walls is the room of the first surface of R3-2. There was another section confirmed on its south across W4. The dimensions of the section of the first surface of R3-2 are 4.5m (east-west)×5.5m (north-south), and the wall W7 on the east exists as a partition of the room. The floor surface is rather hard, and is covered by chalk-like white grains. However, we did not fully examine the floor surface in this investigation.

3.4.5. Artifacts from Extended area (Fig.3.44-47, 49, 50 : 13-19-001-016)

001 - 009 are the artifacts from the northwest extended area, 010, 011 are from the northeast extended area, 012 - 014 are from the southeast extended area, and 015, 016 are the artifacts from the southwest extended area, excluding those from MS1, R (room), and P (pit).

001 - 004, 011, 013, and 014 - 016 are earthenware, 012 is glazed ware, 005 is stone tool, 006, 007 are bronze products, 008 is a spindle wheel converted from earthenware fragment, 009 is a greyish burnt brick.

The vessel types of the earthenware are: cup (015), pot with handle (001), plate with legs (002), pot (003, 011), lid (010, 014, 018), cooking pot (013), narrow necked jar (016). Among these, 002 is presumed to have been a candleholder from the trace of three legs. 013 is a cooking pot unearthed in an upright position right under the surface soil of the southeast extended area. This has four handles on the body, right under the rim.

006 is a bronze product of unknown usage, with patterns only on the surface. 007 may be a small-sized round stud or a button.

3.5. R2-2

3.5.1. R2-2 Extended Area (Fig.3.2)

At the southwest extended area, we investigated right under the topsoil, the first layer, for the western part of R2-2. The wall on the north (W6) and the wall on the south (W5) are shared by the adjacent rooms, R1 and R3, respectively. The distance from wall to wall, or the room's width in the north-south direction, measures 6m. On its west, a part of a wall surface is seen around the excavation area's western wall surface, almost aligning the western wall and the walls of the rooms. This makes the walls' width in the east-west direction 5m. There are bench-like features (sufa) along the south wall lined with sun-dried bricks. The brick alignment is slightly disturbed but can be measured as 1.5m wide, 30cm high, and more than 3.2m long. On the face of the bricks, copper coins (Fig. 3.47-021) and pieces of earthenware (Fig. 3.46-020) were unearthed. The earthenware assemblage here may be the newest group of artifacts from this excavation area. The floor is almost even and firm, and covered with chalk-like thin white layer. In the lower layer of the first surface, according to the wall cross-section of the former excavation area, more than three surfaces were observed until reaching the floor of the fourth surface, which had been excavated in the previous year.

3.5.2. Artifacts from R2-2 (Fig.3.46, 47: 13-19-017-022)

017, 018, and 020 are pieces of earthenware. 019 is a container made of stone. 021 is a bronze coin. 022 is an iron product. 021 is a coin with a square hole at the center and is a coin of the Turgish Khanate. The inscription reads "divine", "Turgish", "Khan", and "copper coin".

3.6. Pits

3.6.1. P1 (Fig.3.3)

P1 situates to the north of MS1 and on the side strip on the east. The diameter is 55cm, and the depth is 14cm. This pit is on the extended line of the serial pits detected on the southern side, and is similar to those pits in the form and the size, which suggests that this pit was a part of them. The confirmation surface is on the side strip of MS1-4 (the 4th road surface), or MS1-5 (the 5th road surface).

3.6.2. P2 (Fig. 3.1)

A large oval pit detected at MS1-1, the top layer of the southern extended area of MS1. The detected point is near the center of the top layer of the road surface. The diameter is about 2m, and the depth is about 40cm.

3.6.2.1. Artifacts from P2 (Fig.3.47 : 13-19-023)

023 is a glass bead unearthed from P2.

3.6.3. P3 (Fig.3.3)

A pit dug into the sun-dried-brick wall W1, the eastern wall of R3-1. Its west side has already been lost due to the investigation of R3-1. It is in a long oval shape in the east-west direction, and the shorter diameter in the north-south direction is 80cm. The depth is 80cm.

3.6.4. P4 (Fig. 3.1)

A pit situated on W1 on the west of MS1, of an oval shape of 50cm (north-south)×60cm (east-west). The depth is as shallow as 20cm. This is 30cm away from P5 on its south.

3.6.5. P5 (Fig.3.3)

A round pit on the south wall of the excavation area, with a diameter of 70cm, and a depth of 25cm. The pit's bottom surface is immediately above the wall (W1).

3.6.6. P6 (Fig. 3.1)

A 30cm×40cm round pit above the wall W4, near the southwest end of the excavation area.

3.6.7. P7 (Fig.3.3)

A round pit on the west of MS1, on the border of W1 and the road surface, with a diameter of 40cm, and a depth of 15cm.

3.6.8. P8 (Fig.3.3)

A round pit on the east of MS1, on the side strip of the road surface, with a diameter of 35cm and a depth of 13cm. It is on the extension line of serial pits on the east of MS1, and dug from the surface corresponding to the face of MS1-2 to 3.

3.6.9. P9 (Fig.3.3)

A pit dug into a sun-dried-brick wall on the east of MS1 with an oval-shaped plane of 60cm×45cm and 8cm deep.

3.6.9.1. Artifacts from P9 (Fig.3.47 : 13-19-024)

024 is a bronze coin with a square hole at the center, and the letters on it, although damaged, are the same as those on 021.

3.6.10. P10 (Fig.3.5)

A cylindrical pit situated on the southeast corner of R1-1, with a diameter of 1m and a depth of 1m. It intersects with the fifth road surface (MS1-5). This was confirmed by a full examination of A1 surface. This pit seems to have been bored from one layer above.

3.6.11. P11 (Fig.3.4)

The eastern one of two round pits lined on the north of P13 of R1, of 50cm in diameter and 26cm deep.

3.6.12. P12 (Fig.3.4)

A round pit on the west of P11, with a diameter of 50cm and a depth of 27cm, almost the same size and form as those of P11.

3.6.13. P13 (Fig.3.4)

A pit constructed as if digging into the south wall of R1(W6). This pit had been investigated in 2018, but by reexamination, it became clear that the pit was deeper, and was re-investigated. It is a deep cylindrical borehole with a diameter of 1.1m and a depth of over 2.6m. However, by inserting a pin pole into it, it was found to be deeper by 1m or more, so it was presumed to be a pit around 4m deep. Only half of the pit was excavated and the bottom was not confirmed.

From P13, a lot of artifacts such as jug styled earthenware or animal bones had been unearthed. By this fact and its stratigraphy, it was presumed to be a toilet. The ground surface at time of construction is assumed to be the floor of the upper layer's second surface. This pit is dug half into the wall of W6, and whether it was an indoor facility, and the time relation with the room needs to be investigated further.

P13 has similar size and form to those of a vertical pit investigated in 2018 on the southeast end of R2-1, (Pit 2018-8), and the position in the room and the construction status digging into the wall are very much alike.

3.6.13.1. Artifacts from P13 (Fig.3.47: 13-19-025-031)

Potteries, stone tools, animal bones, etc. were unearthed from the vicinity of the middle layer, but the amount was small.

025 - 027 are pieces of earthenware, 028 - 030 are polished stones, and 031 is a bronze product. 025 is a lipped dish, having a pourer on one side. 027 is a jug with narrow neck with a spout on one side, and comb-drawn wave pattern between the parallel lines on the shoulder.

3.6.14. P14 (Fig.3.5)

P14, situated at the center to the north of the floor surface of R2-1, is an oval pit with a diameter of 1.2 to 1.5m and 80cm deep, which had been confirmed on the floor surface of the 3rd face in the 2018 excavation.

In the reinvestigation of this pit, we newly unearthed a lower half of a pot in an upright position. By observing the cross-section of the pit, we found a hardened face right above this upper-half-lost pot, suggesting a high possibility that this pottery is related to the floor surface of the lower layer (the 5th face). Therefore, we decided to investigate this pit the following year, and refilled the pit after making a cross-section drawing.

3.6.14.1. Artifacts of P14 (Fig.3.47 : 13-19-032, 033)

032, 033 are pieces of earthenware.

3.7. Main Street (MS1)

3.7.1. Extended Area on the South of MS1 (Fig.3.6)

As a result of the 2019 investigation, it was revealed that there were three road faces in the upper layer of the road face paved with slag in the southern extended area of MS1. Combined with the road faces confirmed in the 2018 investigation, six roads faces were confirmed so far. Hereafter, we refer to each road face from the upper layer to the lower layer as the first to the sixth road surface (MS1-1 - 6) (The names MS1-1 - 3 used in the reports until last year will be replaced by the names MS1-4 - 6).

The newly confirmed three road faces in the upper layer are extremely hard and have no features such as stone mosaics. On the first road face of the top layer, a relatively large pit exists.

On the other hand, the three road surfaces in the lower layer (MS1-4 - 6) are rigidly constructed by paving slag and gravel on the road surface, according to the results of the investigations so far. In the extended area, we dug down to MS1-4 and confirmed a road face paved with a lot of slag in the width of 2 to 3m. Streaky ditches to drain rain water and sewage from the road center have not been confirmed here, but the road sinks in around the center. Both sides of the road on the east and west raise like walkways, leading to the walls of buildings.

By observing the cross-section of the southern wall of the excavation area, a clay-block-like part of 75cm wide and 65cm high was confirmed on the slightly east side of the center of the road. These are not sun-dried bricks, but extremely dried and hard clay blocks. Also, it was confirmed that the sun-dried bricks were paved or laid in a shape of steps, especially on the eastern shoulder, as if corresponding to MS1-4. The bricks are little larger than normal size: of about 60cm×35cm oblong, or 40cm square, and may have been used for the side strips.

A large amount of slag paved on MS1-4 are estimated to have been used as the material of the roadbed to tighten the road surface. Therefore it is presumable that the slag face was not exposed when the road was in use, and was covered with thin layer of soil.

On the road strip on the east of MS1, a row of pits had been confirmed in the 2018 investigation. This time, two more pits were discovered in the southern extended area (P8, P9), laid out on the extended line of the pits formerly found. They were detected on different faces, but can be regarded as the pits of the same function. In addition, two more small pits were discovered in the western road strip (P7, etc.), which suggests that similar rows of pits existed on the west and east sides.

3.7.2. Extended area on the North of MS1 (Fig.3.7)

At the northern extended area of MS1, likewise as the southern extended area, three road surfaces (MS1-1 to 3) were confirmed in the upper layer of a slag-paved road surface (MS1-4). The three road surfaces in the upper layer are almost flat. In the same manner as the southern extended area of MS1, they are not paved with gravel nor slag. They are mildly raised towards the road shoulders with a soil layer as the road face.

On the other hand, MS1-4 (road surface paved with slag) is flat but paved with slag in the width of about 3m. In the 2016 investigation, a very shallow ditch had been confirmed at the center of MS1-4, but in the extended areas on the north and the south investigated this time, center ditch was not confirmed. The road shoulders on the east and the west are like sideways high and narrow, making the walls of rather large sun-dried bricks, 40cm×20cm oblong or 45cm square. They are a part of the street-side walls of the buildings (rooms) on both sides of MS1, and at the same time, the zoning of the main street.

At the cross-section surface of the trench set up along the north wall of the former excavation area, the gravel-paved MS1-5 (the 5th road surface) and MS1-6 (the 6th road surface) were confirmed right under the slag-paved road surface. MS1-6 is gravel paved road surface, and without a

center ditch in the same manner as MS1-6 confirmed on the south side. A row of pits in the eastern road shoulder of MS1 were not clearly confirmed in this northern extended area.

3.7.3. Intersection of MS1-5 (the 5th Road Surface) and A1 Road Surface (Fig. 3.1, 3.8)

By removing the slag pavement of MS1-4 intersecting with A1, and the R1's eastern wall facing the main street, we were able to confirm a crossover where MS1-5 intersected with the road remains in the east-west direction (A1) in the lower layer of R1. In other words, it was clarified that R1 had not existed when MS1-5 had been in use, and that A1 had intersected with MS1.

At R1 on the northwest of MS1, a stone-paved road surface (A1) had been detected right under the third surface in the former investigations, and a gravel-paved road surface had been confirmed right under the eastern wall near the main street. This time, it was clarified that this gravel-paved road surface continued to the gravel paved MS1-5 detected in the lower layer of the slag-paved MS1-4. Therefore, it is presumable that this point had been a crossroad, or a T-intersection.

The MS1-5 near the intersection is lined with rather large sun-dried bricks on its shoulders, making the both sides walkways (side strips). The width of the road face is about 3.5m, and the width of the walkways is about 1.5m.

A1 is a road confirmed in the 2018 investigation. It extends from the intersection to the west, and the width in the north-south direction seems over 6m, although this cannot be confirmed because the road shoulder on the north is out of the excavation area. On both sides are sidewalks lined with sun-dried bricks, and the road surface in between is paved with gravel. The width of the road is about 3m, and the sidewalks are about 2m wide. A gravel-paved surface is 2 - 3m wide and has a step or a ditch in the center. It was confirmed that a gravel pavement leads to the northern doorway of R2-2.

3.7.4. Artifacts from MS1 (Fig.3.48 : 13-19-036-049)

047 was unearthed from MS1-1 of the southern extended area, and 048 from MS1-4. 036, 038, 039 were unearthed from the northern extended area's MS1-1, 040 from MS1-2, and 034 from MS1-3. From the MS1-4 surface of the central northern half, 035, 041, 042, 043, 045, 049 were unearthed, and 037, 046 on MS1-5.

034 - 037 are pieces of earthenware, 038 - 040 are leg parts of earthenware, 041 is a table-like disc, 042 is a polished stone, 043 is a copper product, 044 - 046 are iron products, 047 is a clay object using earthenware fragments, 048 is a bone artifact (horse 2nd phalange bone with polished surface), and 049 is a greyish burnt brick. Among these, 049 is a rare material with an impression of conifer leaf maybe of spruce, and it must have reflected the vegetation and the environment of the time of the production.

3.8. Wall between R4 and R5 (Fig.3.9)

We reinvestigated a row of pasha bricks situated between R4 and R5, extending in the east-west direction. This had been detected in 2018, but we newly confirmed a block-type structure in this investigation. Its length is more than 9m, and the thickness is 80cm, and when observed from the side, it is built on a layer containing a lot of trash and ash.

The wall is built by closely laying pasha bricks, cuboids of 0.8 - 1m×0.8m×0.4 - 0.7m. Unlike the structure of laid-up small sun-dried bricks, this is a line of large blocks, and is obviously different from the sun-dried-brick structure detected so far. In the first Shahrstan, these blocks had been confirmed in the Christian church remains investigated before, and it seems that there had been a tendency to use pasha bricks in the platform of public structures.

3.9. Summary of AKB-13

3.9.1. Extension of Excavation Area

We extended the excavation area according to the direction of the main street and the building cluster on its sides, and dug down wholly for about 30cm. As a result, the dimensions of the excavation area became 35m in east-west, and 29m in north-south.

Judging from the earthenware unearthed from the extended part, the occupation layer remaining right under the present ground surface can be thought to have belonged to the early 11th century.

3.9.2. Road Surface of the Main Street

As for the extended part of the main street, we dug down the south and north side, and revealed the road surface paved with slag (MS1-4). By excavating the north-south extended part, we confirmed three road surfaces (MS1-1 - 3) extremely hardened between the road surface of slag and the present ground surface. Therefore, the road surface paved with slag confirmed already became MS1-4. Underneath this road surface, two more road surfaces (MS1-5, 6) had been confirmed, so the road surfaces confirmed so far are six in total.

On the north of the center of the main street, we removed a part of slag paved on the surface, investigated MS1-5 and confirmed the structure of the sideways (side strips) and the intersecting situation of MS1-5 and the road surface of A1 (passage) in the east-west direction. We collected soil samples from each horizon of the road surface for analysis of plant remains, and conducted water sieving, but could not gain much information at this location.

3.9.3. Investigation of Pits

We conducted reexamination of P13 of R1 and P14 of R2, and confirmed that P13 was a very deep vertical boring.

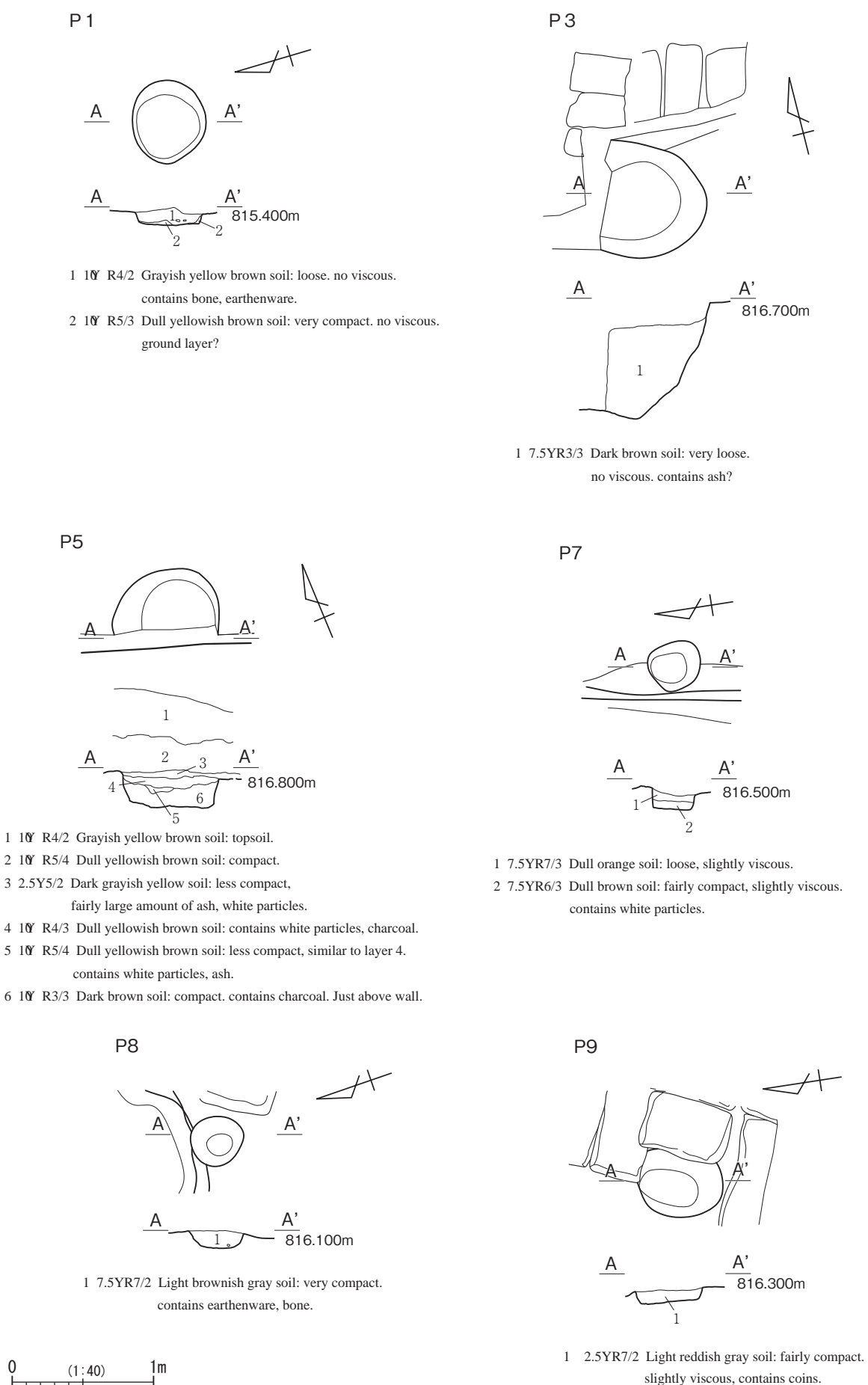


Fig.3.3 AKB-13 P1, 3, 5, 7-9

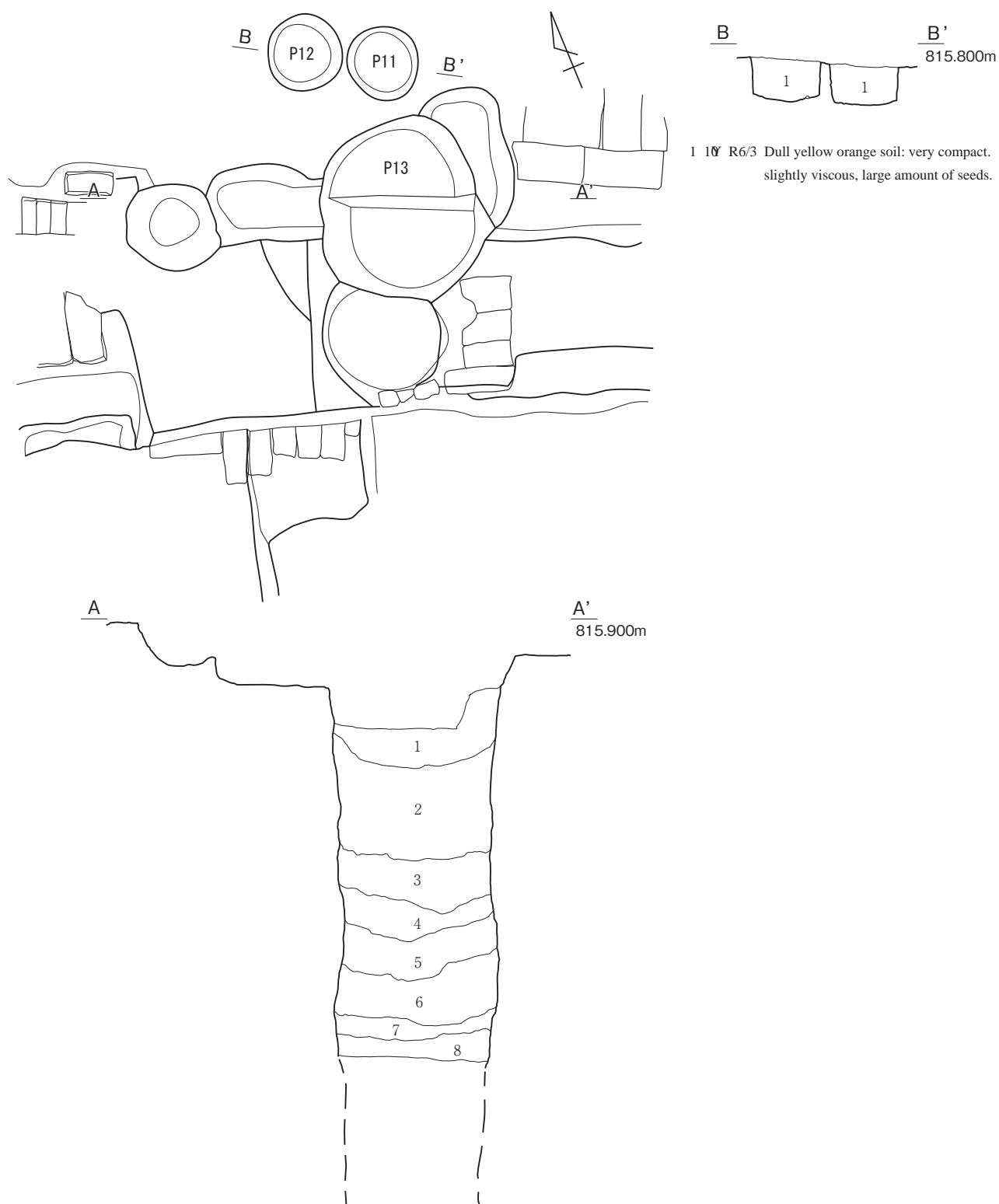
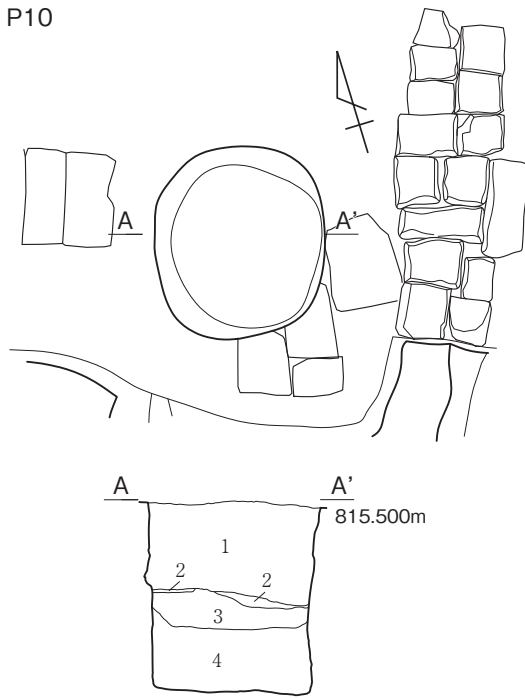


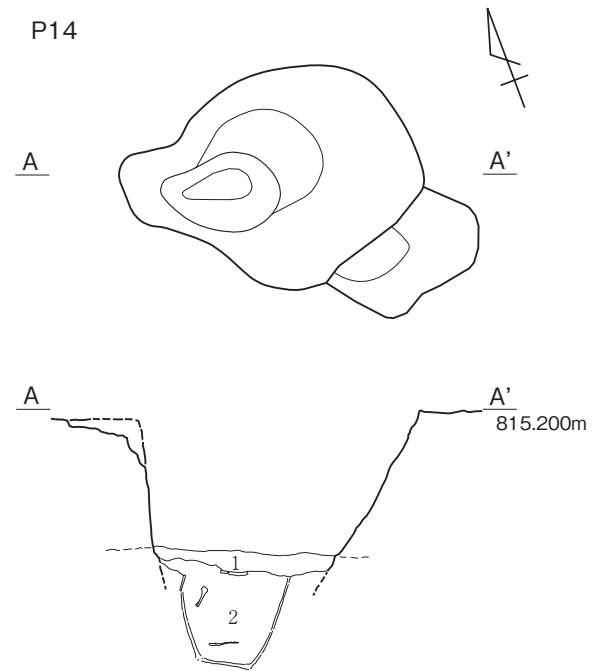
Fig.3.4 AKB-13 P11~13

P10



- 1 7.5YR4/4 Brown soil: loose, no viscous.
contains white particles.
- 2 7.5YR4/6 Brown soil: fairly compact.
no viscous, contains grayish brown particles.
- 3 7.5YR6/4 Dull orange soil: loose, no viscous.
- 4 10Y R5/3 Dull yellowish brown soil: loose, no viscous, contains ash.

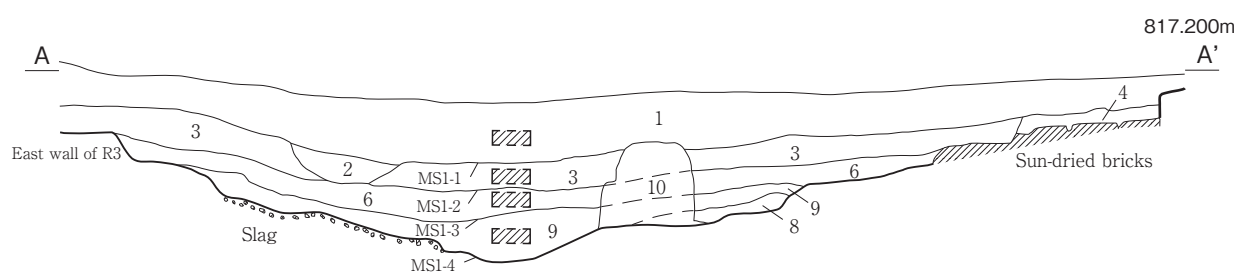
P14



- 1 10Y R4/4 Brown soil: hard, compact.
contains fragments of earthenware.
- 2 10Y R4/2 Grayish yellow brown soil: loose.
contains fragments of earthenware.
fairly large amount of charcoal. contains white particles.

0 (1:40) 1m

Fig.3.5 AKB-13 P10, 14



- 1 10Y R4/2 Grayish yellow brown soil: topsoil, soft.
- 2 10Y R4/3 Dull yellowish brown soil: contains burnt soil, soft.
- 3 10Y R5/3 Dull yellowish brown soil: the top is the road surface of MS1-1.
- 4 7.5YR5/4 Dull brown soil: a surface of sun-dried bricks right underneath.
- 5 10Y R4/2 Grayish yellow brown soil: contains small gravel.
- 6 10Y R4/2 Grayish yellow brown soil: contains white laminar soil layer in the top surface.
the top is the road surface of MS1-2.
- 7 10Y R5/2 Grayish yellow brown soil: large amount of charcoal.
- 8 10Y R6/2 Grayish yellow brown soil
- 9 10Y R5/2 Grayish yellow brown soil: the top is the road surface of MS1-3.
- 10 10Y R7/2 Dull yellow orange soil: very hard, contains clay blocks.

Soil samples

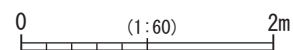


Fig.3.6 AKB-13 The South Extended Area of MS1

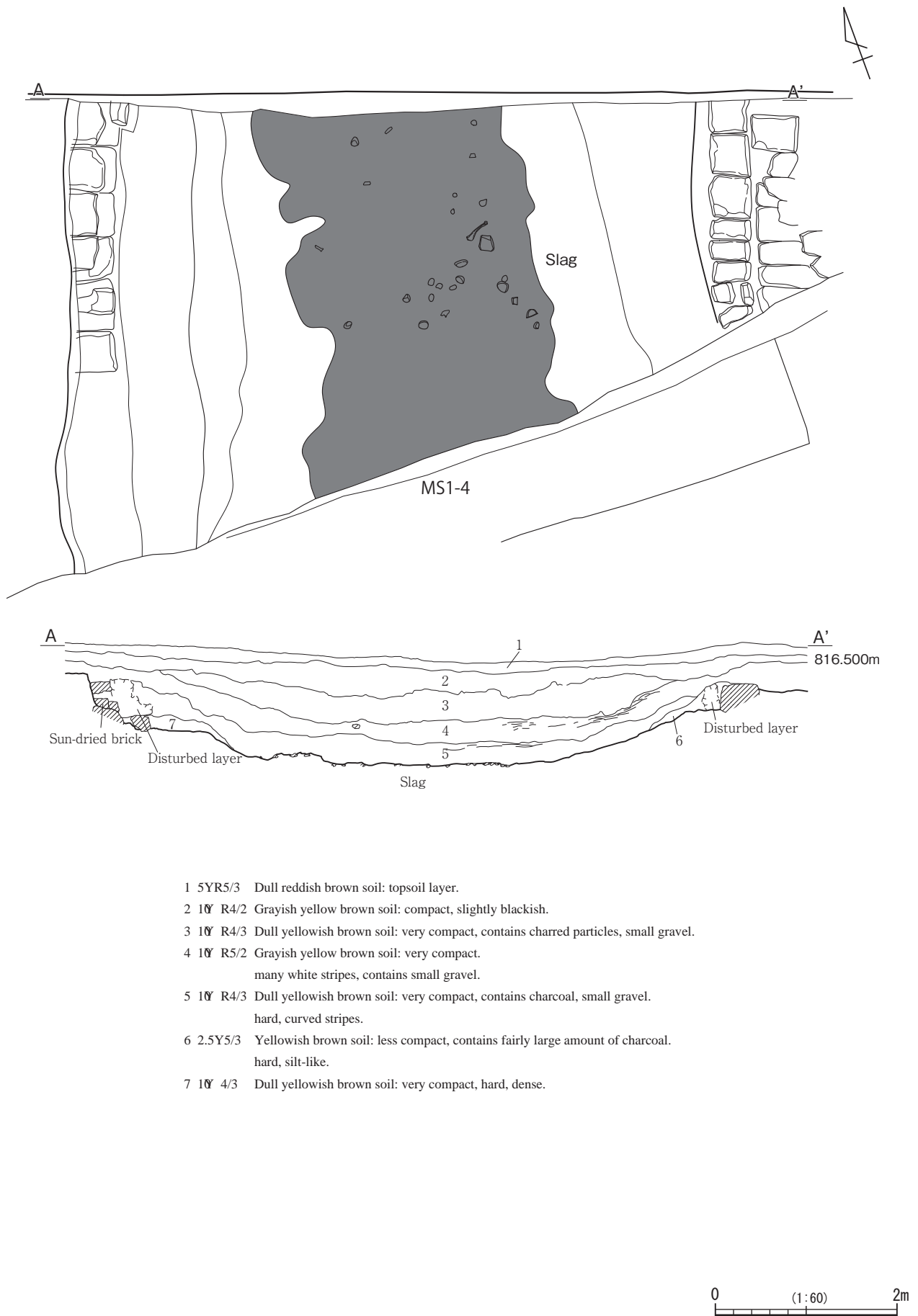


Fig.3.7 AKB-13 The North Extended Area of MS1

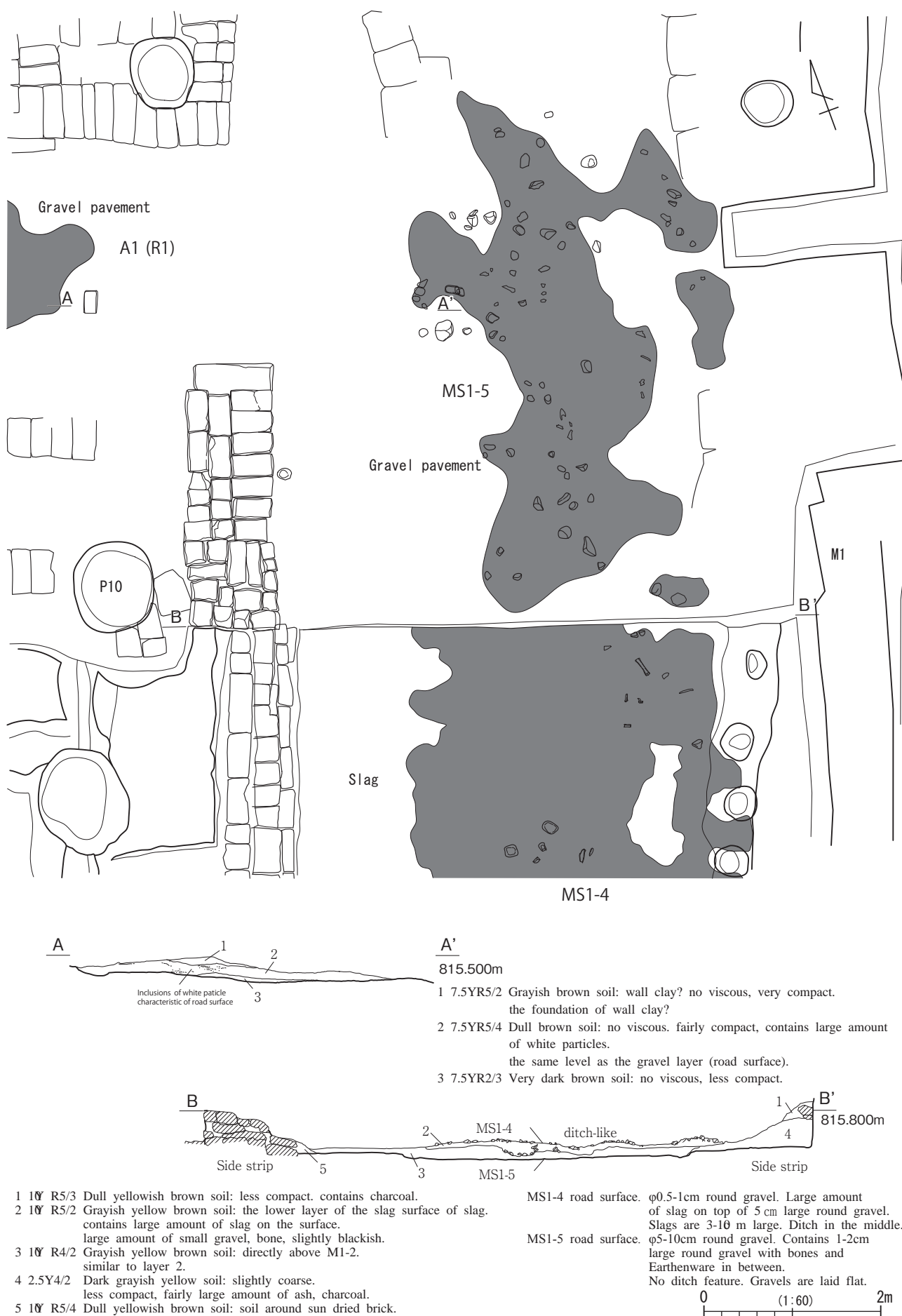


Fig.3.8 AKB-13 MS1

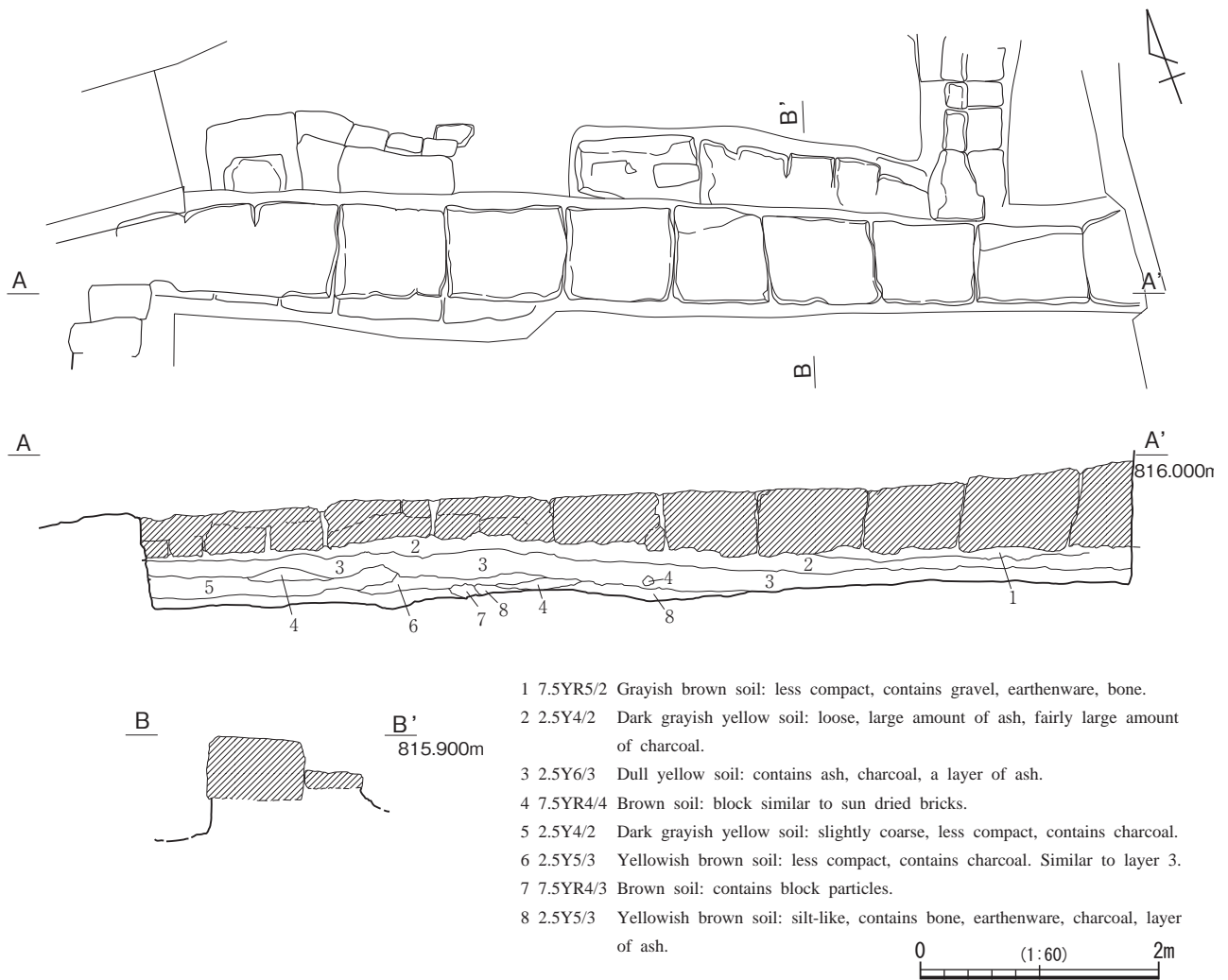


Fig.3.9 AKB-13 Wall Between R4 and R5



Fig.3.10 AKB-13 (from North)



Fig.3.11 AKB-13 (from above)



Fig.3.12 Fifth Road Surface of MS1



Fig.3.13 North of MS1



Fig.3.14 Gravel-Paved Road of A1



Fig.3.15 Wall between R1 and MS1



Fig.3.16 R2-2



Fig.3.17 Earthenware Unearthed at R2-2



Fig.3.18 Row of Pahsa Bricks between R4 and R5(1)



Fig.3.19 Row of Pahsa Bricks between R4 and R5(2)



Fig.3.20 The Fourth Surface of MS1



Fig.3.21 MS1



Fig.3.22 Row of Bricks on the North of MS1



Fig.3.23 The North of MS1



Fig.3.24 Workers on the North Extended Area of MS1



Fig.3.25 The East of the South Extended Area of MS1



Fig.3.26 The South Extended Area of MS1(1)



Fig.3.27 The South Extended Area of MS1(2)



Fig.3.28 Earthen Pot Discovered in the Extended Area on the Southeast End



Fig.3.29 P1



Fig.3.30 P3



Fig.3.31 P4



Fig.3.32 P5



Fig.3.33 P7



Fig.3.34 P10



Fig.3.35 The Vicinity of P10



Fig.3.36 P11,12



Fig.3.37 The Vicinity of P13



Fig.3.38 P13 in Half-Excavated



Fig.3.39 P14



Fig.3.40 The Vicinity of P14



Fig.3.41 Horse Crania Bone Discovered in the East of MS1



Fig.3.42 Workers on the South Extended Area of MS1



Fig.3.43 Washing and sorting materials at the hotel

Tab.3.1 List of Unearthed Materials from AKB-13

No.	fig	Feature	Classification	Type	Rim ϕ /Bottom ϕ /Height/Length/Width/Depth	Weight(g)
13-19-001	3.44	NW Ext. Area	Earthenware	Pot with handle	14/-/-	
13-19-002	3.44	NW Ext. Area	Earthenware	Plate with three legs	10.6/-/-	
13-19-003	3.44	NW Ext. Area	Earthenware	Pot	8.3/-/-	
13-19-004	3.44	NW Ext. Area	Earthenware		(10.9)/-/-	
13-19-005	3.44	NW Ext. Area	Stone tool	Hammer stone?		
13-19-006	3.44	NW Ext. Area	Copper	Part of an ornament?	4.3/-/0.5~0.6	24.7
13-19-007	3.44	NW Ext. Area	Copper	Stud?	1.4/-/-	1.8
13-19-008	3.44	NW Ext. Area	Clay object	Pierced disc	2.8/2.6/0.7	6.6
13-19-009	3.44	NW Ext. Area	Clay object	Greyish burnt brick		
13-19-010	3.45	NE Ext. Area	Earthenware	Lid	(29.4)/-/-	2.1
13-19-011	3.45	NE Ext. Area	Earthenware	Large pot	43/-/-	5.4
13-19-012	3.45	SE Ext. Area	Glazed ware	Plate	35.9/-/-	
13-19-013	3.45	SE Ext. Area	Earthenware	Cooking pot	33.6/-/-	
13-19-014	3.45	SE Ext. Area	Earthenware	Lid	-/13.0/-	
13-19-015	3.46	SW Ext. Area	Earthenware	Cup	(31.3)/-/-	
13-19-016	3.46	SW Ext. Area	Earthenware	Narrow-necked jar		
13-19-017	3.46	SW Ext. Area	Earthenware	Jar with handle	(23)/-/-	
13-19-018	3.46	SW Ext. Area	Earthenware	Lid	18.4/-/-	
13-19-019	3.46	SW Ext. Area	Stone	Stone bowl		
13-19-020	3.46	SW Ext. Area	Earthenware		5.9/-/-	
13-19-021	3.47	SW Ext. Area	Copper	Coin	2.5/-/-	5.5
13-19-022	3.47	SW Ext. Area	Iron	Unknown	4.7/-/-	30
13-19-023	3.47	P2	Glass	Glass bead	1.2	1.1
13-19-024	3.47	P2	Copper	Coin	2.4/-/-	3.1
13-19-025	3.47	P3	Earthenware	Lipped dish	55.2/-/-	
13-19-026	3.47	P3	Earthenware		8.1/-/-	
13-19-027	3.47	P3	Earthenware	Jug	11.5/5.6/3.8	
13-19-028	3.47	P3	Stone tool	Grinding stone		
13-19-029	3.47	P3	Stone tool	Grinding stone		
13-19-030	3.47	P3	Stone tool	Grinding stone		
13-19-031	3.47	P3	Copper	Unknown	1.3/-/-	1.5
13-19-032	3.47	P14	Earthenware	Dish		
13-19-033	3.47	P14	Earthenware		8.4/4.3/-	
13-19-034	3.48	MS1	Earthenware		10.9/(6.4)/-	
13-19-035	3.48	MS1	Earthenware			
13-19-036	3.48	MS1	Earthenware	Dish		
13-19-037	3.48	MS1	Earthenware			
13-19-038	3.48	MS1	Earthenware	Leg		
13-19-039	3.48	MS1	Earthenware	Leg	4.0/-/-	
13-19-040	3.48	MS1	Earthenware	Leg		
13-19-041	3.48	MS1	Earthenware	Disc	-(7.7)/-	
13-19-042	3.48	MS1	Stone tool	Grinding stone		
13-19-043	3.48	MS1	Copper	Pin?	11.2/-/0.15~0.6	4.5
13-19-044	3.48	MS1	Iron	Small knife	(9.4)/-/0.35	11.9
13-19-045	3.48	MS1	Iron	Small knife	(8.3)/-/0.3~0.6	14.9
13-19-046	3.48	MS1	Iron	Unknown	(4.8)/-/0.35	7.9
13-19-047	3.48	MS1	Clay object	Pierced disc	3.1/-/0.9	8.4
13-19-048	3.48	MS1	Animal bone	Unknown	4.3/4.3/2.5	34.9
13-19-049	3.48	MS1	Earthenware	Greyish burnt brick		

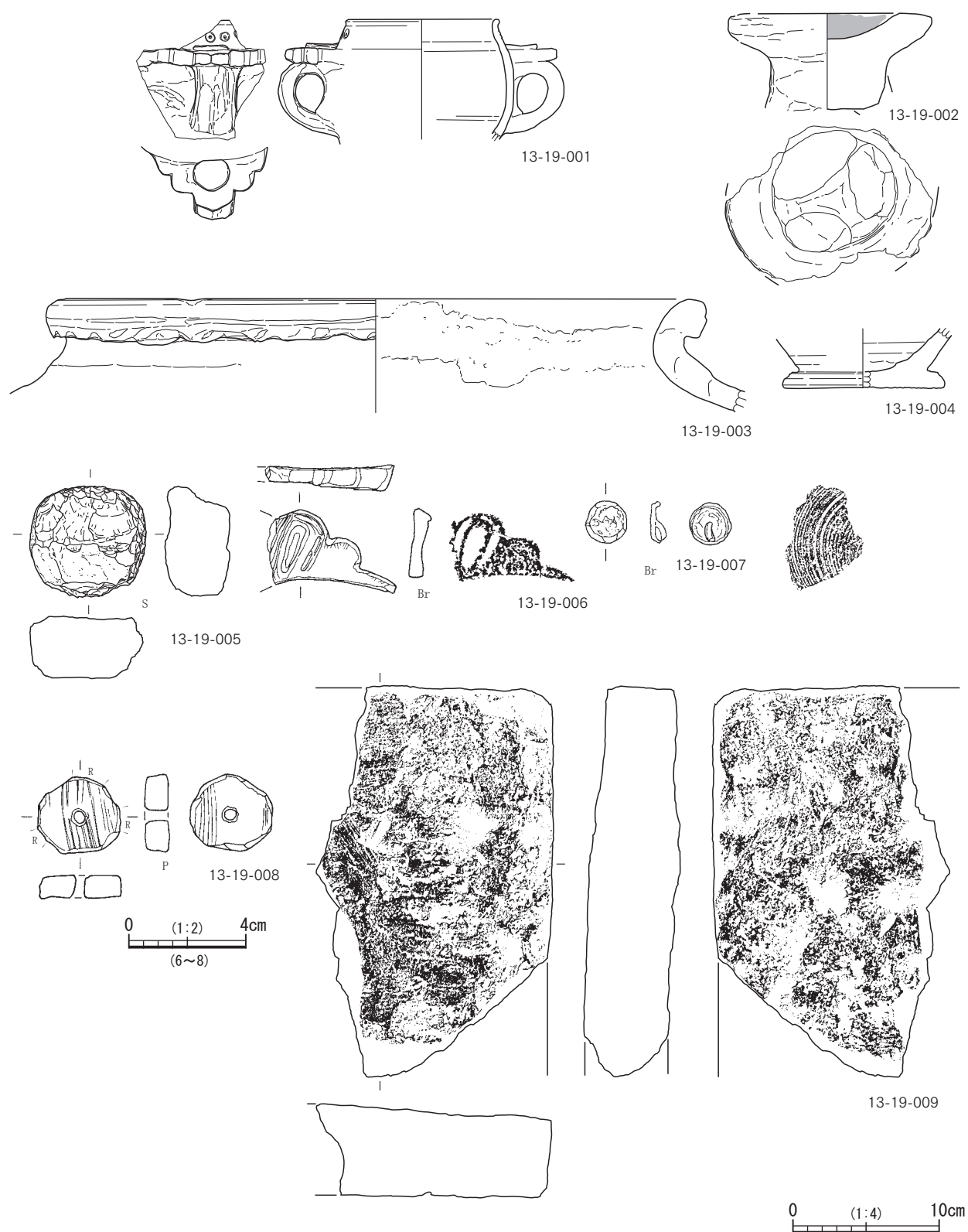


Fig.3.44 Artifacts from AKB-13(1) North East Extended Area (13-19-001 - 009)

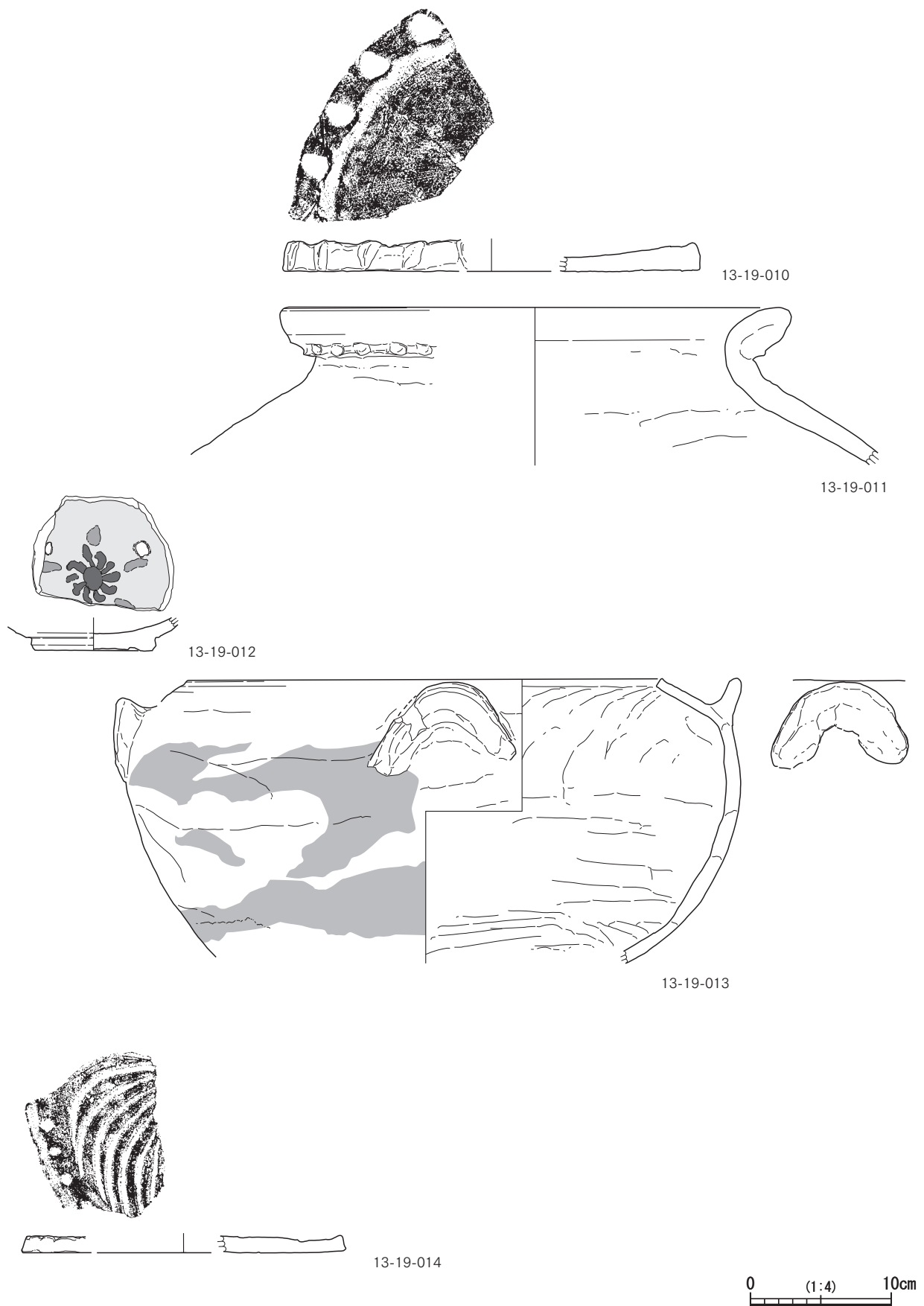


Fig.3.45 Artifacts from AKB-13(2) North East Extended Area (13-19-010 - 011)
South East Extended Area (13-19-012 - 014)

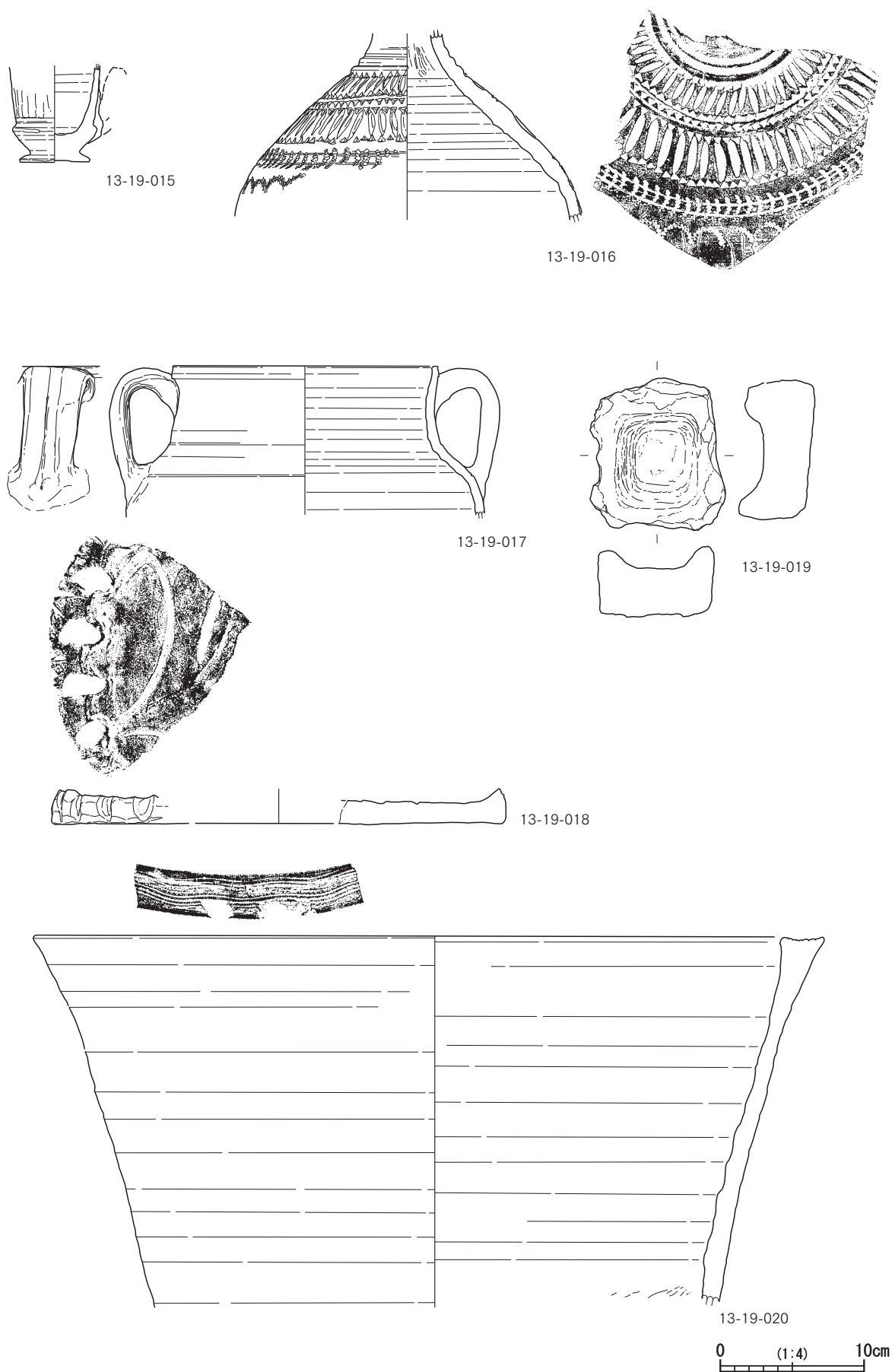


Fig.3.46 Artifacts from AKB-13(3) South West Extended Area (13-19-015, 016), R2-2(13-19-017 - 020)

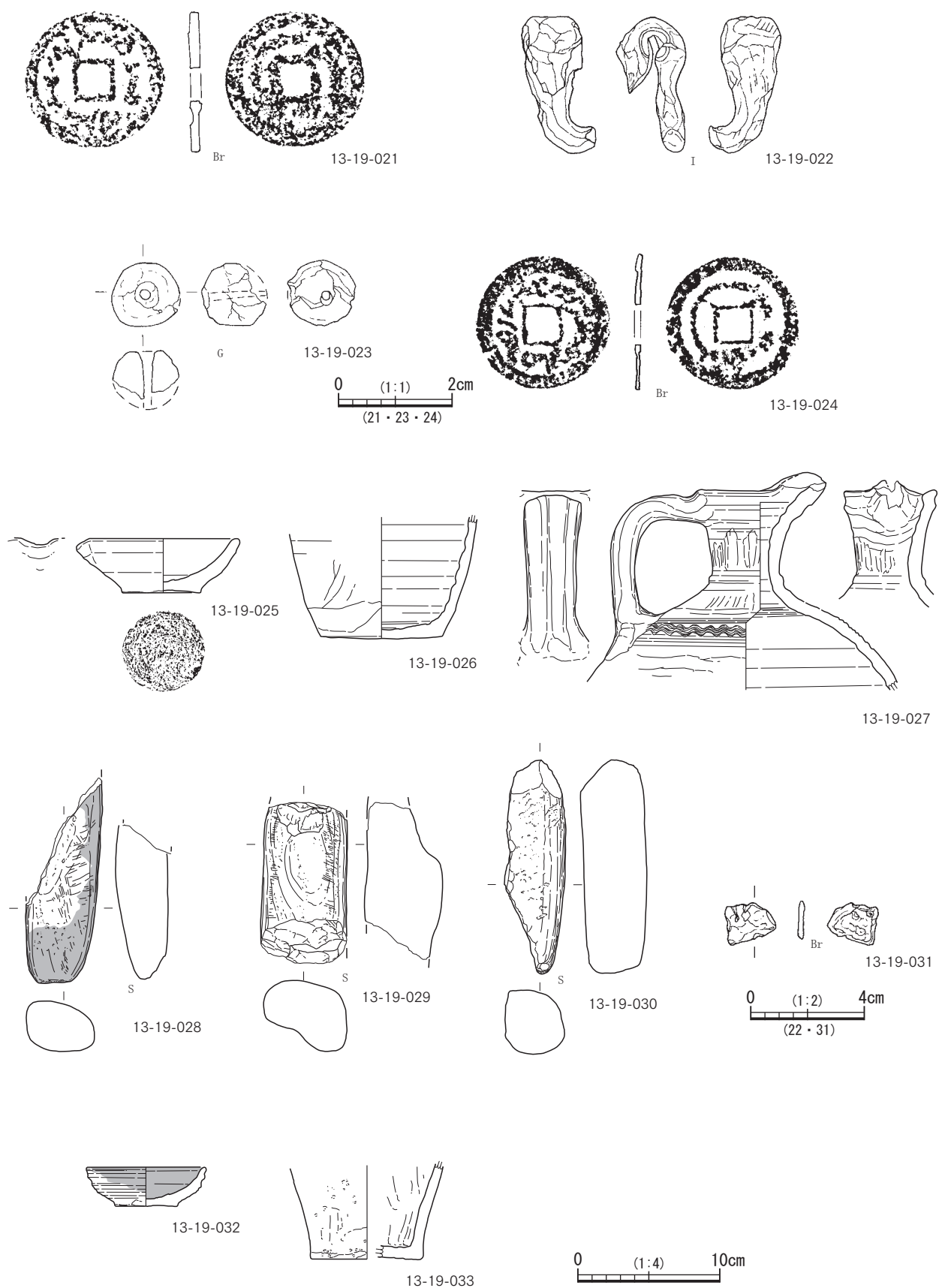


Fig.3.47 Artifacts from AKB-13(4) South West Extended Area (13-19-021, 022)
P2(13-19-023, 024), P3(13-19-025 - 031), P4(13-19-032, 033)

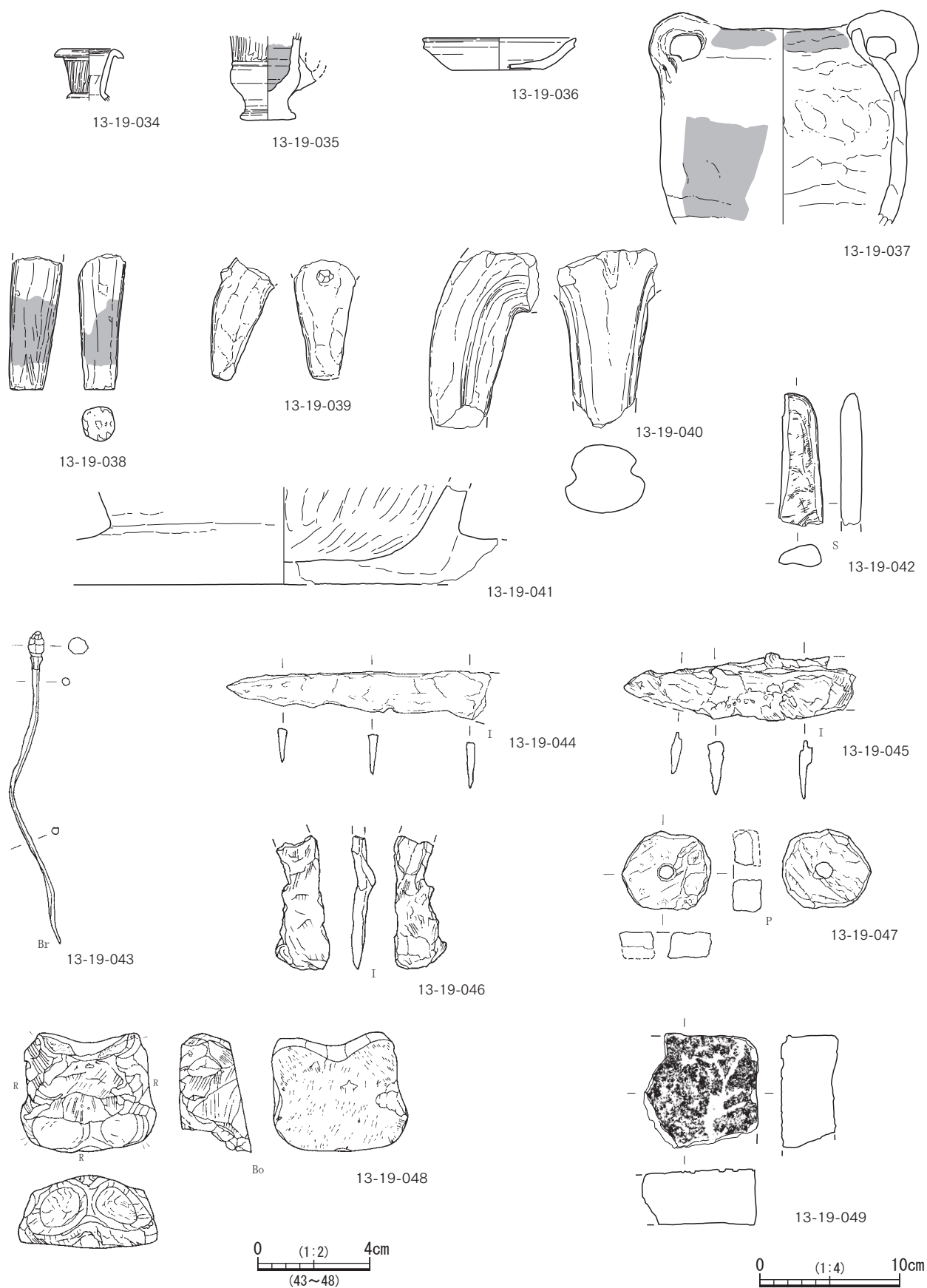


Fig.3.48 Artifacts from AKB-13(5) MS1(13-19-034 - 049)



Fig.3.49 Artifacts from AKB-13(1) North West Extended Area (13-19-001 - 009)
North East Extended Area (13-19-010, 011), South East Extended Area (13-19-012 - 014)



Fig.3.50 Artifacts from AKB-13(2) South West Extended Area (13-19-015 - 22)
P2(13-19-23, 24), P3(13-19-25 - 27)



Fig.3.51 Artifacts from AKB-13(3) P3(13-19-028 - 031)
P14(13-19-032, 033), MS1(13-19-034 - 049)

Tab.3.2 Observation Sheet of Earthenware from AKB-13

Fig.	No.	Context	Feature	Classification	Vessel type	Rim ϕ /Bottom ϕ /Height	Fabric	Color (Exterior)	Color (Interior)	Notes
3.44	13-19-001	52	NW Ext. Area	Earthenware	Pot with handle	14/-/-	Very small amount of sand(includes black particles), carefully selected clay	Pale orange 5YR8/3	Orange 5YR7/6	White coating on the exterior?
3.44	002	31	NW Ext. Area	Earthenware	Plate with three legs	10.6/-/-	Includes white particles, black particles (quartz), round gravel. Slightly dense	Light reddish gray 2.5YR7/1	Light reddish gray 2.5YR7/1	Interior: blackish around the fracture (charred residue?). Exterior: partially black.
3.44	003	52+17	NW Ext. Area	Earthenware	Pot	8.3/-/-	Small amount of white particles. Dense.	Light yellow orange 7.5YR8/3	Reddish brown 10Y5/4	Fracture is orange
3.44	004	92	NW Ext. Area	Earthenware		(10.9)/-/-	Fairly large amount of brown particles, black particles. Dense.	Light brownish gray 7.5YR7/2	Light brownish gray 5YR7/3	
3.45	010	92	NE Ext. Area	Earthenware	Lid	(29.4)/-/-	Includes black particles. Dense (small amount of sand).	Light brownish gray 7.5YR7/2	Light brownish gray 7.5YR7/2	Exterior and Interior: heavy accretion of white substance
3.45	011	16	NE Ext. Area	Earthenware	Large pot	43/-/-	Includes bright reddish brown 2.5YR5/8 sand.	Grayish red 2.5YR6/2	Orange 2.5YR6/6	Accretion of white substance on entire surface
3.45	012	38	SE Ext. Area	Stoneware	Plate	35.9/-/-				Interior: glaze. Bottom: white slip
3.45	013	37	SE Ext. Area	Earthenware	Cooking pot	33.6/-/-	Fairly large amount of white particles (feldspar). Slightly coarse. Fairly large amount of sand.	Bright reddish brown 2.5YR5/6, soot	Orange 2.5YR6/6	Smoothed horizontally
3.45	014	35	SE Ext. Area	Earthenware	Lid	-/13.0/-	Fairly large amount of large round gravel, large amount of sand. Slightly	Grayish brown 5YR6/2	Dull reddish brown 5YR5/3	Exterior: slight change of color. Ash? Interior: sand-like soot.
3.46	015	47	SW Ext. Area	Earthenware	Cup	(31.3)/-/-	Small amount of particles (small amount of sand). Carefully selected clay.	Light brownish gray	Light brownish gray	Smoothed by wheel. Burnished. Accretion of white substance on interior and exterior.
3.46	016	47	SW Ext. Area	Earthenware	Narrow-necked jar		Almost no sand. Carefully selected clay.	Light ray 5YR8/2	Dull orange 5YR7/6	Exterior: white coating? (Fracture is orange)
3.46	017	55	R2-2	Earthenware		(23)/-/-	Small amount of sand. Includes white particles. Very dense.	Dull orange 5YR7/4	Pale reddish orange 2.5YR7/4	
3.46	018	32	"	Earthenware	Lid	18.4/-/-	Slightly coarse. Fairly large amount of black particles.	Light gray 10YR8/2	Light brownish gray 7.5YR7/2	Exterior: white coating Interior: sand-like soot
3.46	020	153	"	Earthenware		5.9/-/-	Dense. Includes white particles (small amount).	Orange 2.5YR7/6	Orange 2.5YR6/6	Exterior: slight soot, ash
3.47	025	145	P13	Earthenware	Lipped dish	55.2/-/-	Large amount of feldspar and sand. Fairly large amount of round gravel etc. Slightly coarse.	Orange 2.5Y7/8	Orange 2.5Y7/8	
3.47	026	146	"	Earthenware		8.1/-/-	Small amount of white sand. Very dense.	Dull orange 2.5YR6/4	Orange 2.5YR6/6	
3.47	027	145	"	Earthenware	Jug	11.5/5.6/3.8	Fair. Includes mica, feldspar.	Orange 5YR6/6	Orange 7.5YR6/6	White coating
3.47	032	144 + 152	P14	Earthenware	Dish		Small amount of white particles, sand.	Orange 2.5YR7/6	Orange 2.5YR7/6	Interior: entirely black (scorched). Exterior: black on the upper half (scorched). 50% remaining
3.47	033	152	"	Earthenware		8.4/4.3/-	Large amount of large feldspar. Coarse.	Black 10YR2/1 scorched	Orange 2.5YR7/6	Exterior and bottom: large amount of millet-like grains adhered
3.48	034	67	MS1	Earthenware		10.9/(6.4)/-	No sand. Carefully selected clay. Very dense.	Dull orange 5YR6/4	Dull orange 5YR6/4	
3.48	035	113	"	Earthenware			Very small amount of particles. Dense.	Dull orange 5YR6/3	Dull orange 5YR6/3	Interior: black, gray. Bottom: smoothed.
3.48	036	65	"	Earthenware	Dish		Includes black particles	Pale reddish orange 2.5YR7/4	Light reddish gray 2.5YR7/2	Bottom: thread cut or scraped.
3.48	037	64	"	Earthenware			Fairly large amount of large white particles (feldspar) etc. Slightly coarse.	Dull yellow orange 10YR7/4	Dull orange 5YR7/3	
3.48	038	65	"	Earthenware	Leg		Very large amount of black breccia	Grayish brown 7.5YR6/2		Surface: slight change in black
3.48	039	73	"	Earthenware	Leg	4.0/-/-	Fairly large amount of large sand (white & black). Slightly coarse.	Dull orange 2.5YR6/4		
3.48	040	77	"	Earthenware	Leg		Slightly coarse (fairly large amount of particles).	Light brownish gray 7.5YR7/2		
3.48	041	113	"	Earthenware	Disc	-(7.7)/-	Fairly large amount of black particles. Slightly coarse.	Light gray 5YR8/2	Light brownish gray 5YR7/1	Exterior: white coating. Interior: slight change of color by scorching. Ash? adhered. Smoothed.
3.48	049	107	"	Earthenware	Greyish burnt brick		Fairly large amount of sand. Hard. Gray (reduction).	Reddish brown(Dull orange 5YR6/3)	Dull yellow orange 10YR7/4	Exterior: impression of spruce tree branch. Interior: board-like impression

Tab.3.3 Observation Sheet of Greyish Burnt Bricks from AKB-13

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color(Front)	Color(Back)	Notes
3.44	13-19-009	56	NW Ext. Area	Clay	Greyish burnt brick	Soft		Dull orange 7.5YR7/3	Dull orange 7.5YR7/3	

Tab.3.4 Observation Sheet of Metal Objects from AKB-13

Fig.	No.	Context	Feature	Classification	Type	Wt. (g)	L/ W/ D	Notes
3.44	13-19-006	89	NW Ext. Area	Copper	A part of an ornament?	24.7	4.3/-/0.5~0.6	
3.44	007	48	NW Ext.	Copper	Stud?	1.8	1.4/-/-	
3.47	021	68	SW Ext. Area	Copper	Coin	5.5	2.5/-/-	Square-holed bronze coin
3.47	022	54	"	Iron	Unknown	30	4.7/-/-	
3.47	024	100	P9	Copper	Coin	3.1	2.4/-/-	Square-holed bronze coin
3.47	031	147	P13	Copper	Unknown	1.5	1.3/-/-	
3.48	043	104	MS1	Copper	Pin?	4.5	11.2/-/0.15~0.6	
3.48	044	53	"	Iron	Small knife	11.9	(9.4)/-/0.35	
3.48	045	114	"	Iron	Small knife	14.9	(8.3)/-/0.3~0.6	
3.48	046	105	MS1-1	Iron	Unknown	7.9	(4.8)/-/0.35	

Tab.3.5 Observation Sheet of Clay Objects from AKB-13

Fig.	No.	Context	Feature	Classification	Type	L/ W/ D	Wt.(g)	Fabric	Color(Exterior)	Color(Interior)	Notes
3.44	13-19-008	31	NW Extended Area	Clay object	Pierced disc	2.8/2.6/0.7	6.6		Dull orange 5YR7/4		Reuse of earthenware fragment. Partially plished on the side.
3.48	047	41	MS1	Clay object	Pierced disc	3.1/-/0.9	8.4	Includes white particles, phlogopite etc.	Orange 2.5YR6/6		

Tab.3.6 Observation Sheet of Bone Tools from AKB-13

Fig.	No.	Context	Feature	Classification	Type	L/ W/ D	Wt.(g)	Notes
3.47	13-19-048	70	MS1	Animal Bone	Unknown	4.3/4.3/2.5	34.9	2nd phalanx of a horse. Polished on 4 sides. One of the 4 sides forming a plane.

Tab.3.7 Observation Sheet of Stone Tools from AKB-13

Fig.	No.	Context	Feature	Classification	Type	Stone Material	Diameter/ Thickness	Fabric/Firing	Color (Exterior)	Color (Interior)	Notes
3.44	13-19-005	88	NW Extended Area	Stone	Unknown						Disc-shaped. Obsidian?
3.46	019	54	R2-2	Stone	Stone	Granite		Granite			
3.47	028	145	P13	Stone	Grinding Stone	Sandstone	28.2		Black	Black, sandstone	Exterior : black (soot). Used on all sides.
3.47	029	145	"	Stone	Grinding Stone	Sandstone			Black	Black, sandstone	Natural gravel but cross striations on the surface.
3.47	030	150	"	Stone	Grinding Stone	Sandstone					Striations
3.48	042	187	MS1	Stone	Grinding Stone	Slate				Sandstone	

Tab.3.8 Observation Sheet of Glassware from AKB-13

Fig.	No.	Context	Feature	Classification	Type	Diameter	Wt.(g)	Color	Notes
3.47	13-19-021	23	P2	Glass	Glass bead	1.2	1.1	Coppery green	

Tab.3.9 Weight of Unearthed Materials from AKB-13

Area	Feature	Earthenware	Glazed ware	Convex tile	Concave tile	Eave-end tile	Ridge tile	Greyish burnt brick	Red brick	Bone	Stone product	Metal	Slag	Wall clay	Clay object
13	MS1	138412	36	126	1418			2502	7667	62081	199	85.2	5230		
13	SW Ext.	16063	14					2271	1612	607		35.5	14		
13	SE Ext.	36111	52	53	29				2928	5550	1264				
13	NW Ext.	33147			2395			5679	1019	3700	448	26.5	67	152	
13	NE Ext.	14541		90	130				1353	585					
13	?	4661	11	168	4330			1093		88					7
13	P10	435								100					
13	P12	12													
13	P13	9106			20			195		1038	1384	54.5			
13	P14	1827								86					
13	P13-1	285								27					
13	P13-2	2489						42		587		3.1			
13	P13-3	389						194		193					
13	P13-4	106								44					
13	P13-5	133								9					
13	P13-8	43								32					
13	2017-P11	120													
13	2017-P2	56								6					
13	A1	2942								825					
13	R2-1	46								7					
13	R2-2	11347	12					345	174	2266	788		97		
13	R4-1	109								22					
13	R4-2	659								182					
13	R5	2102								1515					
Total		275141	125	437	8322	0	0	12321	14753	79550	4083	204.8	5408	152	7

Tab.3.10 AKB-13 List of Contexts

No.	Date	Area/ feature	Discription	No.	Date	Area/ feature	Discription
1	4/21	MS1-1	Fill	79	5/2	P3	SE ext.
2	4/21	MS1-2	Fill	80	5/2	P4	SE ext.
3	4/21	MS1	Both sides of the main street	81	5/2	P5	SE ext.
4	4/21	A1	A1(R1)	82	5/2	P6	SE ext.
5	4/21	MS1-3	Fill	83	5/2	SW ext.	Topsoil (south side)
6	4/21	A1	On the road surface	84	5/2	SW ext.	South of R3-1
7	4/21	MS1-2	Near frontage road of the main street	85	5/4	MS1-4 North ext.	Slag surface
8	4/21	SW ext.	West of R3	86	5/4	NW ext.	North side near MS1
9	4/21	R4-1	Re-investigation	87	5/4	NW ext.	South near MS1
10	4/21	R4-2	Re-investigation	88	5/4	NW ext.	North of R1
11	4/21	SW ext.	R2-2 West ext.	89	5/4	NW ext.	Bronze product
12	4/23	NW ext.	North of R1	90	5/4	NW ext.	North of R1, northern part
13	4/23	MS1-1	Topsoil	91	5/4	NW ext.	North of R1, western part
14	4/23	NW ext.	R4 North ext.	92	5/4	NW ext.	Northwest corner
15	4/23	NE ext.	East of R6	93	5/4	SW ext.	Around floor of the uper layer building
16	4/23	NE ext.	East of R5	94	5/4	MS1-4 North ext.	Near the west roadside
17	4/23	NE ext.	East of R4	95	5/5	MS1-4 North ext.	Near east roadside
18	4/23	MS1 east side	Road side	96	5/5	NW ext.	Near MS1
19	4/23	R2-1	Re-investigation	97	5/5	SW ext.	West of R1
20	4/23	R5	Re-investigation	98	5/5	NW ext.	West of R1
21	4/23	SE ext.	Topsoil	99	5/5	SE ext.	South of R3-1
22	4/24	P1		100	5/5	P9	Coin
23	4/24	2018-P2	Re-investigation in the pit, Glass bead	101	5/5	P8	Fill
24	4/24	SE ext.	Southeast corner	102	5/5	SE ext.	Topsoil
25	4/24	MS1 South ext.	Topsoil	103	5/5	NE ext.	Near SE ext.
26	4/24	R4-1	Re-investigation	104	5/6	MS1-5	Bronze pin
27	4/24	MS1 east side	Main street roadside east	105	5/6	MS1-5	Iron product
28	4/24	MS1	Road surface of MS1-1	106	5/6	MS1-4	Bone in slag
29	4/24	MS1-2	Re-investigation	107	5/6	MS1-4	Earthenware in slag
30	4/24	MS1-1 west side	Re-investigation	108	5/6	MS1-5	Iron product
31	4/24	NW ext.	Topsoil	109	5/6	MS1-4	Iron product
32	4/24	SW ext.	West of R2-2, topsoil	110	5/6	MS1-4	Copper-adhered slag
33	4/24	SW ext.	West of R3-2, topsoil	111	5/6	MS1-4	Glass product
34	4/24	SE ext.	South of R7	112	5/6	MS1-5	Bone
35	4/24	SE ext.	Southeast corner	113	5/6	MS1-5	Earthenware
36	4/24	R4-1	Re-investigation	114	5/6	MS1-5	Bronze product
37	4/26	SE ext.	Cooking pot in isolation	115	5/6	MS1-5	Bronze product
38	4/26	SE ext.	Southeast corner	116	5/6	MS1-6	Trench along north side
39	4/26	SE ext.	South of R7	117	5/6	MS1 North ext.	MS1-4
40	4/26	R5	Re-examination	118	5/7	MS1	Trench along north side, just above MS1-6
41	4/26	MS1 South ext.	Spindle wheel from topsoil	119	5/7	MS1	East roadside
42	4/26	MS1 pit row	Re-investigation	120	5/7	MS1	West roadside, south side of R1 east
43	4/26	MS1 South ext.	Topsoil	121	5/7	A1	A1 pavement surface
44	4/26	NE ext.	Side ditch fill	122	5/7	MS1	West roadside, north side of R1 east
45	4/27	MS1 South ext. P2	Pit from the upper layer of road surface	123	5/7	W9	Near wall foundation
46	4/27	MS1 South ext.	Upper layer	124	5/7	MS1-4	The lower layer of the slag at the center section
47	4/27	SW ext.	Upper layer	125	5/7	R5	Near pahsa row
48	4/27	NW ext.	Bronze product	126	5/7	P10	Fill
49	4/27	SW ext.	West of R2-2, topsoil	127	5/7	P11	Fill
50	4/27	MS1 east side	Horse cranium	128	5/7	P12	Fill
51	4/27	MS1 South ext.	MS1-2 fill & surface	129	5/7	MS1 North ext.	Near west roadside brick row
52	4/27	NW ext.	Topsoil	130	5/7	MS1-4	West roadside
53	4/28	MS1 South ext.	MS1-2 fill & surface	131	5/7	2018-P27	Re-investigation
54	4/28	R2-2 West ext.	The edge of the south wall	132	5/7	R1(A1)	Re-investigation of east
55	4/28	R2-2 West ext.	R2-2	133	5/7	R1(A1)	Re-investigation of west
56	4/28	NW ext.	Topsoil	134	5/10	MS1 North ext.	West brick row
57	4/29	MS1-3 South ext.	Fill & road surface	135	5/10	MS1 road side	East brick row
58	4/29	R2-2 West ext.	Near the south wall	136	5/10	MS1 road side	Near west brick row
59	4/29	R2-2 West ext.	Near the south wall	137	5/10	MS1-5	Near west
60	4/29	R2-2 West ext.	Near north wall	138	5/10	P10	Fill
61	4/29	W3 fill	W3 fill	139	5/11	P3	Fill
62	4/29	R2-2 West ext.	Near north wall	140	5/11	P4	Fill
63	4/29	MS1-3 South ext.	Slag surface	141	5/11	P5	Fill
64	4/29	MS1 South ext.	Near east brick row	142	5/11	2018-P11	Re-investigation
65	4/29	MS1 NE ext.	Road surface of MS1-1	143	5/11	2018-P2	Re-investigation
66	4/29	MS1 North ext.	MS1-2 fill & surface	144	5/11	P14	Re-investigation
67	4/29	MS1-3 South ext.	Road surface of MS1-3	145	5/11	P13	Fill
68	5/1	R2-2 West ext.	Square-holed bronze coin excavated from near the south wall	146	5/11	P13	Charcoal
69	5/1	MS1 South ext.	Slag surface near the south brick row	147	5/11	P13	Bronze product
70	5/1	MS1-4 North ext.	Slag surface	148	5/11	Inside of W2	Flue-like ditch
71	5/1	SE ext.	South of R3-1	149	5/11	Inside of W2	Near 148
72	5/1	R2-2 West ext.	Near the west wall	150	5/12	P13	Close to bottom surface
73	5/1	MS1 North ext.	MS1-1 fill & surface	151	5/12	P13	Iron product
74	5/1	MS1 North ext.	MS1-2 fill & surface	152	5/12	P14	In the fill
75	5/2	MS1 South ext.	MS1-3 slag surface	153	5/12	R2-2 West ext.	Bowl-shaped earthenware excavated from near the south wall
76	5/2	SE ext.	Ditch, topsoil	154	5/13	Outside of excavation area	Collected near tent
77	5/2	MS1 North ext.	MS1-2				
78	5/2	MS1 North ext.	MS1-3				

4. Investigation of AKB-15

4.1. Location of Excavation Area (Fig.1.5)

AKB-15 situates at the center of the Second Shahrستان in the shape of an irregular pentagon. The northern oblong section (the pivotal part) existed in the past. AKB-15 is almost in the center seen from the east-west direction, and slightly north seen from north-south direction in this oblong section.

4.2. Objective of Investigation

- To reexamine Tr. 1-Tr. 11 excavated in 2017 and 2018, to extend Tr. 5, and to clarify the range, configuration, and the structure of the features by setting up a new trench.
- To continue the excavation of well-like features detected in 2018 (P3), and clarify its function.
- To conduct ground penetrating radar survey prior to the excavation, and confirm the existence of underground features.

4.3. Summary of Investigation

We started the investigation of AKB-15 in 2017, setting up a trench in north-south direction along the axis of the pivotal part (inner wall) of the Second Shahrستان (Tr. 1 - Tr. 7). As a result, a linear tile belt was revealed at about 8° west from the north-south grid, and a tile with the Chinese character “懷” was unearthed. In the investigation in 2018, we set up new trenches (Tr. 8 - Tr. 11), and explored the existence of features and the extension of the tiles. In the process, we discovered a rain-permeable ditch made of greyish burnt bricks, a decoration of stone mosaic, the “permeable pavement with egg-like stones”, and well-like features in Tr. 5, along with various features related to a building cluster and platforms.

In the 2019 investigation, we set up more trenches in the vicinity to explore the structure of platforms and building features, and investigated well-like features and some pits. We also explored the structure and the scope of the platforms by stratigraphic observation of the cross-section of the trenches and the pits.

As a result, a configuration of three building platforms lining up on a north-south direction was assumed. At the same time, a huge amount of earthenware and animal bones belonging to the terminal 10th to mid 11th century were unearthed from P1, P3, and P7. These will be a useful collection of materials for the research of earthenware chronology of Kara-Khanid Khanate in this region, and will make good samples for the study of animal and plant resource utilization.

4.4. Trenches

4.4.1. Tr. 2, Tr.3 (Fig.4.1-Fig.4.4)

Tr. 2 and Tr. 3 are a connection of north-south trenches set up in 2017 with the dimensions of 29m in north-south and 4m in east-west. By analyzing aerophotos, the existence of a platform in the vicinity had been assumed, so we reexamined inside the trench, and confirmed the features. Then we observed and recorded the cross-section of the eastern wall of the trench, and researched some of the features.

As a result, we found P1 on the north of the trench, and unearthed a large amount of earthenware and animal bones. Ditch1 and P2 were also detected on the south of P1.

4.4.2. Tr. 4 (Fig.4.1 - Fig.4.4)

Tr. 4 is a north-south trench extending to the south side of Tr. 3, set up in 2017. The dimensions are 20m in north-south, and 4m in east-west. In 2019, we reexamined the confirmation surface in-

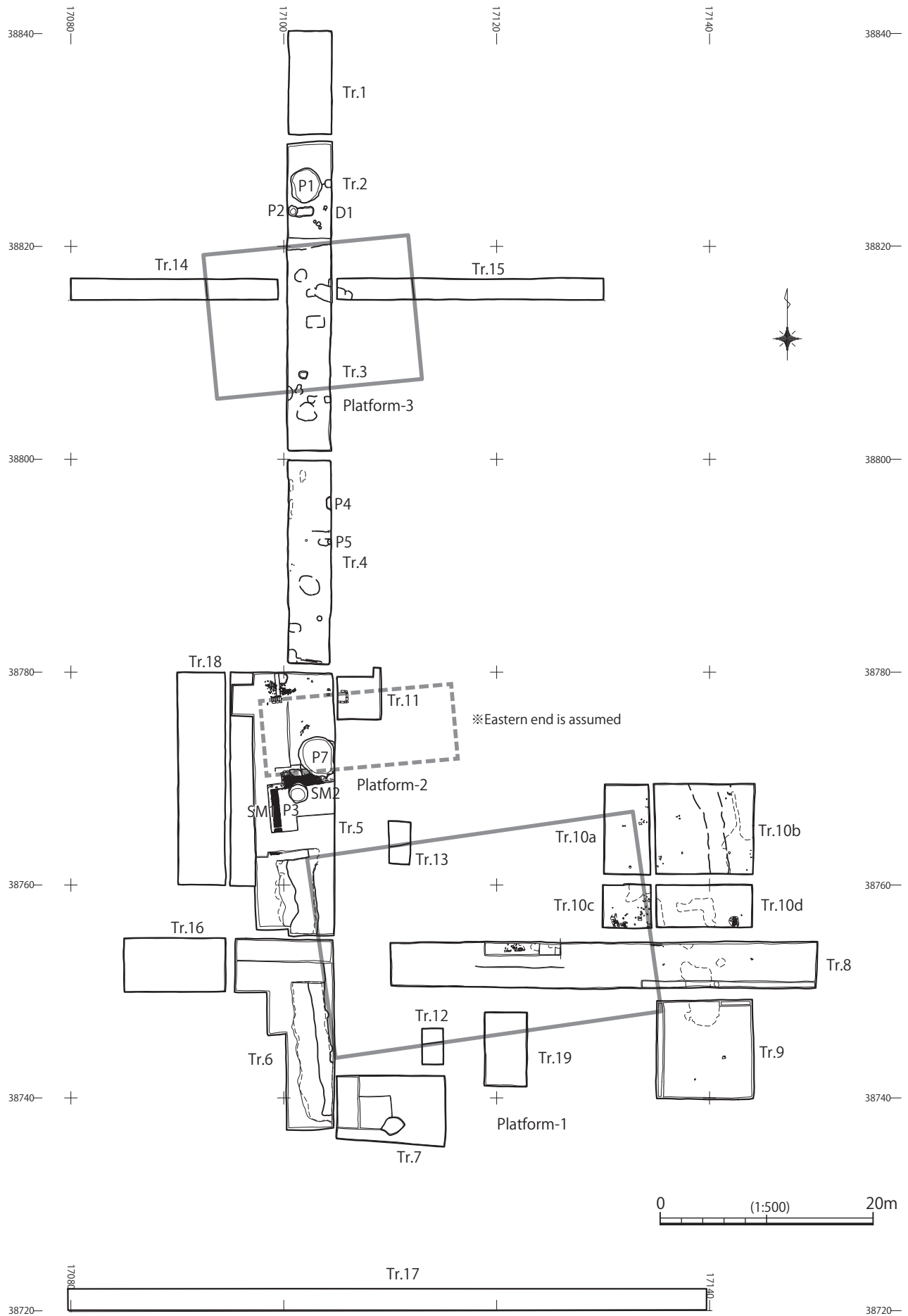


Fig.4.1 General View of AKB-15

side the trench, made a cross-section drawing of the east side of the wall of the excavation area, and investigated P 4 and P 5 which had been confirmed adjoined to the wall.

4.4.3. Tr.5 (Fig.4.1-Fig.4.4)

Tr. 5 is a north-south trench set up in 2017, which was extended in 2018 to have the dimensions of 25m in north-south, and 10m in east-west. In the 2017 investigation, a tile belt was discovered westbound in the north-south direction. In 2018, rain-permeable burnt-brick ditches and flower-patterned stone mosaic were discovered on its north, and the existence of a building was assumed between the burnt-brick ditches (Platform-2). Furthermore, a well-like feature (P3) was confirmed in the condition almost overlapped with the stone mosaic, which was investigated in 2018 for the depth of 1.1m, only one third of the total depth.

In 2019, we reexamined inside the trench, and collected the surface tiles of the exposed tile belt. We confirmed the south end of the stone mosaic, and investigated the relations of the tile belt and the stone mosaic, along with P3, and P7 on the side of the stone mosaic. Also, we observed and recorded the cross-section of the eastern wall of the trench.

4.4.4. Tr.6 (Fig.4.1-Fig.4.4)

This is a north-south trench set up in 2017, extended to west in the 2018 investigation. The dimensions are 23m in north-south, and 9m in east-west. In 2017 tile belt was confirmed in the direction of north-south, and by cross-section observation, we assumed the existence of the features of rammed-earth platform (Platform-1). In 2019, we collected roof tiles from the exposed surface of the tile belt and reexamined it.

4.4.5. Tr.8 (Fig.4.1, Fig.4.5)

This east-west trench is set up in 2018, to be perpendicular to Tr. 6, with the dimensions of 40m in east-west, 4m in north-south. In the 2018 investigation, we found tile accumulations in several places in the sub-trench set up along the wall on the north of the trench, and set up a sub-trench along the wall on the south and observed stratigraphy.

In 2019, we reexamined this trench, observed and recorded the cross-section of the southern wall face of the trench, and explored the eastern end of Platform-1.

4.4.6. Tr.12 (Fig.4.1)

Tr. 12 is a trench situated on the east of Tr. 6 and on the south of Tr. 8, with the dimensions of 3.3m in north-south and 2m in east-west. As we confirmed the southwest end of Platform-1 in the investigation of Tr. 6, we set up Tr. 12 to examine stratigraphy of the platform.

We dug down from the ground surface to a depth of 23cm. As a result, firm brownish yellow soil presumed to have been the construction soil of a platform was confirmed in the width of about 1.4m from the north end of the trench to the south.

4.4.7. Tr.13 (Fig.4.1)

Tr. 13 is a trench set up on the east of Tr. 5, with the dimensions of 4m (north-south) × 2m (east-west). As we had confirmed the north-west end of Platform-1 in the investigation of Tr. 5, we investigated Tr. 13 aiming to confirm the northern side of the platform.

As a result, we confirmed firm brownish yellow soil presumed to have been the construction soil of a platform with the width of about 1.7m extending from the south end of the trench to the north. It is presumed that the line is the northern end of the platform.

4.4.8. Tr. 14 (Fig.4.1, Fig.4.6, Fig.4.7)

Tr. 14 is a trench set up perpendicular to the west side of Tr. 3 with the dimensions of 19m (east-west) \times 2m (north-south). In the drone aerial photos shot in 2016, we recognized an area of dried color of surface soil and assumed the possibility of the existence of another platform inside Tr. 2. So, we set up this trench aiming to confirm the position of the west side of the platform.

When we dug down to the depth of about 18cm from the ground surface, we confirmed firm brownish yellow soil presumed to have been the construction soil of a platform on the east of Tr. 14. The brownish yellow soil extended from the trench's east end to the west for 6.7m. On its west was the accumulation of dark brown soil, presumed to have been beyond the range of the platform, so it was assumed that this was the west-end of the platform.

4.4.9. Tr.15 (Fig.4.1, Fig.4.6, Fig.4.7)

Tr. 15 is a trench set up perpendicular to the east side of Tr. 3 with the dimensions of 25m (east-west) \times 2m (north-south). This was set up in order to confirm the east end of Platform-3.

As a result of the investigation, we confirmed a range of firm brownish yellow soil of about 7.3m long from the west end of Tr. 15 towards east, in the same manner as the west side. On its east, accumulation of dark brown soil, as in Tr. 14, was confirmed. Therefore, we perceive this extent of brownish yellow soil to be Platform-2.

4.4.10. Tr.16 (Fig.4.1)

Tr. 16 is a east-west trench set up perpendicular to the west side of Tr. 6 with the dimensions of 5m (north-south) \times 9.5m (east-west). In Tr. 5 and Tr. 6, we had confirmed a platform with tile belt on its west side, so in Tr. 16, we aimed to comprehend the condition of the west side of the platform.

Consequently, the outside of the platform presented its sunk condition, and as we dug down to the depth of 45cm from the ground surface, we confirmed brownish yellow soil wall presumably a part of a sun-dried brick building.

4.4.11. Tr.17 (Fig.4.1)

Tr. 17 is an east-west trench set up on the south side of Tr. 6 with the dimensions of 60m (east-west) \times 2m (north-south). The purpose of setting up this trench was to confirm the existence of features on the south of Platform-1.

When we dug down to 30 - 40cm from the ground surface, we confirmed an accumulation of tiles and stones in the vicinity of the extended line of the tile belt. On the west side of the trench, a feature presumed to have been a wall made of sun-dried brick was confirmed.

4.4.12. Tr.5 Extended Area and Tr. 18 (Fig.4.1)

On the west of Tr. 5, we set up an extended area of 20m (north-south) \times 2.5m (east-west) (Tr. 5 extended area). Also, we set up a north-south trench of 20m (north-south) \times 5m (east-west) on the west of the Tr. 5 extended area (Tr. 18). This extended area and Tr. 18 were set up to comprehend the condition of the west side of the stone mosaic remains.

From the relations of stone mosaic and burnt-brick ditch, we assumed the existence of platform features in the vicinity, but we could not confirm it on the level where the surface soil had been removed. However, on the south of Tr. 5 extended area, we confirmed a breadth of firm brownish yellow soil, which is considered to have been a trace of a construction of building foundation or a ground leveling.

4.4.13. Tr.19 (Fig.4.1)

Tr. 19 is a trench set up on the east side of Tr. 12, of 7m (north-south) ×4m (east-west). We set it up on the point presumed to have been the center of the south end of Platform-1, aiming to confirm the south end of the platform features.

At the depth of 20cm from the ground surface, we confirmed accumulated soil presumed to have been the face of Platform-1, as in Tr. 12.

4.4.14. Artifacts from the Trenches (Fig.4.70 : 15-19-195-199)

These are the artifacts from the outside of the features in the trenches. 195 is a piece of earthenware unearthed from Tr. 10a. 196 is a grindstone unearthed from Tr. 5, with an insertion slot in the center and a depression on the upper face. 197 is a bronze pin-shaped product of unknown use. 198 and 199 are iron products of unknown use.

4.5 Platform

4.5.1. Platform-1 (Fig.4.1)

As a result of reexamination of the eastern side of the tile belt detected in Tr. 5 and Tr. 6, we detected the northwest corner and the southwest corner of Platform-1. With this as a clue, we newly set up Tr. 12, Tr. 13 and Tr. 19, and assumed the eastern and northern end of Platform-1. However, since any of the platforms, including Platform-2 and Platform-3, has no exterior such as laid greyish burnt bricks, and since it was investigated in trenches which were limited areas, it is difficult to determine that this is really a platform at present. Also, since the information we have is only from the detection surface, it is necessary to implement further investigation to clarify if the confirmed platform (-like features) is an absolute platform, or a groundwork made by digging down the ground surface in that time.

As a result of this investigation, it was presumed that Platform-1 was in a long rectangular shape in the direction of east-west, with the dimensions of about 30 (east-west)×about 20m (north-south). The tile belt detected on the westside of this platform contained burnt soil and charcoal. A piece of charcoal from this feature was radiocarbon dated in 2018 and found to be dated to the late 7th century (Yamauchi, et al. 2019). Therefore, it can be presumed that this platform was constructed after the late 7th century.

It is presumable that the tile fragments of the tile belt had been the roof tiles of the building on Platform-1, and was later accumulated on the western margin, or cleaned up to the west side of the platform. It is clear that the forming of the tile belt was later than the construction of the stone mosaic, from the fact that the ditch on the west of Platform-1 broke a part of the stone mosaic in the direction of north-south, and that a part of the tile belt's northwest corner heaped slightly over the upper layer of the stone mosaic. In the investigation of Tr. 10d, we found that the tile fragments had been laid along the eastern margin of the assumed platform, as if corresponding to the tile belt having been detected on the west side of the platform. There is room to study how and why the tile belt was formed.

As a result of the 2019 investigation, it became presumable that a platform exists on the east of the tile belt, and that this Platform-1 is associated with the building construction in the Tang era. The future task is to confirm its planar range and to reveal its structure.

4.5.2. Platform-2 (Fig.4.1)

There exists a planar ground slightly higher than the stone mosaic (SM1) between the rain permeable greyish burnt bricks on the north of the stone mosaic detected in Tr. 5 (Burnt-brick ditch-2. Indicated as B2 in Fig. 4.9) and the rain permeable greyish burnt bricks on the north side (Burnt-brick

ditch-1,**indicated in the figure B1**). Yellow brownish hard soil extended in this area which made us assume that a platform existed in this part, so we named this part Platform-2 for descriptive purposes.

The distance of the two rain permeable ditches, assumedly equivalent to the dimension of the north-south width of the building, measures 6.5m, but the dimension and the range in the east-west direction is unknown. The L-shaped stone mosaic detected on the south of B2 is presumed to have been made on the front passage or the inner courtyard of the building.

By observing the wall of P3 dug into the stone mosaic as if cutting into it, a tier of rammed-earth groundwork was confirmed on the upper layer. A future study is necessary to determine if this layer of rammed-earth is associated with Platform-2.

4.5.3. Platform-3 (Fig.4.1)

On the aerial photos shot in 2016, an area of surface soil in yellow brown, which is different from the surrounding colour, was observed on the north of Platform-2. The colour difference made us presume that there existed a platform of yellow brown clay which had been buried and re-exposed by scraping of the upper soil layer by cultivation. So, we set up Tr. 14 and Tr. 15 perpendicular to Tr. 3, and confirmed a range of yellow-brown firmly hardened soil. It clarified that this area also had platforms, and we named it Platform-3.

Platform-3 is in a long rectangular shape in the east-west direction, and the dimensions are presumed to be approximately 19m (east-west) × 13m.

4.6. Pit

4.6.1. P1 (Fig.4.8)

P1 is in Tr. 2. The plan view is almost circular of about 2.7m in east-west and about 3.2m in north-south, and the depth from the confirmation surface is about 50cm. It is dug into a leveled ground seemingly of the Tang era.

The covering soil is roughly divided into dark-colored upper layer (layer 1) and light-colored lower layer (layers 2 to 5) extending from the bottom face to the wall. Artifacts were unearthed especially near the border of the upper and the lower layers, which made us presume that the artifacts had been disposed collectively when this pit had sunk to some level making a dip.

At the southwest corner of P1, a scoop presumed to have been a part of another feature was detected. Since this continues underneath the wall of P1, it can be presumed that this feature is older than the levelled ground layer observed on the wall of P1. Near the confirmation surface of this feature, large sized earthenware was unearthed in a group. The unearthed artifacts include large earthenware fragments and tile fragments, animal bones mainly of sheep and cattle, and round gravel of the sizes of human head to fist. These are thought to be the materials of a limited period. In the Second Shahrstan, there have been few limited assemblage like this so far. These are important materials to construct pottery chronology and to comprehend the characteristics of animal resource exploitation at the time (See Section 7). At the same time, we collected column samples from a range of 50cm-square at the west end of section belt (A-A'), for the purpose of collecting plant remains (See Section 8).

In order to obtain chronological evidence, we collected about 20 pieces of samples for radiocarbon dating with the record of unearthed points. Among these, three charcoal were carbon-dated back in Japan (See Addendum 2 & 3).

4.6.1.2. Artifacts from P1 (Fig.4.52-58, 71 : 15-19-001-086, 200, 201)

Unearthed artifacts are: earthenware (001 - 073), glazed ware (074 - 081), a tile (200), a greyish burnt brick (201), clay objects (083 - 085), bone tool (086), and a stone tool (082).

The vessel types of the earthenware are: small jars (001, 002), small pots (003 - 007), short-necked jars (008 - 014), long-necked jars (015 - 019), narrow-mouthed jars (020 - 028), jar with diagonal mouth (031), bowls (033 - 041), round-bodied jars (042, 043), bowl-shaped cooking pots (046, 047), jar-shaped cooking pots (048, 049), pots (050 - 053), various bottom parts (054 - 068), lids type A (069, 071), and a lid type B (070).

Small pots and short-necked jars are varied in presence/absence of handles or in the number of handles, but are in similar shapes and sizes. Narrow-mouthed jars are characteristic with one or two tiers of comb-wave patterns on the shoulder. A jar with diagonal mouth 031 is differentiated from normal narrow-necked jars, with a narrow mouth on the diagonal side and rotation stroke inside. The bowls 033, 036, 039 have a feature in the rim part hemmed with two incisions. Two pieces of large tub-shaped bowls were unearthed, which feature the patterned rim (040, 041). 045 has a short spout on the shoulder and a handle sideways, seemingly a jar associated with dairy. Bowl-shaped cooking pots 046 and 047 have a round body or a rotund body with a short rise, with a handle-like decoration on the shoulder. A pot 051 has sign-like stamping inside the rim.

The vessel types of the glazed ware are: a drinking cup (074), dishes (075 - 079), a lamp (080), and a pot (081). 075 has Arabic characters inscribed inside. 076 has a pattern of petals or radial swirls in the center of the interior. Pot 081 has Arabic characters drawn like patterns in white glaze on the outside of the neck. Lamp 080 has lost the peak and the handle, but retains almost a perfect form. The whole body is embossed with small trigonal-pyramid-like protrusion, and covered by green glaze.

Clay objects are: a dustpan-shaped clay object (072), earthen pipes (083, 084), and earthenware-fragment-converted clay disc (085). The dustpan-shaped clay object (072) has an unusual style of trigonal body with a handle on the rear side of the body, and hems on sides, with round pipe pressing patterns on the outside and inside of the hems. The pipes 083 and 084 are shaped like eave-end tiles without patterns in and outside. The production method is half-cutting of a cylinder, similar to the eave-end tiles in the form and the technique, so it is possible that this product was made under the influence of the convex tile making.

The greyish burnt brick 201 has rope-tapping patterns in the longitudinal direction, and retains linear embossments on the back. The embossments suggest the production technique of the brick, and the trace must be of wooden frames, etc. for clay forming. 082 is a polished stone.

4.6.2. P2 (Fig.4.8)

P2 situates at the west end of D1. The planar figure is circular, the diameter is about 90cm, the depth is about 60cm, and the bottom face is irregularly shaped. The artifacts unearthed from it are a small amount of earthenware fragments. D1 is formed thin as if covering P2.

4.6.2.1. Artifacts from P2 (Fig.4.60 : 15-19-087, 088)

From P2 a narrow-necked jar with a cylinder erecting from its shoulder (087), and a fraction of a jug with crest on its rim (088) were unearthed. They are presumed to have been from 7 - 8th century by the characteristics of the rim. These characteristics of 087 and 088 are different from the narrow-necked jars of 10 - 11th centuries unearthed from P1, 3, 7 which have a cross-section of thick round rim.

4.6.3. P3 (Fig.4.9, Fig.4.10)

4.6.3.1. The Background to the Investigation

At Tr.5 of the Second Shahristan, the L-shaped stone mosaic remains were found (Yamauchi et al. 2019). At the western half of the stone mosaic, P3 situates like cutting into the stone mosaic. Since the rim of P3 is made as if incorporating the round stones of the stone mosaic, it was presumed that

both features were integrally built at first. P3 was named 'well-like pit'.

The planar shape of P3 is circular with a diameter of 1.8m. In the 2018 investigation, only the southern half was excavated to the depth of about 110cm. In 2019, excavation was resumed aiming at specifying the actual function and the period, and to complete the excavation. After completing the investigation, we refilled it for the protection of the feature.

In the 2019 investigation, we dug down to the bottom of the southern half, recorded cross-section. Then we dug down toward the north to the extent not to affect the stone mosaic remains, and completed the excavation. As a result, we learned that P3 is cylindrical in section, with a diameter of 1.8m and the depth of 2.9m (Fig. 4.7). It is presumed that this vertical pit is dug down from the upper layer in the early 11th century, later than the construction of the stone mosaic, as a water-well or toilet at first, but later was abandoned and temporarily used as a trash pit before it was refilled.

4.6.3.2. Stratigraphy, etc.

Based on the observation of the cross-section of P3, we confirmed that the layers 1 to 17, at the depth of 1.6m, were of brownish clay, and that they were refilled at once. On the other hand, from layer 18 to the lowest layer 22 were mainly of greyish yellow brown soil, and several layers containing a large amount of charcoal and charred particles were observed. On the western margin of P3, roof tile fragments flowing in diagonally from the west was confirmed. These fragments are thought to have been the tiles roofed on the building on the platform on the west of the stone mosaic remains.

Thus, the fill can be roughly divided into three: the trash-pit like depression in the upper layer in the later period (layers 1 to 5), the soil layer flowing in from the west (layers 6 to 17), and the soil layer beneath the lower layer of the filling soil (18 to 22).

On the wall of P3, many horizontal layers were confirmed. Among them, a silt layer surely thought to be a natural sediment was confirmed at depth below 2m. The depth corresponds with the depth of layer 19 of the filling soil of P3. On the upper layer of this natural sediment, in other words, to the depth of 2m from the surface, we observed a horizontally accumulated brownish yellow or brown soil separable to 10 to 11 layers. It is presumed at least that the upper part of this accumulation was a foundation work or a platform constructed by rammed-earth method, and P3 was excavated from the upper face of the platform.

The bottom of P3 is dug into the natural layer of silt. However, since there was no trace of water flowing inside P3, it did not seem to have functioned as a well. On the other hand, there is a possibility that it was dug as a toilet. Either way, the digging was discontinued for some reason.

On the top layer, earthenware fragments presumed to belong to the 10 - 11th century were contained. The radiocarbon dating of the carbonized seeds from layer 18 yielded two ages; the end of the 7th century and the early 11th century. From the buried situation of the roof tiles, it can be presumed that P3 was dug in the early 11th century, and at the time of its burial, carbonized grains of the late 7th century flowed in. Therefore, the earthenware and others artifacts from the backfill are of the late 10th century to the early 11th century. (See App. 2 & 3).

4.6.3.3. Artifacts from P3 (Fig. 4.60-63, 71, 72 : 15-19-089-124, 203, 209)

Materials unearthed from P3 are: earthenware fragments, tile fragments, burnt-brick fragments, bones of cattle, sheep, horses, birds, and dogs, and fruit seeds of grape, watermelon, melon, etc. A fiber fragment as if attached to a horse skull bone was discovered while washing the artifacts.

Unearthed artifacts are: pieces of earthenware (089 - 121), a piece of glazed earthenware (122), a clay object (123), a stone tool (124), and roof tiles (203 - 209).

The vessel types of the earthenware are: short-necked jars (089, 090), a long-trunked pot (091), a bowl (092), narrow-necked jars (093 - 095, 097), a jar with diagonal mouth (096), long-necked jars (099 - 102), small-sized pots (103, 104), a pot (105), a tub-shaped bowl (106), bowl-shaped cooking

pots (107, 108), bottom parts (109 - 117), an bell-shaped object (118), a small jar (119), an earthen pipe (120), a lid (121), etc.

089 and 090 are containers of the same shape but the sizes are different. 091 is a complete body of long-trunked pot, and an identical pot was found in Ditch 1. Referring to the present folklore examples, this pot resembles a container of urine on the side of a cradle, a so called chamber pot. 092 is a round bowl with two broad groove/insicion on the rim. The narrow-necked jars in large and small sizes have comb-wave pattern between the incisions on the shoulder. 096 is a jug with a diagonal mouth. 094 and 097 have trumpet-like straight rim, while the rim of 096 is two-tiered bulge. 100 has a vertical incision under comb-drawn wave-like patterns on the shoulder. 107 and 108 are ball-like cooking pots for boiling water with vestige handle-like decoration attached. These also have sizes small and large. 118 is a piece of earthenware with vertical cut on the bottom, presumed to have been a bell (musical instrument). 120 is a clay pipe branched in two, shaped like a branched part of a clay pipe.

122 is a handle of glazed ware jug. 123 is an earthenware pipe which may have been a tuyere of bellows. It has some mesh-like trace on the outside. 124 may be a stone bead, or a button.

203 is a eave-end tile, and from the bonding of round-pat in an obtuse angle, this may be the tile used at the end of a descending ridge. 204 and 205 are concave tiles, 206 and 207 are convex tiles, and 208 is a ridge tile. 209 is a greyish burnt brick with a diagonal rope-tapping trace remaining on the surface.

4.6.4. P4 (Fig.4.1)

This pit was found on the side of the east wall of Tr. 4, in a round or an oval form with a length of 1.3m in north-south and the bottom is flat. The depth from the confirmation surface is 20cm, but seen on the cross-section of the trench wall, the cut starts right from the cultivated soil of the surface layer, so the overall depth measures about 30cm. Tile fragments were unearthed from here, but this seems to have been a trash pit.

4.6.5. P5 (Fig.4.1)

This pit was found on the side of the east wall of Tr. 4, and situated about 2.5m south of P4. The form is round or oval with a diameter of 50cm, with a round bottom, morphologically resembling a bread-baking oven. The cut of this pit also starts from the cultivated soil of the surface layer, to the depth of about 50cm.

4.6.6. P7 (Fig.4.9)

This is a trash pit constructed by destructing the east end of the second stone mosaic (SM2) in the east-west direction, which was confirmed at Tr. 5.

The planar form of P7 is oval, and the dimensions are 4.3m in north-south and 3.2m in east-west. The depth from the confirmation surface is 20cm. This is also dug from right under the surface cultivated soil, and the total depth measures 55cm. Its northern wall is almost perpendicular, but other walls are loosely rising.

The bottom face is flat. About 2/3 of the southern bottom are brownish soil, but about 1/3 on the north is reddish brown soil containing a lot of carbonized materials and burnt soil. Therefore, P7 is dug through different soil layers.

From this pit, the cobbled stones used in the stone mosaic were unearthed, which means that the second stone mosaic was destructed when P7 was dug. Also, from the upper to middle layers of the fill, a lot of earthenware, animal bones, tile fragments, greyish burnt bricks, etc. were unearthed. A piece of charcoal from this pit was radiocarbon dated, and yielded a date of terminal 10th to the

beginning of 11th century CE. (see App. 3).

4.6.6.1. Artifacts from P7 (Fig.4.64-68, 73 : 15-19-125-188, 210-212)

The unearthed artifacts are: pieces of earthenware (125 - 164), pieces of glazed ware (166 - 168), roof tiles (210, 212), a greyish burnt brick (211), a table-shaped earthenware (184), clay objects (165, 180 - 183, 187, 188), metal products (169 - 177), a coral product (178), bone artifacts (185, 186), and a stone tool (179).

The vessel types of the earthenware are: pieces of cup-shaped earthenware (125 - 127), small-sized pots (128 - 132), short-necked jars (133, 134), thick-mouthed, long-necked jars (135 - 137), long-necked jars (138 - 141), narrow-necked jars (144 - 146), a tub-shaped pot (147), bowl (148, 149), bowl-shaped cooking pots (150, 151), pots (152 - 154), lids (162 - 164), and others such as bottom parts (155 - 161). On the whole, these pieces of earthenware resemble those from P1 and P3, and they seemed to have been from the same period, in the late 10th century to the early 11th century.

Small-sized jars with thick long necks of 135 - 137 are characteristic. 135 has two parallel incisions on the trunk with a vertical line descending from the incisions. This vertical line was also confirmed on the artifact 022 of P1, and 100 of P3, and suggests the date of the production. 144 - 146 are narrow-necked jars with a band of patterns on the shoulder, which are comb-drawn wave, comb-drawn arch, or comb-tooth prodding between parallel incisions. 148 and 149 are bowls curved inside, with characteristic two to three parallel incisions on the rim. Similar pieces of earthenware were unearthed from P1 and P3.

169 - 174 are bronze products, 169, 170 are decorations of belts, buckles. Especially, 169 has elaborate patterns on it. 171 must be a clasp or an ornament. 172 and 173 are copper products of unknown purpose. 175 is a fragment of a small patternless square-holed coin. 176 looks like a small knife. 177 must be some metal fitting.

178 is an accessory made of red coral.

183 is in the shape of a horse head, presumably a handle part of a container. It is brown-glazed on the base of white glaze. 184 is a large disc-shaped pottery with circular patterns stamped on the surface.

185 and 186 are sheep ankle bones (talus). 185 is worn on the sides, and 186 has a hole in the center.

179 is a stone tool, a hanging ornament made of round lapis lazuli with a small hole pierced on the side.

210 is a eave-end tile, 211 is a greyish burnt brick, 212 is a concave tile with seemingly incisions carved on the convex face.

4.6.7. D1 (Fig.4.5)

D1 situates on the south of P1 of Tr. 2. Ditch1 is a groove-like area of about 2.2m long with an oval-shape, in which large-sized earthenware fragments, tile fragments, gravels were crammed. After removing these, we detected a shallow depression of less than 10cm deep. Beneath the depression, P2 was detected.

4.6.7.1. Artifacts from D1 (Fig.4.69 : 15-19-189-194)

Unearthed from Ditch1 are mostly pieces of earthenware (189—194). They are: a long-trunked pot (189), a small pot with two handles (190), long-necked jars (191, 192), a tub-shaped bowl (193), and a lid (194). The parallel incisions seen on the shoulder of 190 and the comb-drawn wavy pattern of the rim of 193 are the features common in the artifacts from P1, P3, and P7. The long-trunked pot 189 also has similarity with the earthenware from P3. Therefore, these can be seen as generally from the same period.

A long-trunked pot 189, has a white substance adhered on the bottom interior. This may not be a cooking device, but a chamber pot for infants, and requires further a chemical analysis..

4.7. Roof tiles from roof tile belt (Fig.4.73-78 : 15-19-213-241)

At the roof tile belts in Tr. 5 and Tr. 6, we newly unearthed eave-end tiles (213), concave tiles (214 - 216), convex tiles (217 - 219), and ridge tiles (220 - 224). They do not have particular differences from the materials reported so far, but on the convex tile of 219, the trace of ring-building method was observed on the convex face and cross-section surface in a good condition.

Other tiles were unearthed from the cluster of tiles accompanying the northern burnt-brick-ditch (B1) of Platform-2. They are a eave-end tile fragment 225 and a round-tile part of a eave-end tile 226. 227 and 228 were unearthed from the west side of the roof tile belt. 227 is a eave-end tile with three-fold connected-bead pattern, the type which has not been unearthed in the previous investigations. 228 is a greyish burnt brick, with some iconography drawn in incisions only on one side. 229, a greyish burnt brick from Tr. 3, has a longitudinal trace of rope-tapping on the surface, and is presumed to have been a construction material of the burnt-brick Ditch-2. 230 - 237 were unearthed from Tr. 5, 230 and 231 are eave-end tiles, 232 - 237 are greyish burnt bricks. These greyish burnt bricks have a trace of rope tapping on the surface, but are tapped sparsely and diagonally, not longitudinally.

238 was unearthed from the accumulation of roof tiles by the south wall of Tr. 8, and has a line-carving-like inscription on the convex face. 239 is a round-tile part of the eave-end tile from Tr. 10. 240 is a eave-end tile unearthed from Tr. 11. 241 is a greyish burnt brick unearthed from Tr. 14, with a longitudinal rope-tapping trace.

4.8. Summary of AKB-15

4.8.1. Configuration of Features and the Preservation Condition (Fig.4.1)

In AKB-15, several platforms were lined in the north-south direction, which are presumed to have been the foundations of the buildings made in the Tang era. In addition, the existence of the features from the later period (10th - 11th century) situated between some of these platforms was confirmed.

Platform-1 - 3 incline from north to west by 8°, and their north-south axes accord to the axis of the Second Shahristan. Platform-1 is especially large, and is presumed to have been a central facility.

By the observation of the cross-section of the east wall of Tr. 1 - Tr. 6, the features of the later period (10th - 11th century) are prone to be detected outside the platforms, or, in the space without platforms. The reason for this may be that the features on the lower subsurface outside the platforms remained while all of the upper features were mostly destroyed by a massive ground-leveling by bulldozers after 1970's.

4.8.2. Stone Mosaic (Fig.4.9)

By the investigation of P7, it was clarified that the stone mosaic had extended further to the east. On the south of the stone mosaic in north-south direction, it was confirmed that it was destructed by the western ditch of the platform. On the other hand, there is a likelihood that the stone mosaic which is L-shape at present was actually U-shaped laid out along the inner courtyard.

4.8.3. P3 (Fig.4.10)

There is a possibility that P3 had been excavated as a water-well at first, but in the end it was used as a trash pit. The materials unearthed from near the bottom of P3 were the bones of animals: hors-

es, cattle, sheep, dogs and birds, and seeds of fruits: grape, watermelon, melon, etc.

Most of the seeds were uncarbonized, but we conducted radiocarbon dating of two carbonized seeds of wheat. As a result, the two samples yielded two different ages; the late 7th century and the early 11th century. Late 7th century is the time when the Second Shahristan, namely the Suyab Garrison City, was constructed. Early 11th century is when Ak-Beshim (Suyab) was abandoned. Although the stone mosaic is situated nearby, the area is lower compared to Platform-1. Therefore, this vertical pit must have been dug as a water well or a toilet. Most of the materials unearthed from the pit must have been disposed after the dig, so the sample from the late 7th century must have mixed in during the burial of the pit. The animal remains and plant remains unearthed from P3 are important in investigating the food resource in the area from the late 10th century to the early 11th century.

By the observation of the wall of P3, a soil layer of rammed-earth was confirmed. It is presumed that P3 had been dug from above the rammed-earth construction.

4.8.4. Trash Pits

In the 2019 investigation, we implemented excavation of some trash pits (P1, P7). From these holes, a large amount of earthenware, plant remains, animal bones, etc. were unearthed. They will be important materials to construct pottery chronology and to discuss the utilization of plant and animal resource exploitation.

Based on the radiocarbon dating, P1 belongs to the mid 11th century, while P7 belongs to the terminal 10th to the beginning of 11th century.

These features are generally called “trash pits” and regarded as the holes to dispose of garbage from daily life, but it is possible that they were originally dug to mine the clay for sun-dried bricks or palsa bricks, and eventually were used as trash pits.

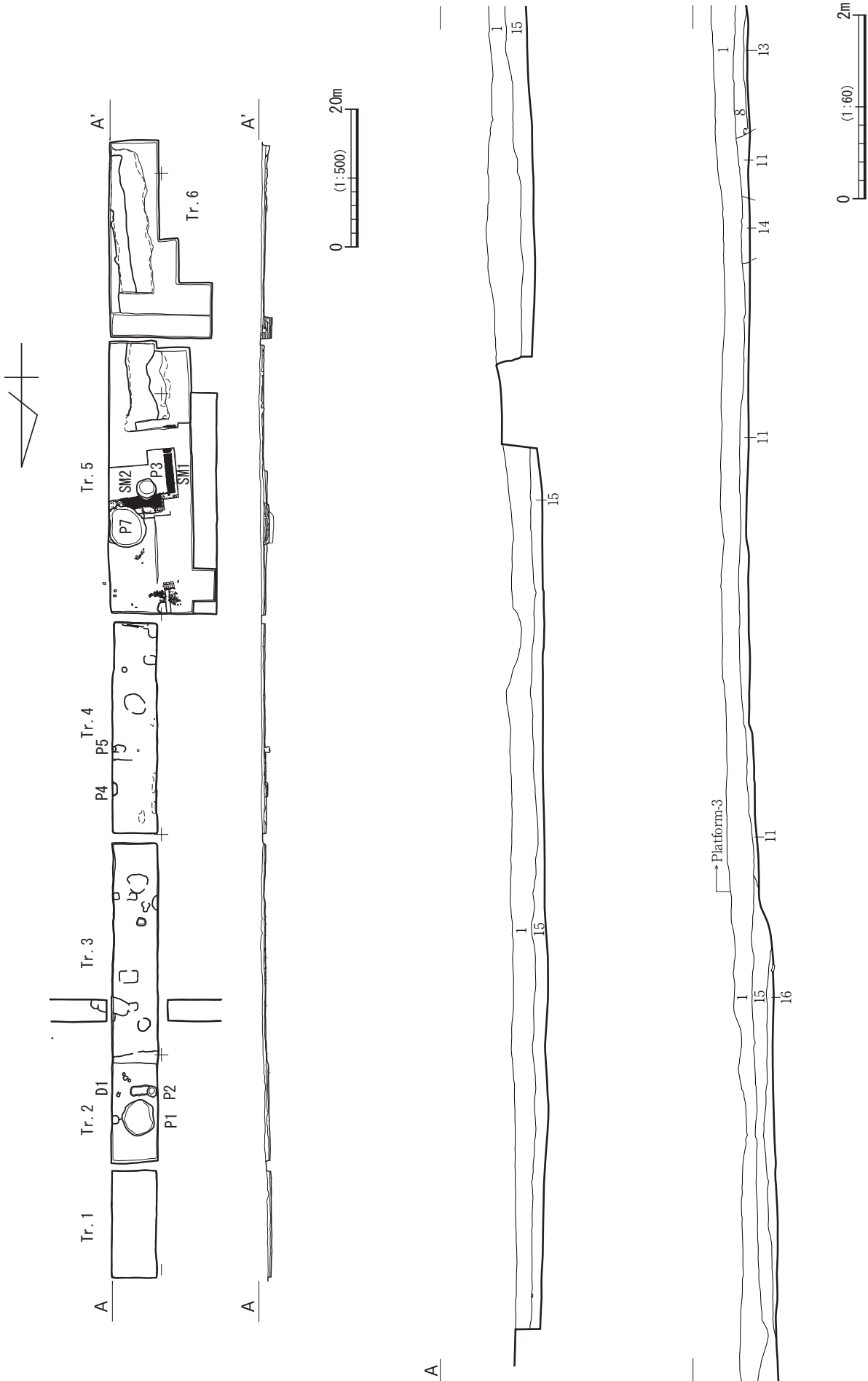


Fig.4.2 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(1)

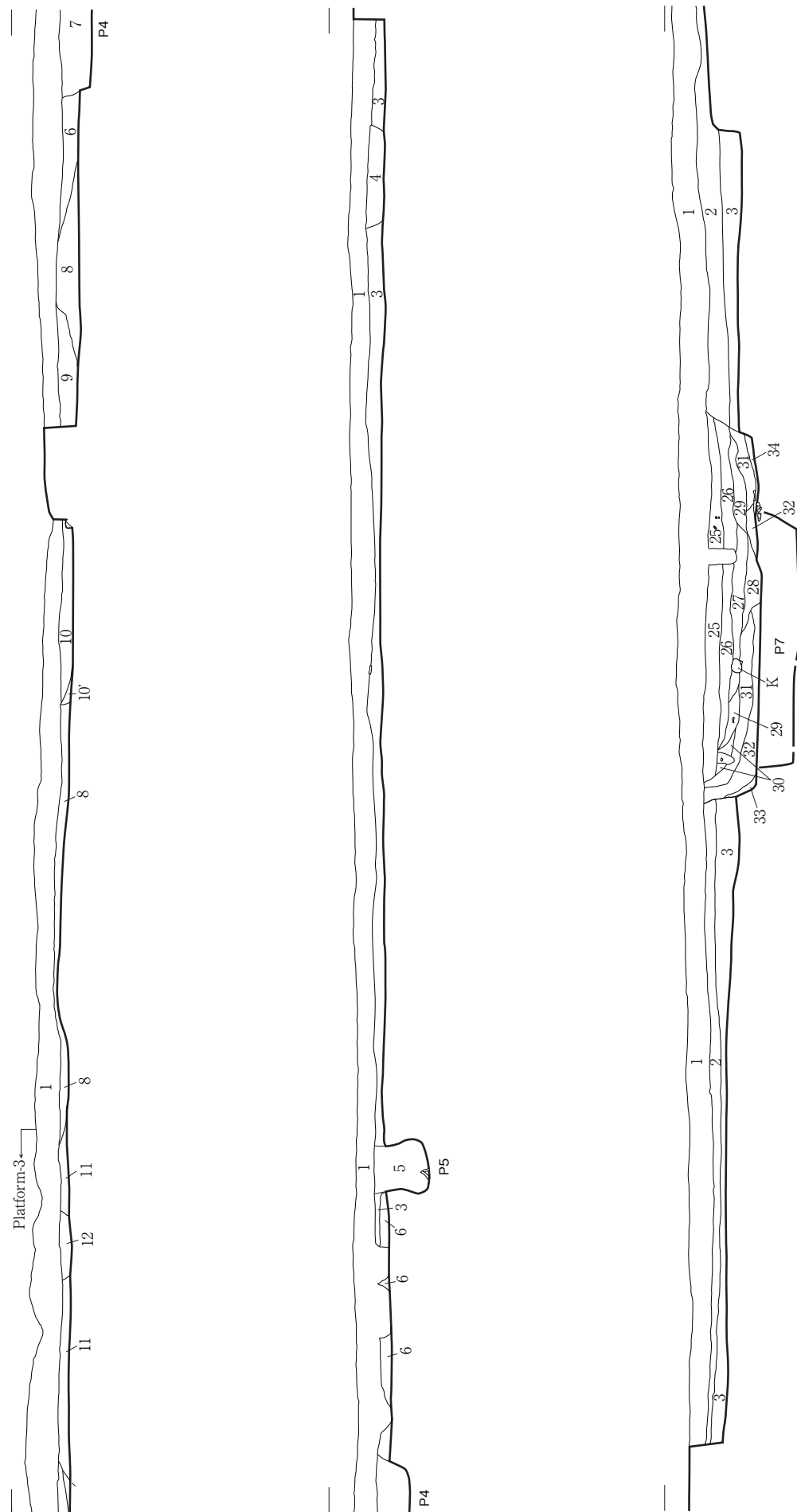


Fig.4.3 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(2)

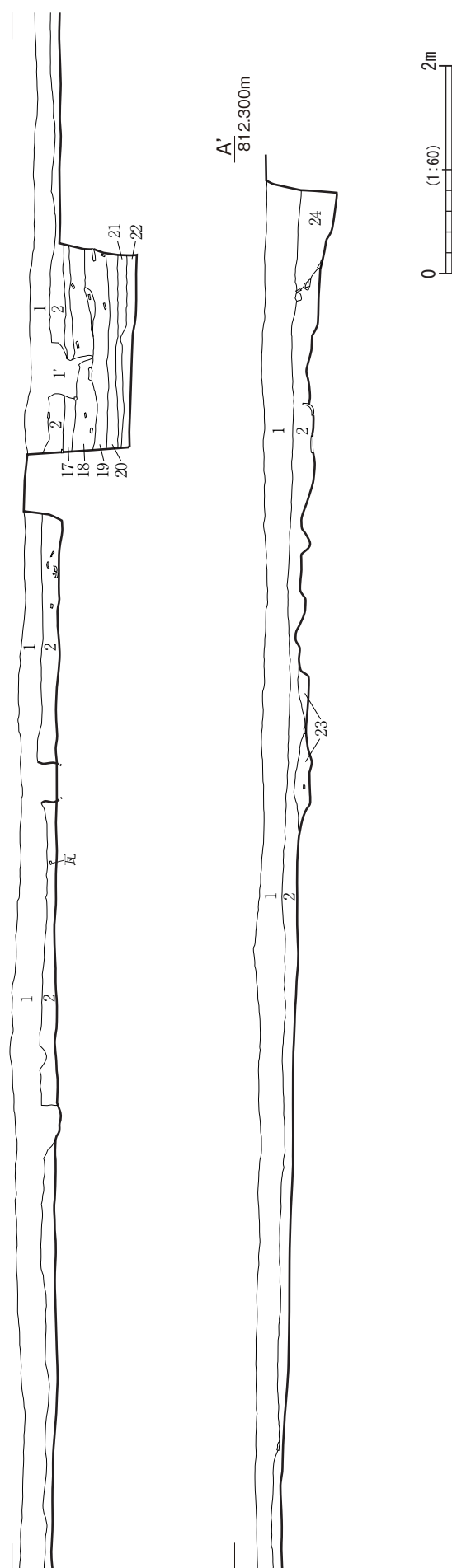
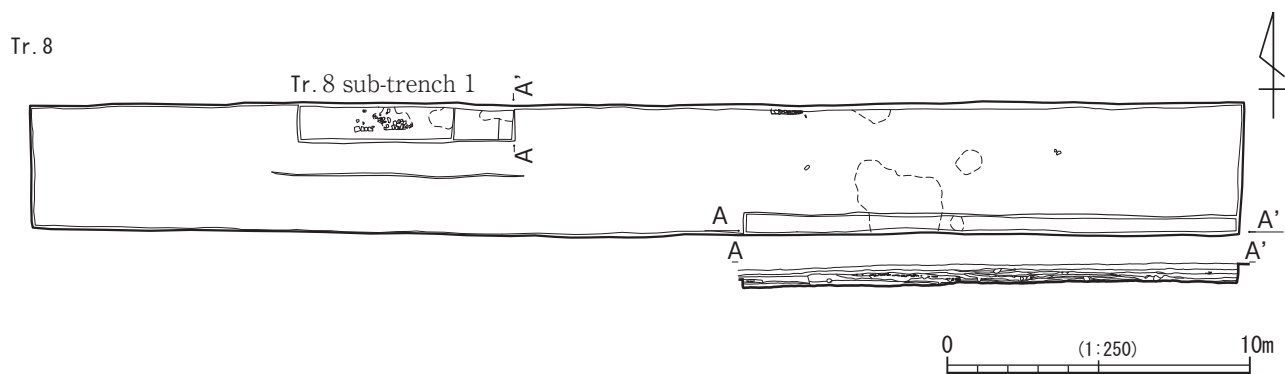
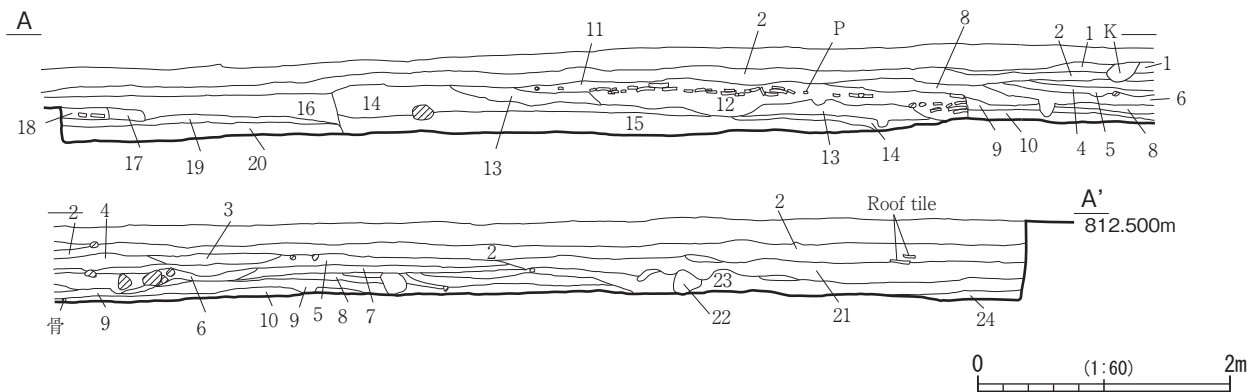


Fig.4.4 Cross-section of East-Wall of Tr.1~Tr.6, AKB-15(3)

- | | | | |
|-------------|---|-------------|---|
| 1 7.5YR4/3 | Brown soil: contains charred particles, small fragments of tile. | 18 10YR5/3 | Dull yellowish brown soil: viscous. contains fragments of tile, very compact, contains red particles. |
| 2 10YR4/3 | Dull yellowish brown soil: contains charred particles, fragments of tile. | 19 10YR5/3 | Dull yellowish brown soil: contains fragments of earthenware, bone, very small amount of burnt soil, charred particles, very compact. |
| 3 7.5YR5/3 | Dull brown soil: sandy soil, contains white soil, charred particles, iron. | 20 10YR5/3 | Dull yellowish brown soil: clay layer, no inclusions, very compact. |
| 4 5YR6/4 | Dull orange soil: contains charred particles, Ø5cm gravels, viscous. | 21 7.5YR4/3 | Brown soil: grooved deposits, iron? reddish. |
| 5 7.5YR3/3 | Dark brown soil: contains large amount of charred particles, fragments of bone, tile, earthenware. Trash pit. | 22 10YR4/3 | Dull yellowish brown soil: clay layer. contains white particles. |
| 6 10YR4/3 | Dull yellowish brown soil: contains charred particles, sandy soil, very compact. | 23 10YR3/3 | Dark brown soil: contains large amount of tile, burnt soil and charcoal. |
| 7 10YR4/2 | Grayish yellow brown soil: contains charred particles, fragments of earthenware, bone, tile. Trash pit. | 24 10YR3/3 | Dark brown soil: contains very small amount of fragments of tile, small gravel. |
| 8 7.5YR4/3 | Brown soil: contains large amount of charred particles, viscous, contains small amount of fragments of tile, less compact. | 25 10YR4/3 | Dull yellowish brown soil: contains charred particles, fragments of tile. |
| 9 7.5YR5/3 | Dull brown soil: contains small amount of charred particles, small amount of iron. contains very small amount of white soil, very compact. | 26 10YR3/3 | Dark brown soil: contains very small amount of fragments of tile, small gravel, charcoal. |
| 10 7.5YR5/3 | Dull brown soil: similar to layer 9. Accumulation of burnt soil, charcoal, gravel on the lower part. | 27 10YR4/3 | Dull yellowish brown soil: contains charred particles. |
| 11 7.5YR5/4 | Contains large amount of burnt soil and charcoal. | 28 7.5YR4/3 | Brown soil: contains charred particles, small amount of gravel Ø5cm. |
| 12 10YR4/3 | Dull brown soil: contains small amount of charred particles, dense, contains very small amount of white soil, very compact. North side platform layer. | 29 7.5YR3/3 | Dark brown soil: contains large amount of charred particles, fragments of tile. |
| 13 10YR5/3 | Dull yellowish brown soil: contains small amount of charred particles, small amount of gravel, earthenware. less compact, contains gravel of Ø20cm in the fill. | 30 7.5YR5/3 | Dull brown soil: viscous soil, contains charred particles, iron. |
| 14 10YR4/3 | Dull yellowish brown soil: contains charred particles, less compact. | 31 10YR3/3 | Dark brown soil: contains large amount of charred particles, viscous, contains white soil, small amount of gravel Ø5cm. |
| 15 10YR5/3 | Dull yellowish brown soil: contains charred particles, small amount of fragments of tile. | 32 7.5YR4/3 | Brown soil: contains charred particles, viscous, very small amount of gravel Ø5cm. |
| 16 10YR5/3 | Dull yellowish brown soil: contains very small amount of fragments of tile, small gravel. | 33 7.5YR5/3 | Dull brown soil: similar to layer 3, sandy soil, contains white soil, charred particles, iron. |
| 17 10YR5/3 | Dull yellowish brown soil: viscous soil, contains very small amount of charred particles, burnt soil, small amount of small fragments of tile. | 34 2.5Y4/2 | Dark grayish yellow soil: contains sandy soil, very compact, stone-covered surface? |

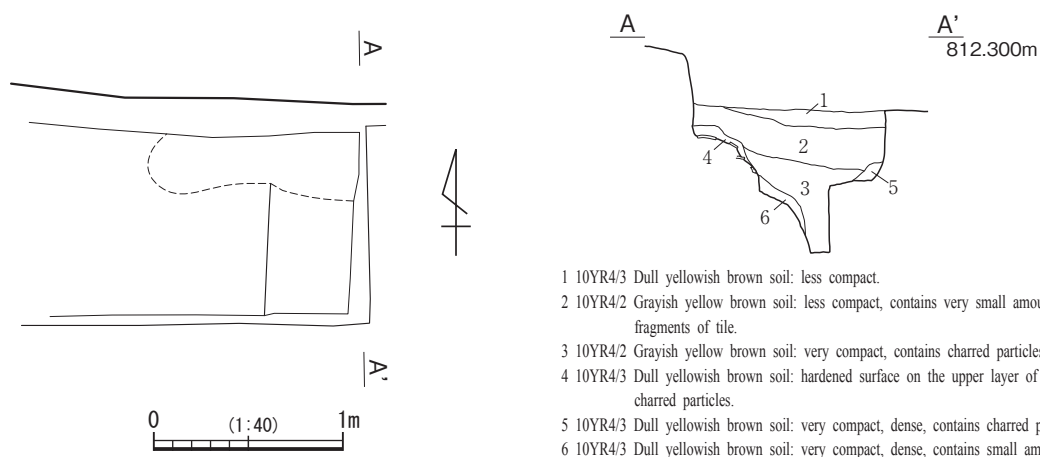


Tr. 8 sub-trench 2 south wall



- | | |
|---|---|
| 1 10YR4/2 Grayish yellow brown soil: viscous, contains gravel Φ 3mm. | 14 10YR4/3 Dull yellowish brown soil: viscous, very compact, contains small amount of white soil, charred particles, gravel in the lower layer. |
| 2 7.5YR5/3 Dull brown soil: viscous, contains charred particles, sand, small amount of gravel Φ 3mm. | 15 2.5YR4/2 Grayish red soil: contains sandy soil, very compact. |
| 3 Layer of gravel. Contains gravel Φ 3 to 30mm, charred particles, very compact. Road surface? | 16 7.5YR4/3 Brown soil: viscous, less compact, contains charred particles, iron, slightly coarse. |
| 4 7.5YR4/3 Brown soil: contains large amount of charred particles, viscosity, contains very small amount of iron. | 17 10YR4/2 Grayish yellow brown soil: viscous, fairly compact, contains iron. |
| 5 7.5YR5/3 Dull brown soil: Just above the gravel layer, very compact, viscous, contains large amount of iron. (layer of gravel : contains gravel, gravel Φ 2 to 5cm, tiles. very compact.) | 18 7.5YR4/2 Grayish brown soil: contains small amount of charred particles, just above the layer of tile accumulation, viscous. Platform layer? very compact. |
| 6 10YR5/3 Dull yellowish brown soil: contains gravel, tile from the upper layer, very compact. | 19 10YR4/2 Grayish yellow brown soil: viscous, very compact, dense. |
| 7 10YR5/3 Dull yellowish brown soil: viscous, contains charred particles, very small amount of gravel Φ 2cm. Levelled layer? | 20 10YR4/2 Grayish yellow brown soil: contains charred particles, very compact. |
| 8 2.5YR4/2 Grayish red soil: contains small amount of charred particles, white soil, viscous, very compact. | 21 10YR4/2 Grayish yellow brown soil: viscous, contains fragments of bone. |
| 8' 7.5YR4/2 Grayish brown soil: accumulation of gravel. | 22 10YR4/2 Grayish yellow brown soil: viscous, dense. |
| 9 10YR4/2 Grayish yellow brown soil: contains gravel Φ 5cm, fragments of bone. | 23 7.5YR4/3 Brown soil: less compact, contains sand (sandy soil), contains fragments of bone, gravel Φ 3cm. |
| 10 10YR4/2 Grayish yellow brown soil: very compact. dense. viscous. Layer of rammed earth? | 24 7.5YR4/3 Brown soil: contains large amount of charred particles, burnt soil. Fill? |
| 11 10YR4/2 Grayish yellow brown soil: viscous, very compact. Just above the accumulation of tile: contains very small amount of white soil (limestone layer?). | |
| 12 10YR4/2 Grayish yellow brown soil: right under the layer of tile accumulation, contains fragments of tile, charred particles, white soil. Ditch like groove containing sands? (tiles are in it.) | |
| 13 10YR4/2 Grayish yellow brown soil: viscous, very compact, contains small amount of white soil, charred particles, fragments of tile in the lower layer. | |

Tr. 8 sub-trench



- | |
|--|
| 1 10YR4/3 Dull yellowish brown soil: less compact. |
| 2 10YR4/2 Grayish yellow brown soil: less compact, contains very small amount of charred particles, small fragments of tile. |
| 3 10YR4/2 Grayish yellow brown soil: very compact, contains charred particles, fragments of tile, viscous. |
| 4 10YR4/3 Dull yellowish brown soil: hardened surface on the upper layer of the tile accumulation, contains charred particles. |
| 5 10YR4/3 Dull yellowish brown soil: very compact, dense, contains charred particles. |
| 6 10YR4/3 Dull yellowish brown soil: very compact, dense, contains small amount of charred particles. |

Fig.4.5 Cross-section of Tr.8, Sub-trench in Tr.8, AKB-15

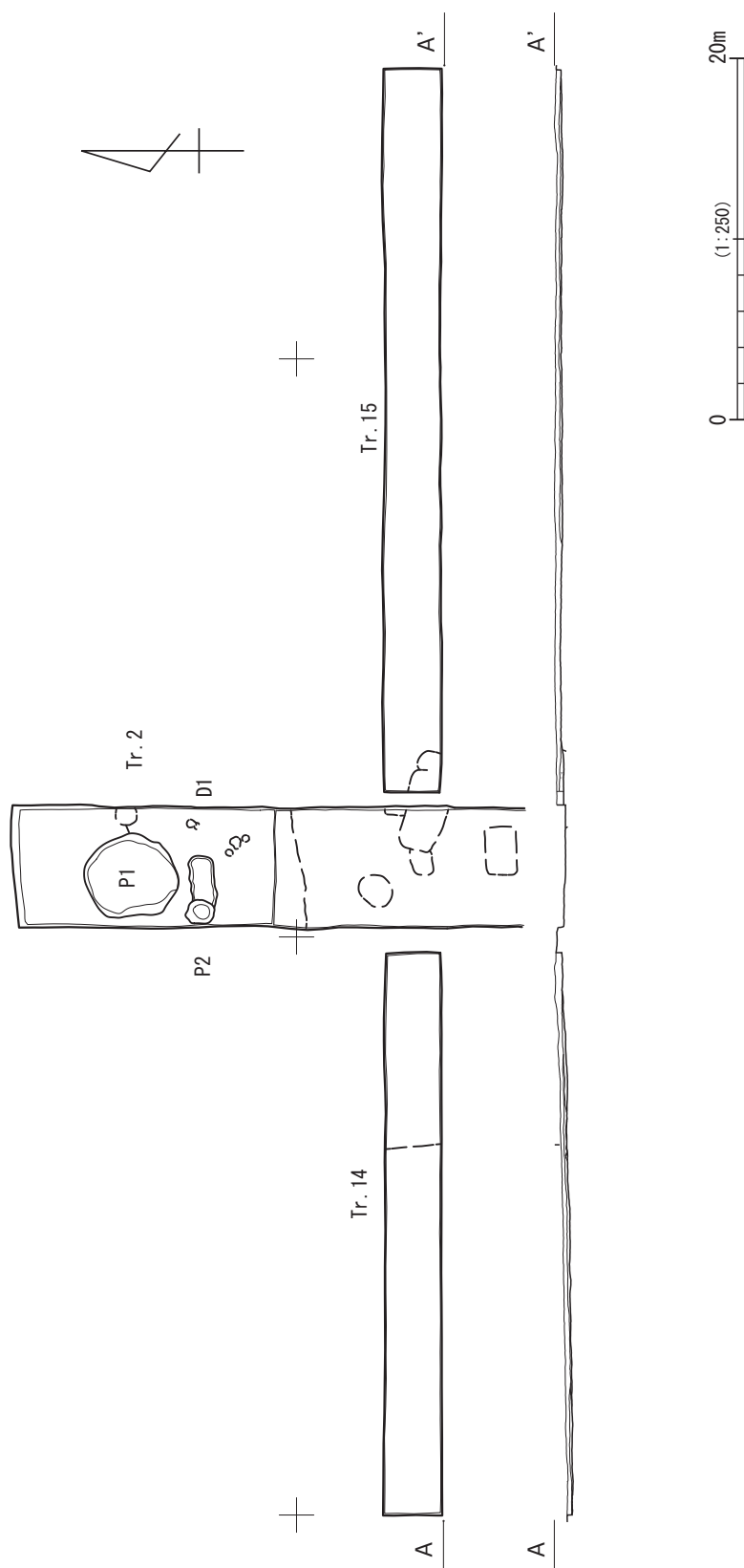


Fig.4.6 Cross-section of the South-Wall of Tr.14,15, AKB-15(1)

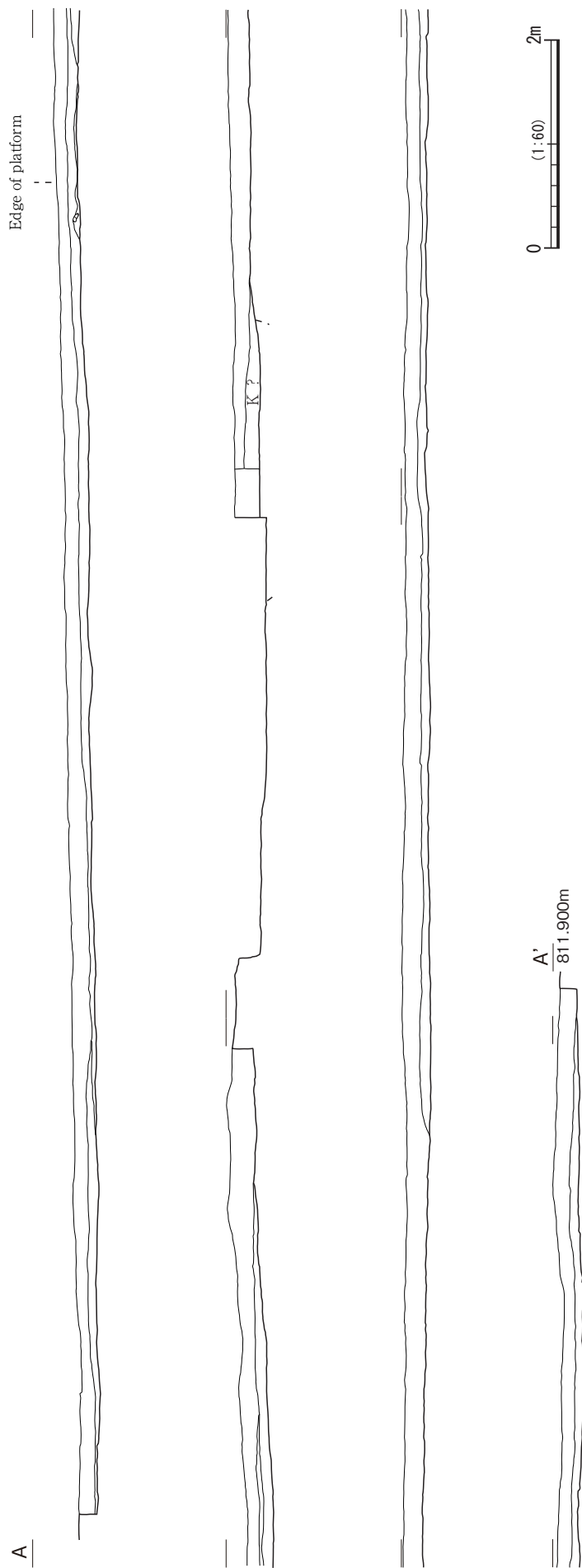


Fig.4.7 Cross-section of the South-Wall of Tr.14,15, AKB-15(2)

P1, P2, D1

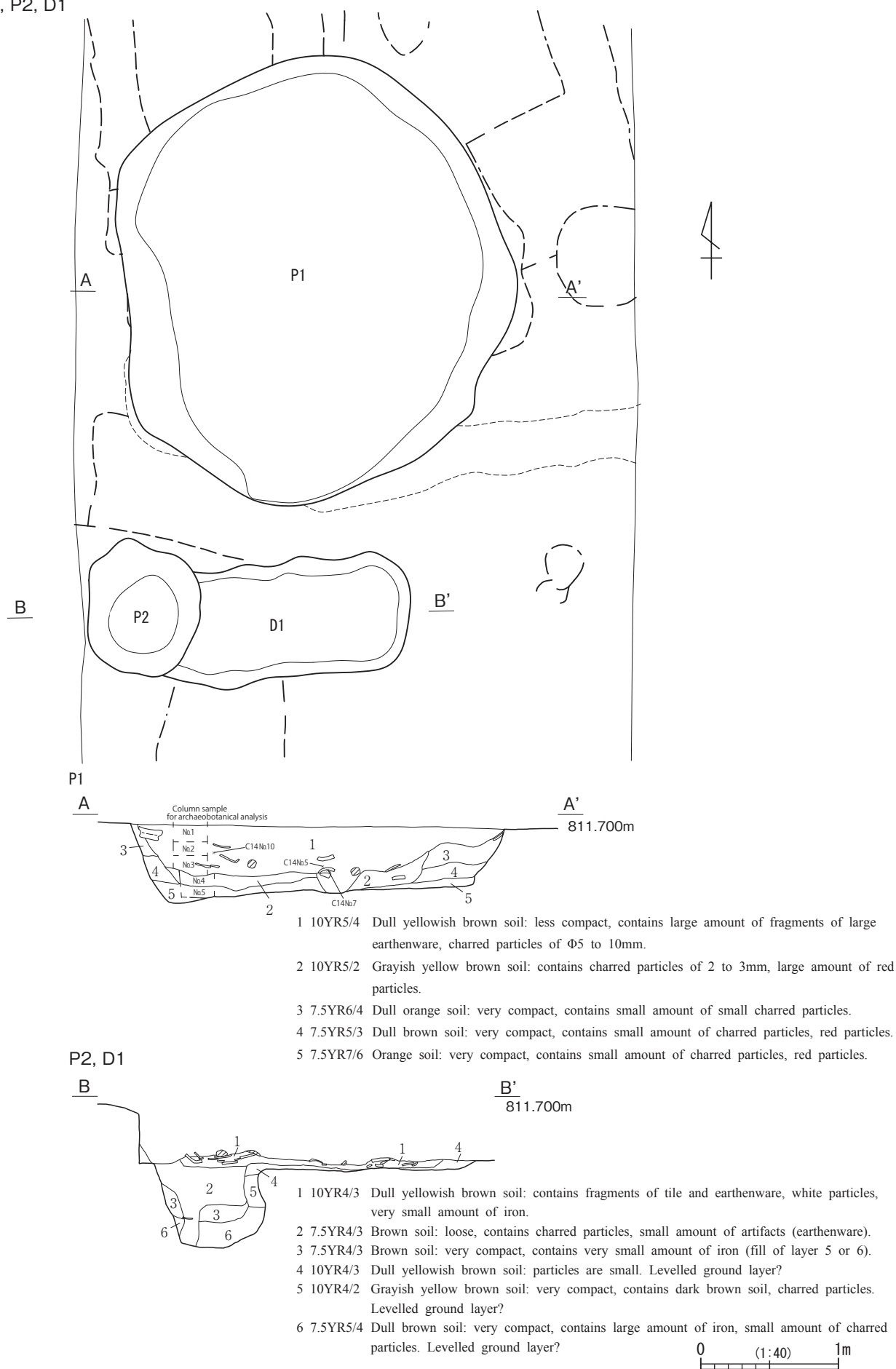


Fig.4.8 P1, 2, D1 of AKB-15

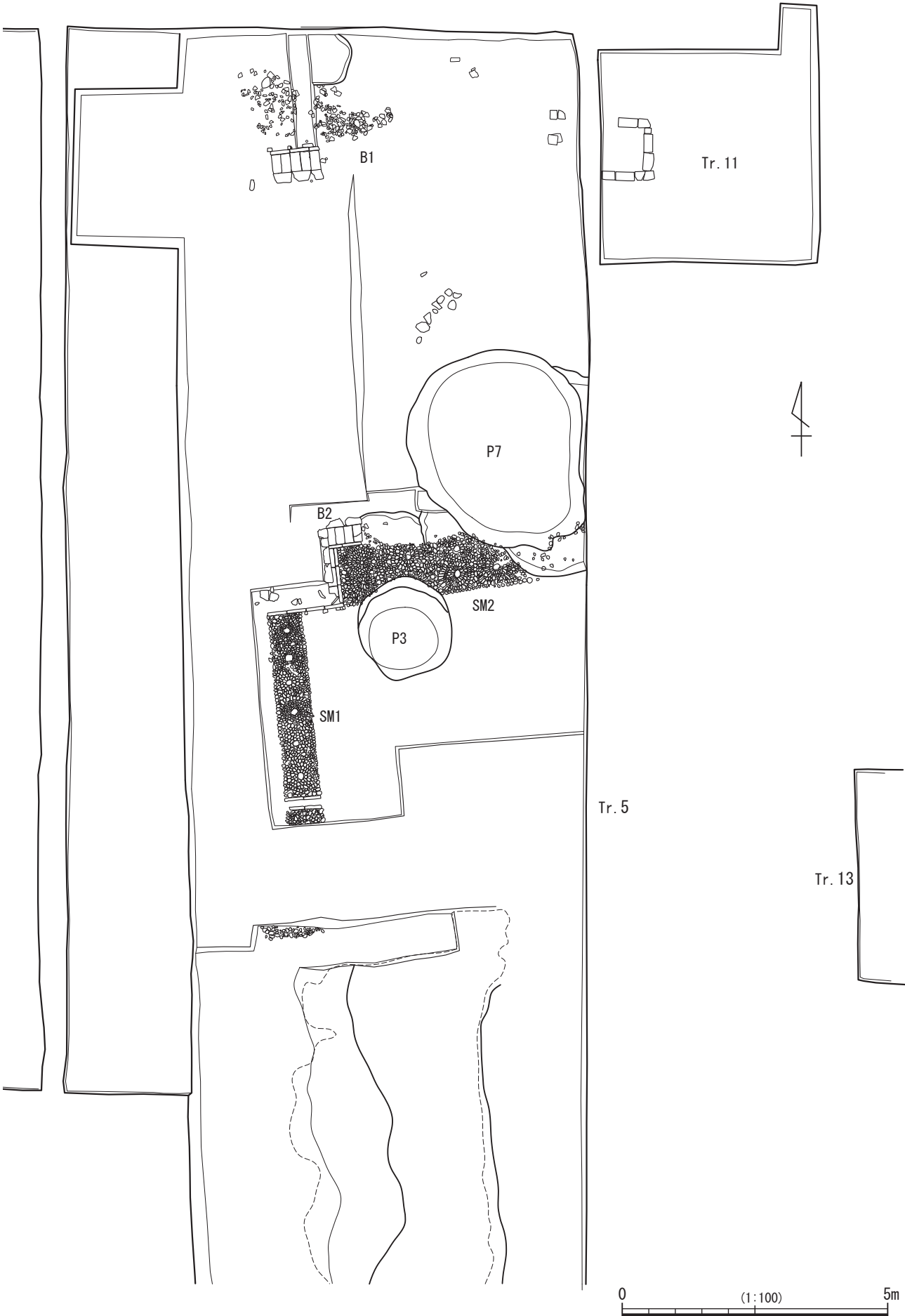


Fig.4.9 Stone Mosaic 1, 2, P3, 7 and their Vicinities in AKB-15

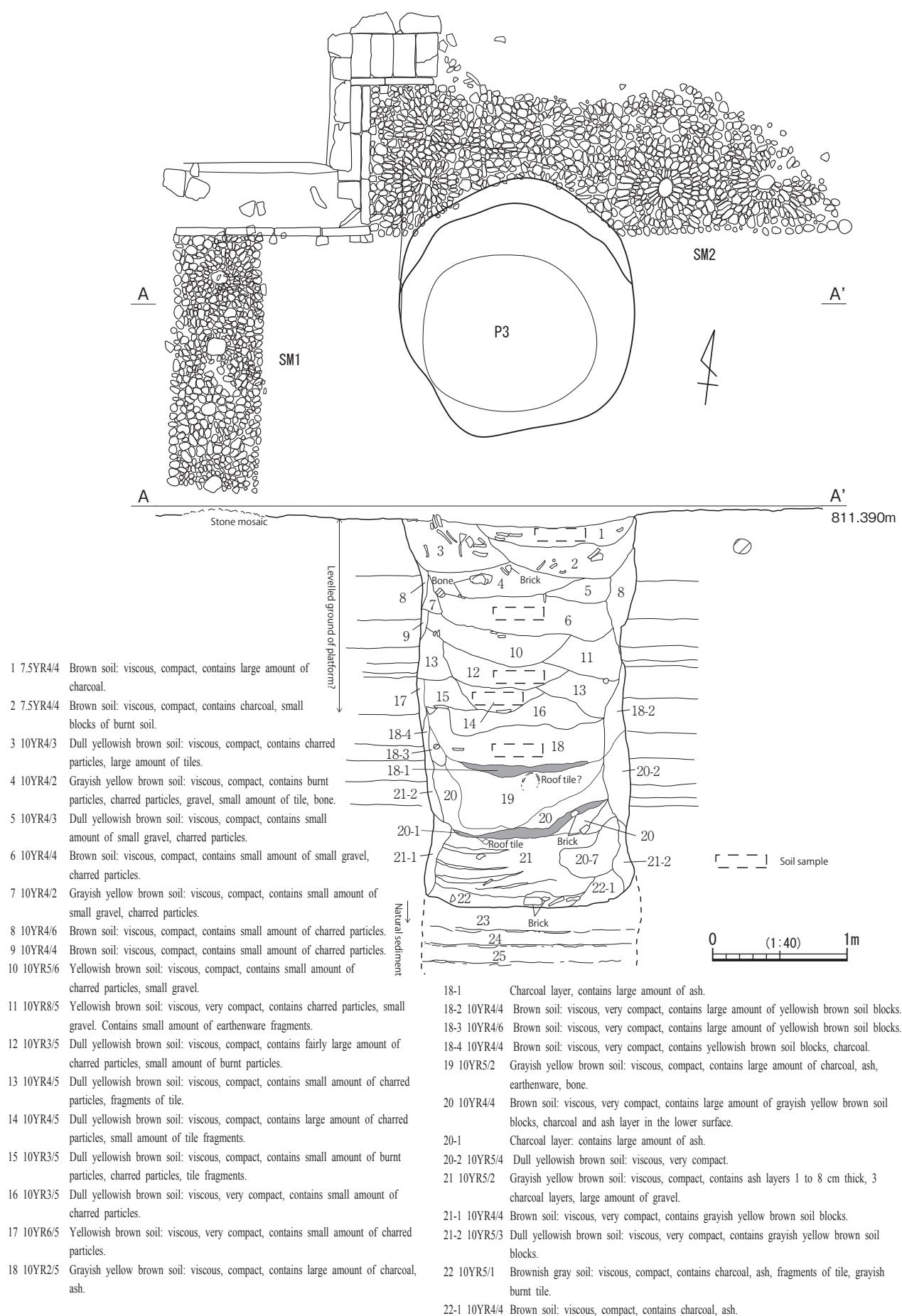


Fig.4.10 P3 of AKB-15



Fig.4.11 Full View of the Site



Fig.4.12 AKB-15 (from above)



Fig.4.13 Tr.2



Fig.4.14 North-Wall Cross-section of Tr.8



Fig.4.15 Row of Roof Tiles in Sub-trench 8



Fig.4.16 North Sub-trench of Tr.8



Fig.4.17 Cluster of Roof Tiles in Tr.10



Fig.4.18 Row of Roof Tiles in Tr.10



Fig.4.19 Row of Roof Tiles in Tr.10



Fig.4.20 Tr.13



Fig.4.21 Tr.14, 15



Fig.4.22 Tr.16



Fig.4.23 Tr.18



Fig.4.24 Tr.19



Fig.4.25 Estimated Range of Platform-1



Fig.4.26 Cross-section of Eastern Border of Platform-1

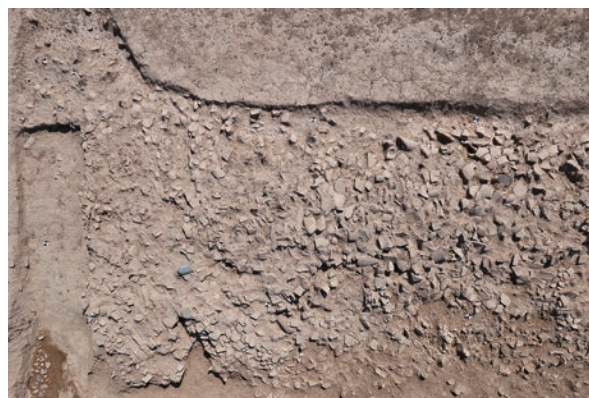


Fig.4.27 Southwest Corner of Platform-1



Fig.4.28 Earthenware and Bones Unearthed in P1



Fig.4.29 Earthenware in P1



Fig.4.30 Cross-section of P1



Fig.4.31 P1 after Excavation



Fig.4.32 Cross-section of P2



Fig.4.33 P2 after Excavation



Fig.4.34 Cross-section of P3



Fig.4.35 Earthenware Unearthed in P3



Fig.4.36 Bones Unearthed in P3



Fig.4.37 Bones and Earthenware Unearthed in P3



Fig.4.38 P3 and SM



Fig.4.39 P3 after Excavation



Fig.4.40 P5



Fig.4.41 P6



Fig.4.42 P7 and SM



Fig.4.43 P7



Fig.4.44 P7 after Excavation



Fig.4.45 P2 and D1 after Excavation



Fig.4.46 Roof Tile Belt



Fig.4.47 Roof Tile Belt



Fig.4.48 SM



Fig.4.49 SM



Fig.4.50 Southern End of SM1



Fig.4.51 Eastern Side of SM1

Tab.4.1 List of Unearthed Materials from AKB-15

No.	fig	Feature	Classification	Type	Rimø/Bottomø/Height/Length/Width/Depth	Weight(g)
15-19-001	4.52	P1	Earthenware	Jar		
15-19-002	4.52	P1	Earthenware	Jar		
15-19-003	4.52	P1	Earthenware	Pot	16.5/-/-	
15-19-004	4.52	P1	Earthenware	Jar	11.6/7.7/14.1	
15-19-005	4.52	P1	Earthenware	Pot	15.8/-/-	
15-19-006	4.52	P1	Earthenware	Pot	(13.0)/-/-	
15-19-007	4.52	P1	Earthenware	Pot	(11.2)/-/-	
15-19-008	4.52	P1	Earthenware	Jar	8.8/-/-	
15-19-009	4.52	P1	Earthenware	Jar	9.6/7.9/-	
15-19-010	4.52	P1	Earthenware	Jar	7.6/6.8/15.5	
15-19-011	4.52	P1	Earthenware	Jar	7.5/-/-	
15-19-012	4.52	P1	Earthenware	Jar	(11.0)/-/-	
15-19-013	4.52	P1	Earthenware	Jar	(9.2)/-/-	
15-19-014	4.52	P1	Earthenware	Jar	9.0/-/-	
15-19-015	4.52	P1	Earthenware	Jar	5.9/-/-	
15-19-016	4.52	P1	Earthenware	Jar		
15-19-017	4.52	P1	Earthenware	Jar		
15-19-018	4.53	P1	Earthenware	Jar	9.0/-/-	
15-19-019	4.53	P1	Earthenware	Jar		
15-19-020	4.53	P1	Earthenware	Jar	5.9/-/-	
15-19-021	4.53	P1	Earthenware	Jar	4.8/-/-	
15-19-022	4.53	P1	Earthenware	Jar		
15-19-023	4.53	P1	Earthenware	Jar		
15-19-024	4.53	P1	Earthenware	Jar		
15-19-025	4.53	P1	Earthenware	Jar	5.0/-/-	
15-19-026	4.53	P1	Earthenware	Jar		
15-19-027	4.53	P1	Earthenware	Jar	2.0/-/-	
15-19-028	4.53	P1	Earthenware	Jar		
15-19-029	4.53	P1	Earthenware			
15-19-030	4.53	P1	Earthenware			
15-19-031	4.53	P1	Earthenware	Jar	6.1/-/-	
15-19-032	4.53	P1	Earthenware			
15-19-033	4.53	P1	Earthenware	Bowl	1.5/11.5/14.4	
15-19-034	4.53	P1	Earthenware	Bowl	10.9/-/-	
15-19-035	4.54	P1	Earthenware	Bowl	30/(12.4)/12.1	
15-19-036	4.54	P1	Earthenware	Bowl	21.0/-/-	
15-19-037	4.54	P1	Earthenware	Bowl	22.5/-/-	
15-19-038	4.54	P1	Earthenware	Bowl	14.0/-/-	
15-19-039	4.54	P1	Earthenware	Bowl	20.3/-/-	
15-19-040	4.54	P1	Earthenware	Bowl		
15-19-041	4.54	P1	Earthenware	Bowl	52.0/-/-	
15-19-042	4.54	P1	Earthenware	Round bodied jar	19.8/-/-	
15-19-043	4.54	P1	Earthenware	Round bodied jar	22.0/-/-	
15-19-044	4.54	P1	Earthenware		-/14.7/-	
15-19-045	4.54	P1	Earthenware			
15-19-046	4.55	P1	Earthenware	Bowl shaped cooking pot	29.4/-/25.4	
15-19-047	4.55	P1	Earthenware	Bowl shaped cooking pot	22.7/-/-	
15-19-048	4.55	P1	Earthenware	Jar shaped cooking pot	17.0/-/-	
15-19-049	4.55	P1	Earthenware	Jar shaped cooking pot	17.1/(8.4)/29	
15-19-050	4.55	P1	Earthenware	Large pot	(44.0)/-/-	
15-19-051	4.55	P1	Earthenware	Large pot	(55.5)/-/-	
15-19-052	4.56	P1	Earthenware	Large pot	40.5/-/-	
15-19-053	4.56	P1	Earthenware	Large pot	38.5/-/-	
15-19-054	4.56	P1	Earthenware	Jar	-/6.6/-	
15-19-055	4.56	P1	Earthenware	Jar	-/(6.8)/-	
15-19-056	4.56	P1	Earthenware	Jar		
15-19-057	4.56	P1	Earthenware	Jar	-/6.2/-	
15-19-058	4.56	P1	Earthenware	Bowl	-/25.6/-	
15-19-059	4.56	P1	Earthenware		-/11.6/-	
15-19-060	4.56	P1	Earthenware		(35.1)/-/-	
15-19-061	4.57	P1	Earthenware		-/(18.8)/-	
15-19-062	4.57	P1	Earthenware	Jar	-/11.2/-	
15-19-063	4.57	P1	Earthenware	Jar	-/(12.2)/-	
15-19-064	4.57	P1	Earthenware	Jar	-/(12.0)/-	
15-19-065	4.57	P1	Earthenware	Jar	-/(11.2)/-67	
15-19-066	4.57	P1	Earthenware	Jar	-/(13.4)/-	
15-19-067	4.57	P1	Earthenware	Jar	-/(11.8)/-	
15-19-068	4.57	P1	Earthenware	Jar	-/11.5/-	
15-19-069	4.57	P1	Earthenware	Lid	-/-/-	
15-19-070	4.58	P1	Earthenware	Lid?	-/-/-	
15-19-071	4.58	P1	Earthenware	Lid	-/-/-	
15-19-072	4.58	P1	Earthenware	Clay object	-/-/-	
15-19-073	4.58	P1	Earthenware	Jar	-/2.0/-	
15-19-074	4.58	P1	Glazed ware	Cup	9.3/4.0/4.0	
15-19-075	4.58	P1	Glazed ware	Dish	-/22.6/-	
15-19-076	4.58	P1	Glazed ware	Dish	-/10.4/-	
15-19-077	4.58	P1	Glazed ware	Dish	-/7.5/-	
15-19-078	4.58	P1	Glazed ware	Dish	-/6.2/-	
15-19-079	4.58	P1	Glazed ware	Dish	-/9.0/-	
15-19-080	4.58	P1	Glazed ware	Lamp	-/5.0/-	
15-19-081	4.58	P1	Glazed ware	Jar	-/5.3/-	

No.	fig	Feature	Classification	Type	Rimφ/Bottomφ/Height/Length/Width/Depth	Weight(g)
15-19-082	4.58	P1	Stone tool	Grinding stone		
15-19-083	4.59	P1	Earthenware	Pipe	-/-/-	
15-19-084	4.59	P1	Earthenware	Pipe?	-/-/-	
15-19-085	4.59	P1	Glazed ware	Pierced disc	2.7/2.5/0.55	5.1
15-19-086	4.59	P1	Sheep astragalus	Chuko	3/20/1.5	
15-19-087	4.60	P2	Earthenware	Jar	(6.7)/-	
15-19-088	4.60	P2	Earthenware	Jug	(8.4)/-	
15-19-089	4.61	P3	Earthenware	Small-sized jar	7.4/4.7/9.3	
15-19-090	4.61	P3	Earthenware	Jar	10.0/8.6/18.0	
15-19-091	4.61	P3	Earthenware	Pot	12.8/6.4/17.9	
15-19-092	4.61	P3	Earthenware	Bowl	(19.2)/-	
15-19-093	4.61	P3	Earthenware	Jar		
15-19-094	4.61	P3	Earthenware	Jar	4.8/8.3/(21.0)	
15-19-095	4.61	P3	Earthenware	Jar		
15-19-096	4.61	P3	Earthenware	Jar	6.3/-/-	
15-19-097	4.61	P3	Earthenware	Jar	(5.8)/-	
15-19-098	4.61	P3	Earthenware	Jar		
15-19-099	4.61	P3	Earthenware	Jar		
15-19-100	4.61	P3	Earthenware	Jar	-(6.2)/-	
15-19-101	4.61	P3	Earthenware	Jar	-(12)/-	
15-19-102	4.62	P3	Earthenware	Jar	-/8.4/-	
15-19-103	4.62	P3	Earthenware	Pot	13.2/-/-	
15-19-104	4.62	P3	Earthenware	Pot	15.0/-/-	
15-19-105	4.62	P3	Earthenware	Pot	(28.3)/-	
15-19-106	4.62	P3	Earthenware	Bowl	-(32.4)/-	
15-19-107	4.62	P3	Earthenware	Cooking pot	27.6/-/-	
15-19-108	4.62	P3	Earthenware	Cooking pot	15.6/-/-	
15-19-109	4.62	P3	Earthenware		-/6.6/-	
15-19-110	4.62	P3	Earthenware		-/6.6/-	
15-19-111	4.62	P3	Earthenware		-/12.4/-	
15-19-112	4.62	P3	Earthenware		-/7.2/-	
15-19-113	4.62	P3	Earthenware		-(13)/-	
15-19-114	4.62	P3	Earthenware	Jar	-(13)/-	
15-19-115	4.63	P3	Earthenware		-/11.2/-	
15-19-116	4.63	P3	Earthenware	Bowl	-/14.2/-	
15-19-117	4.63	P3	Earthenware	Bowl	-/11.0/-	
15-19-118	4.63	P3	Earthenware	Bell		
15-19-119	4.63	P3	Earthenware	Jar		
15-19-120	4.63	P3	Earthenware	Drainage pipe?		
15-19-121	4.63	P3	Earthenware	Lid		
15-19-122	4.63	P3	Earthenware	Handle		
15-19-123	4.63	P3	Earthenware	Leg		
15-19-124	4.63	P3	Stone tool	Bead	0.7/0.4	0.2
15-19-125	4.64	P7	Earthenware	Cup	-/4.2/-	
15-19-126	4.64	P7	Earthenware	Cup		
15-19-127	4.64	P7	Earthenware	Cup		
15-19-128	4.64	P7	Earthenware	Small pot		
15-19-129	4.64	P7	Earthenware	Small pot		
15-19-130	4.64	P7	Earthenware	Small pot		
15-19-131	4.64	P7	Earthenware	Small pot		
15-19-132	4.64	P7	Earthenware	Small pot		
15-19-133	4.64	P7	Earthenware	Jar		
15-19-134	4.64	P7	Earthenware	Jar		
15-19-135	4.64	P7	Earthenware	Jar		
15-19-136	4.64	P7	Earthenware	Jar		
15-19-137	4.64	P7	Earthenware	Jar		
15-19-138	4.64	P7	Earthenware	Jar		
15-19-139	4.64	P7	Earthenware	Jar		
15-19-140	4.64	P7	Earthenware	Jar		
15-19-141	4.64	P7	Earthenware	Jar		
15-19-142	4.64	P7	Earthenware			
15-19-143	4.64	P7	Earthenware			
15-19-144	4.65	P7	Earthenware	Jar		
15-19-145	4.65	P7	Earthenware	Jar		
15-19-146	4.65	P7	Earthenware	Jar		
15-19-147	4.65	P7	Earthenware	Pot		
15-19-148	4.65	P7	Earthenware	Bowl		
15-19-149	4.65	P7	Earthenware	Bowl		
15-19-150	4.65	P7	Earthenware	Cooking pot		
15-19-151	4.65	P7	Earthenware	Cooking pot		
15-19-152	4.65	P7	Earthenware	Pot		
15-19-153	4.65	P7	Earthenware	Pot		
15-19-154	4.66	P7	Earthenware	Pot		
15-19-155	4.66	P7	Earthenware			
15-19-156	4.66	P7	Earthenware	Jar	-/7.8/-	
15-19-157	4.66	P7	Earthenware			
15-19-158	4.66	P7	Earthenware	Jar	-/13.8/-	
15-19-159	4.66	P7	Earthenware	Jar	-/10.9/-	
15-19-160	4.66	P7	Earthenware	Jar	-/11.6/-	
15-19-161	4.66	P7	Earthenware	Jar	-/11.5/-	
15-19-162	4.66	P7	Earthenware	Lid		
15-19-163	4.66	P7	Earthenware	Lid		

No.	fig	Feature	Classification	Type	Rimφ/Bottomφ/Height/Length/Width/Depth	Weight(g)
15-19-164	4.66	P7	Earthenware	Lid		
15-19-165	4.66	P7	Earthenware			
15-19-166	4.66	P7	Glazed ware	Dish	13.8/8.7/3.1	
15-19-167	4.66	P7	Glazed ware		-7.9/-	
15-19-168	4.66	P7	Glazed ware		(19.0)/-/-	
15-19-169	4.67	P7	Copper	Belt end tip/ horse tack	3.1/1.5/0.1~0.2	6.6
15-19-170	4.67	P7	Copper	Horse tack?	5.1/2.6/0.2~0.4	12.0
15-19-171	4.67	P7	Copper		(4.0)/07~08/0.2	3.3
15-19-172	4.67	P7	Copper	Unknown	1.3/-/-	0.3
15-19-173	4.67	P7	Copper	Fragment of tack?	(1.4)/0.5/0.4	0.7
15-19-174	4.67	P7	Copper	Unknown	2.3/-/0.25	8.5
15-19-175	4.67	P7	Copper	Coin	(1.4)/-0.1	0.3
15-19-176	4.67	P7	Iron	Small knife	(7.8)/1.1~1.2/0.2	9.1
15-19-177	4.67	P7	Iron	Unknown	(11.5)/3.5/0.2~0.4	51.4
15-19-178	4.67	P7	Coral		2.2/-/-	1.2
15-19-179	4.67	P7	Stone tool	Bead	1.2/0.3	0.9
15-19-180	4.67	P7	Glazed ware	Pierced disc	(1.3)/-0.5	0.6
15-19-181	4.67	P7	Clay object	Pierced disc	(3.9)/-1.1	9.1
15-19-182	4.67	P7	Clay object	Pierced disc	3.1/-/0.5	8.7
15-19-183	4.67	P7	Glazed ware	Horse figurine		20
15-19-184	4.67	P7	Earthenware	Lid		
15-19-185	4.67	P7	Sheep astragalus	Chuko	3.2/2.0/1.9	6.7
15-19-186	4.67	P7	Sheep astragalus	Chuko	2.9/2.1/-	3.8
15-19-187	4.68	P7	Earthenware	Stand (Stamp)		
15-19-188	4.68	P7	Earthenware	Stand		
15-19-189	4.69	D1	Earthenware	Urinal formed	11.7/5.9/18.0	
15-19-190	4.69	D1	Earthenware	Pot with handles	11.9/6.4/15.5	
15-19-191	4.69	D1	Earthenware	Jar		
15-19-192	4.69	D1	Earthenware	Jar		
15-19-193	4.69	D1	Earthenware	Tub-shaped bowl	(54)/-/-	
15-19-194	4.69	D1	Earthenware	Lid		
15-19-195	4.70	Tr.10a	Earthenware	Jar	-/14.0/-	
15-19-196	4.70	Tr.5	Stone tool	Mill		
15-19-197	4.70	Tile belt	Copper	Handle	4.5/-/0.1	1.0
15-19-198	4.70	Tile belt west	Iron	Unknown	4.0/-/0.1~0.2	2.8
15-19-199	4.70	Tr13	Iron	Fragment of iron pot?	-/-0.1	35.7
15-19-200	4.71	P1	Roof tile	Concave tile		
15-19-201	4.71	P1	Clay object	Greyish burnt brick		
15-19-202	4.71	P2	Roof tile	Eave-end tile		
15-19-203	4.71	P3	Roof tile	Eave-end tile		
15-19-204	4.71	P3	Roof tile	Concave tile		
15-19-205	4.72	P3	Roof tile	Concave tile		
15-19-206	4.72	P3	Roof tile	Convex tile		
15-19-207	4.72	P3	Roof tile	Convex tile		
15-19-208	4.72	P3	Roof tile	Ridge tile		
15-19-209	4.72	P3	Clay object	Greyish burnt brick		
15-19-210	4.73	P7	Roof tile	Eave-end tile		
15-19-211	4.73	P7	Clay object	Greyish burnt brick		
15-19-212	4.73	P7	Roof tile	Concave tile (inscribed?)		
15-19-213	4.73	Tile belt	Roof tile	Eave-end tile		
15-19-214	4.73	Tile belt	Roof tile	Concave tile		
15-19-215	4.73	Tile belt	Roof tile	Concave tile		
15-19-216	4.74	Tile belt	Roof tile	Concave tile		
15-19-217	4.74	Tile belt	Roof tile	Convex tile		
15-19-218	4.74	Tile belt	Roof tile	Convex tile		
15-19-219	4.74	Tile belt	Roof tile	Convex tile		
15-19-220	4.75	Tile belt	Roof tile	Ridge tile		
15-19-221	4.75	Tile belt	Roof tile	Ridge tile		
15-19-222	4.75	Tile belt	Roof tile	Ridge tile		
15-19-223	4.75	Tile belt	Roof tile	Ridge tile		
15-19-224	4.75	Tile belt	Roof tile	Ridge tile		
15-19-225	4.75	North of a Rain-Permeable Ditch made of Greyish Burnt Bricks	Roof tile	Eave-end tile		
15-19-226	4.75	North of a Rain-Permeable Ditch made of Greyish Burnt Bricks	Roof tile	Eave-end tile		
15-19-227	4.75	Tile aggregation 4	Roof tile	Eave-end tile		
15-19-228	4.76	Tile belt west	Clay object	Greyish burnt brick		
15-19-229	4.76	Tr.3	Clay object	Greyish burnt brick		
15-19-230	4.76	Tr.5	Roof tile	Eave-end tile		
15-19-231	4.76	Tr.5	Roof tile	Eave-end tile		
15-19-232	4.76	Tr.5	Clay object	Greyish burnt brick		
15-19-233	4.77	Tr.5	Clay object	Greyish burnt brick		
15-19-234	4.77	Tr.5	Clay object	Greyish burnt brick		
15-19-235	4.77	Tr.5	Clay object	Greyish burnt brick		
15-19-236	4.78	Tr.5	Clay object	Greyish burnt brick		
15-19-237	4.78	Tr.5	Clay object	Greyish burnt brick		
15-19-238	4.78	Tr.8	Roof tile			
15-19-239	4.78	Tr.10a	Roof tile	Eave-end tile		
15-19-240	4.78	Tr.11	Roof tile	Eave-end tile		
15-19-241	4.78	Tr.14	Clay object	Greyish burnt brick		

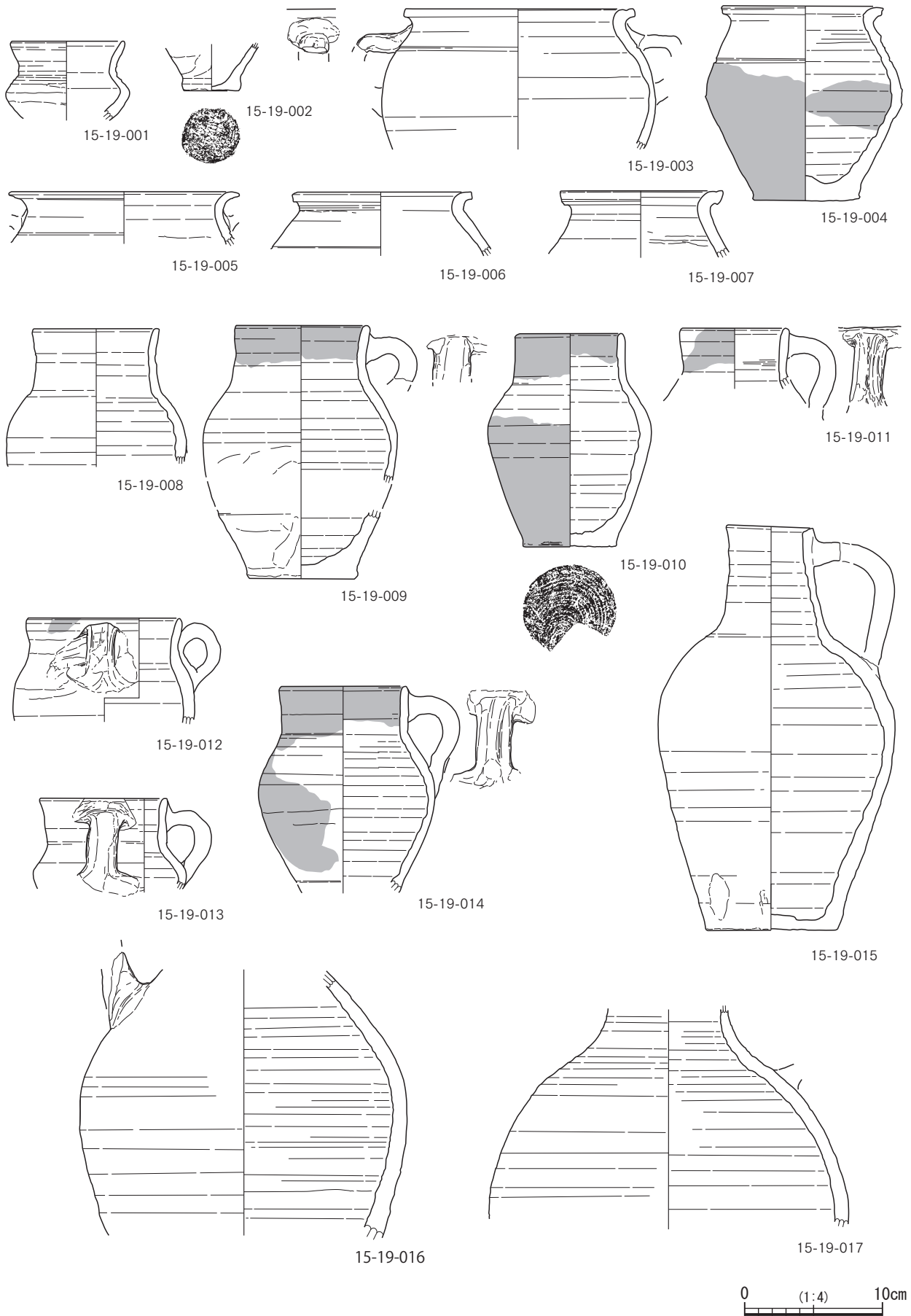


Fig.4.52 Artifacts from AKB-15(1) P1(15-19-018 - 034)

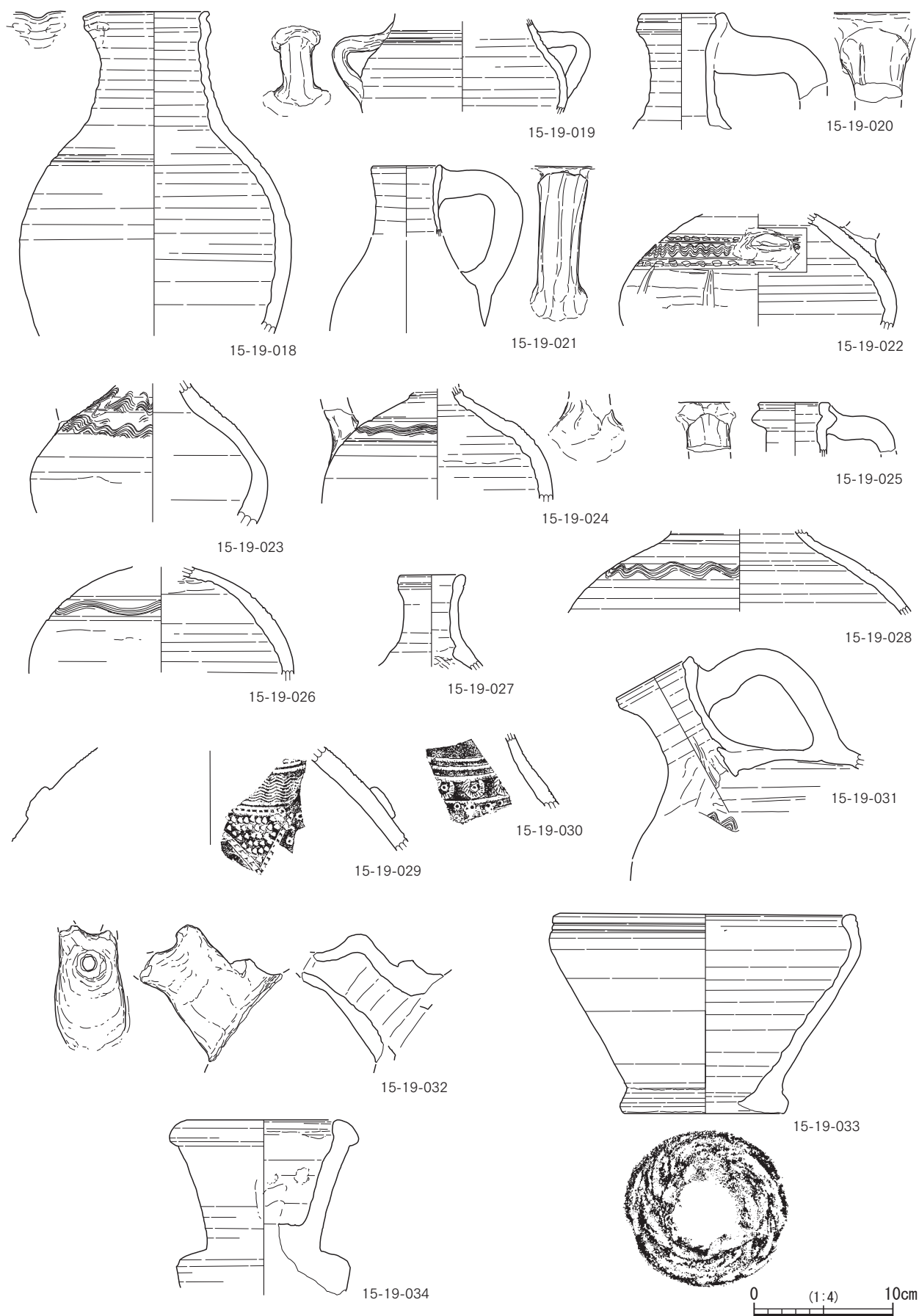


Fig.4.53 Artifacts from AKB-15(2) P1(15-19-018 - 034)

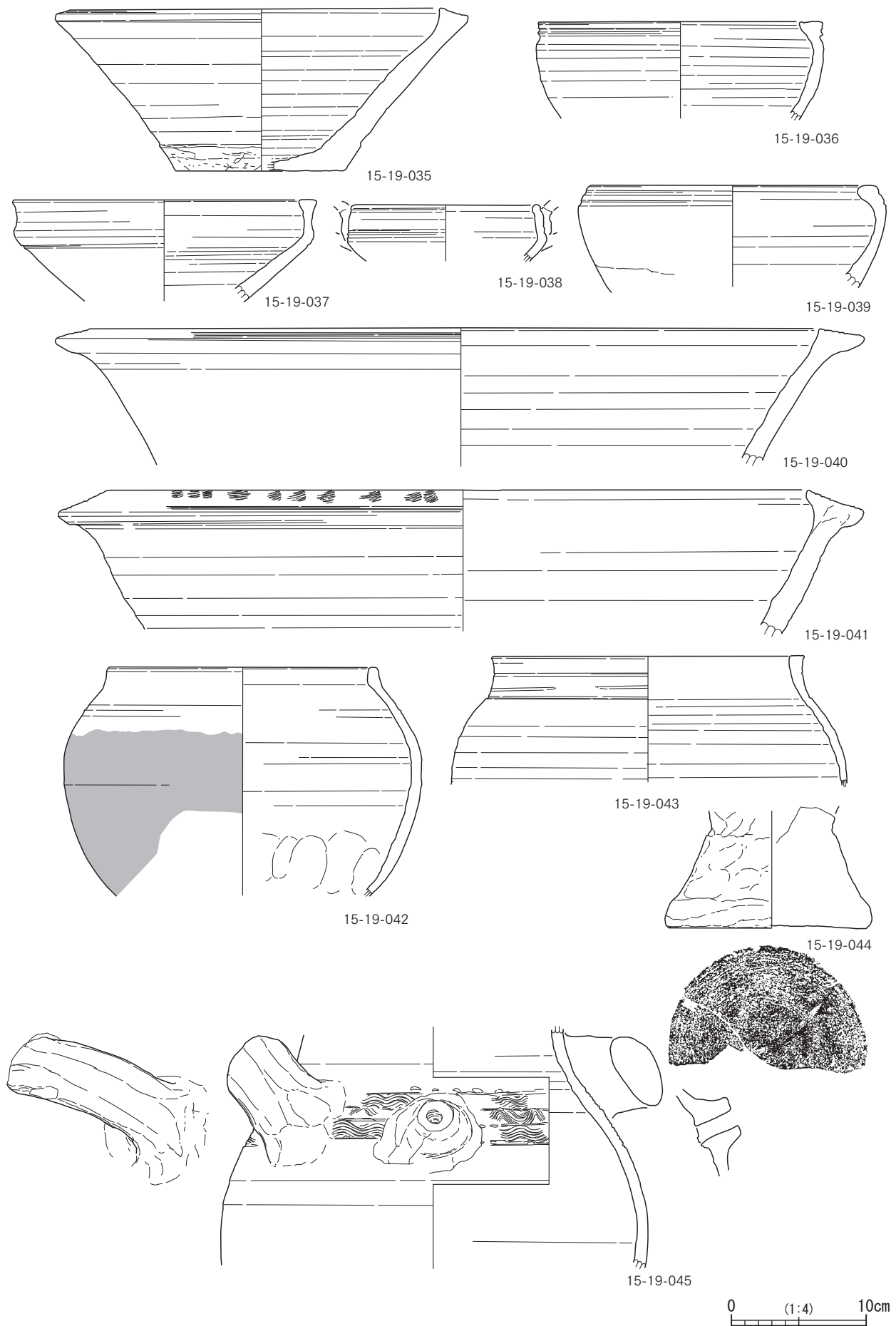


Fig.4.54 Artifacts from AKB-15(3) P1 (15-19-035 - 045)

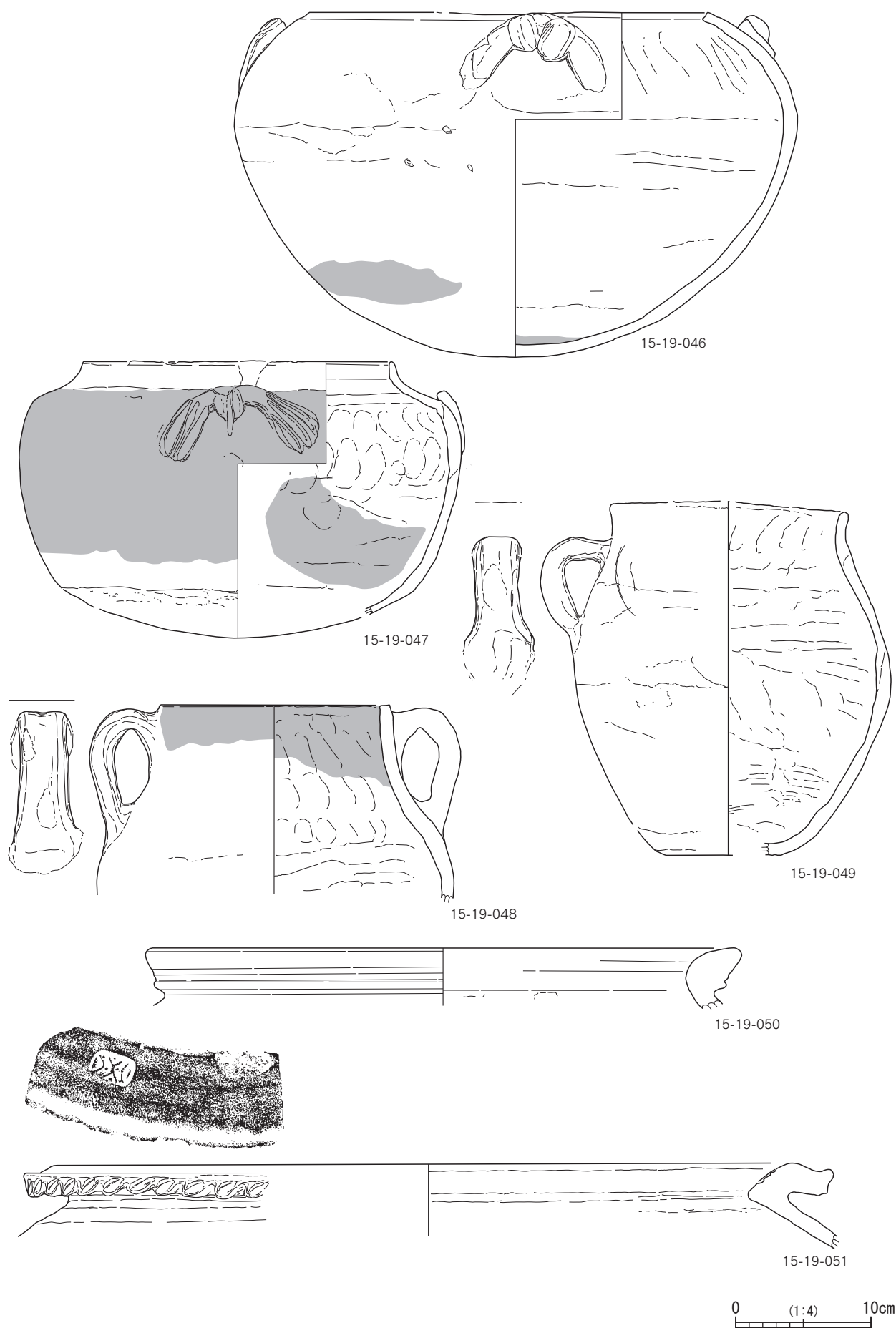


Fig.4.55 Artifacts from AKB-15(4) P1 (15-19-046 - 051)

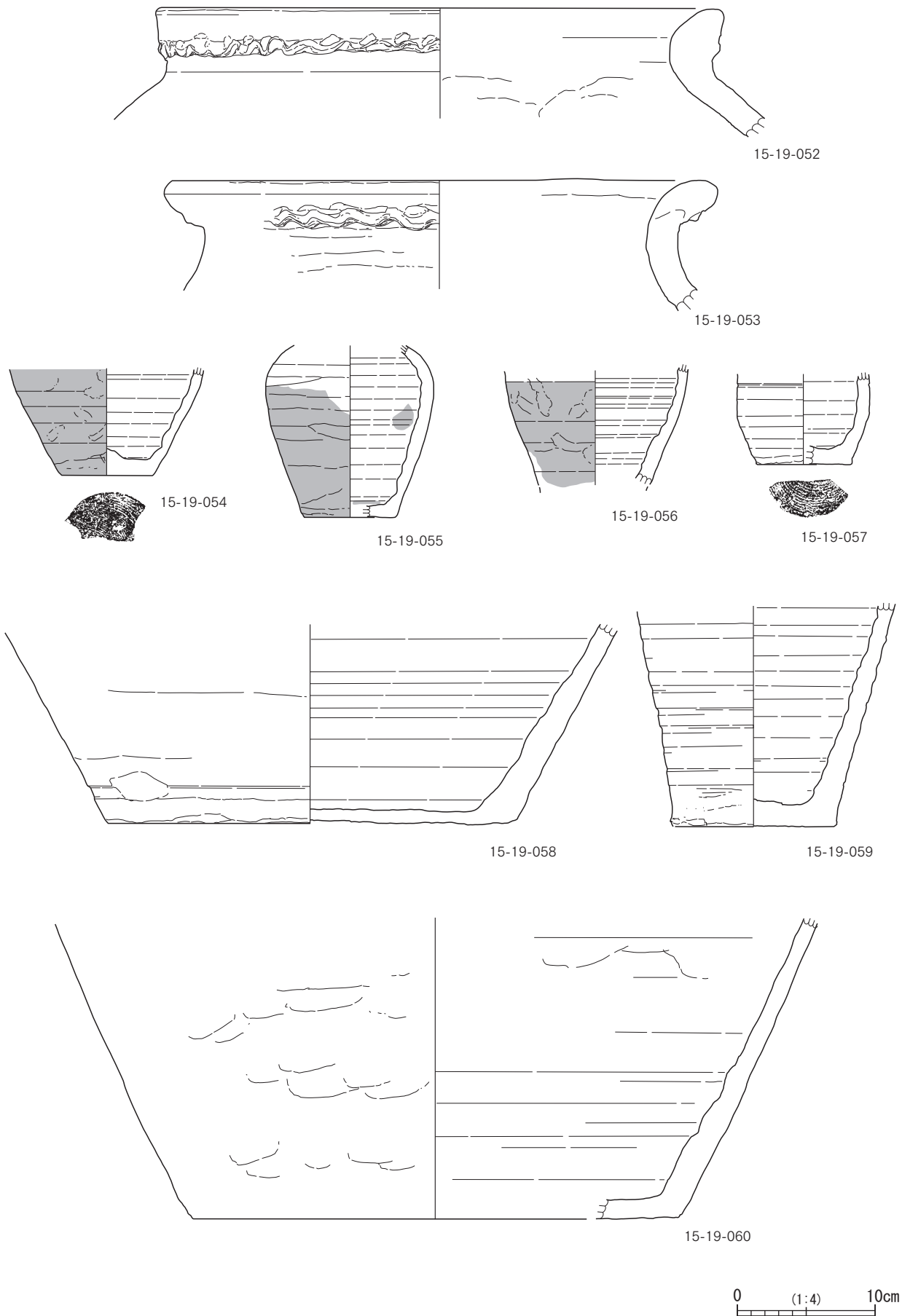


Fig.4.56 Artifacts from AKB-15(5) P1 (15-19-052 - 060)

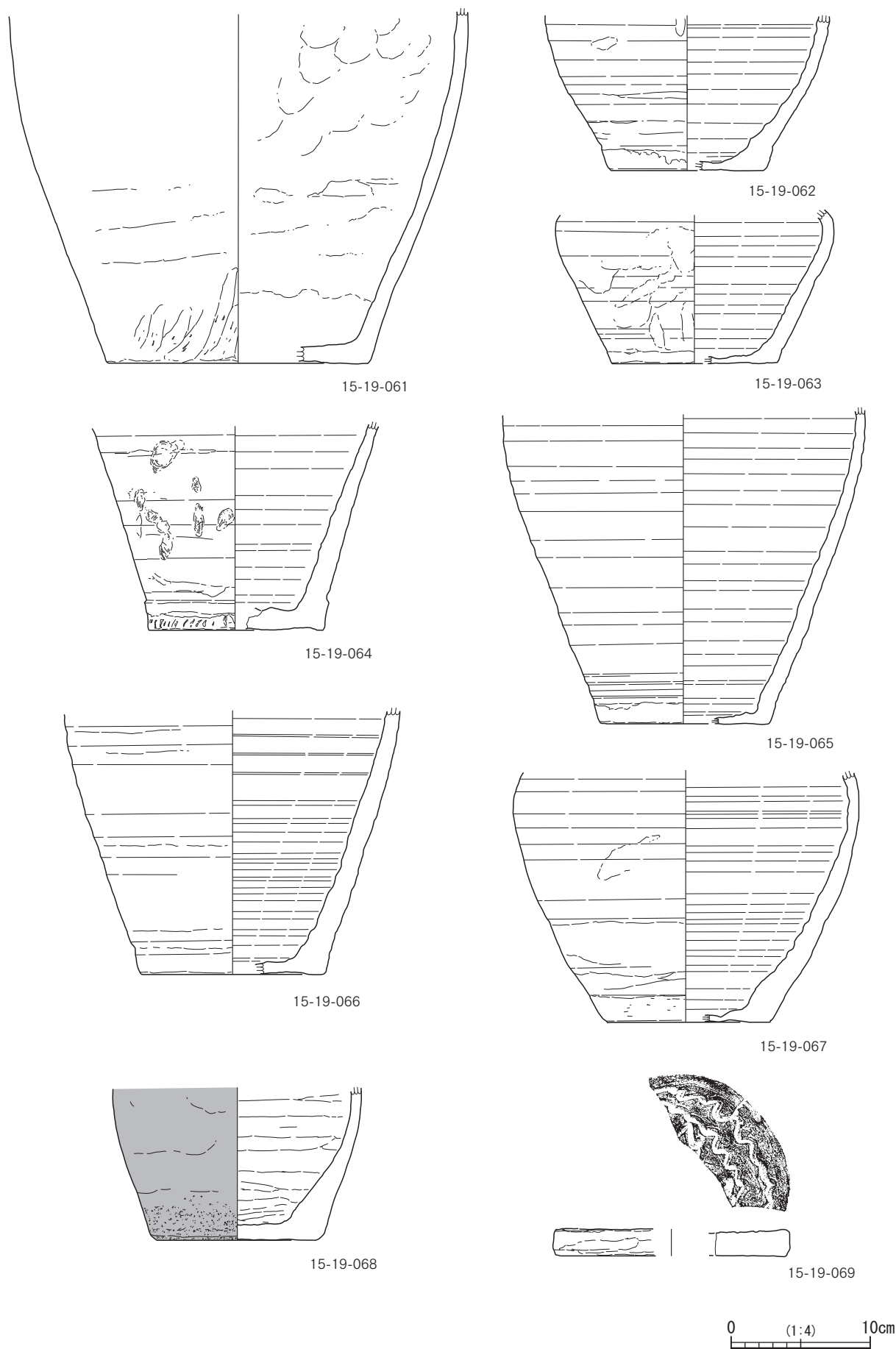


Fig.4.57 Artifacts from AKB-15(6) P1 (15-19-061 - 069)

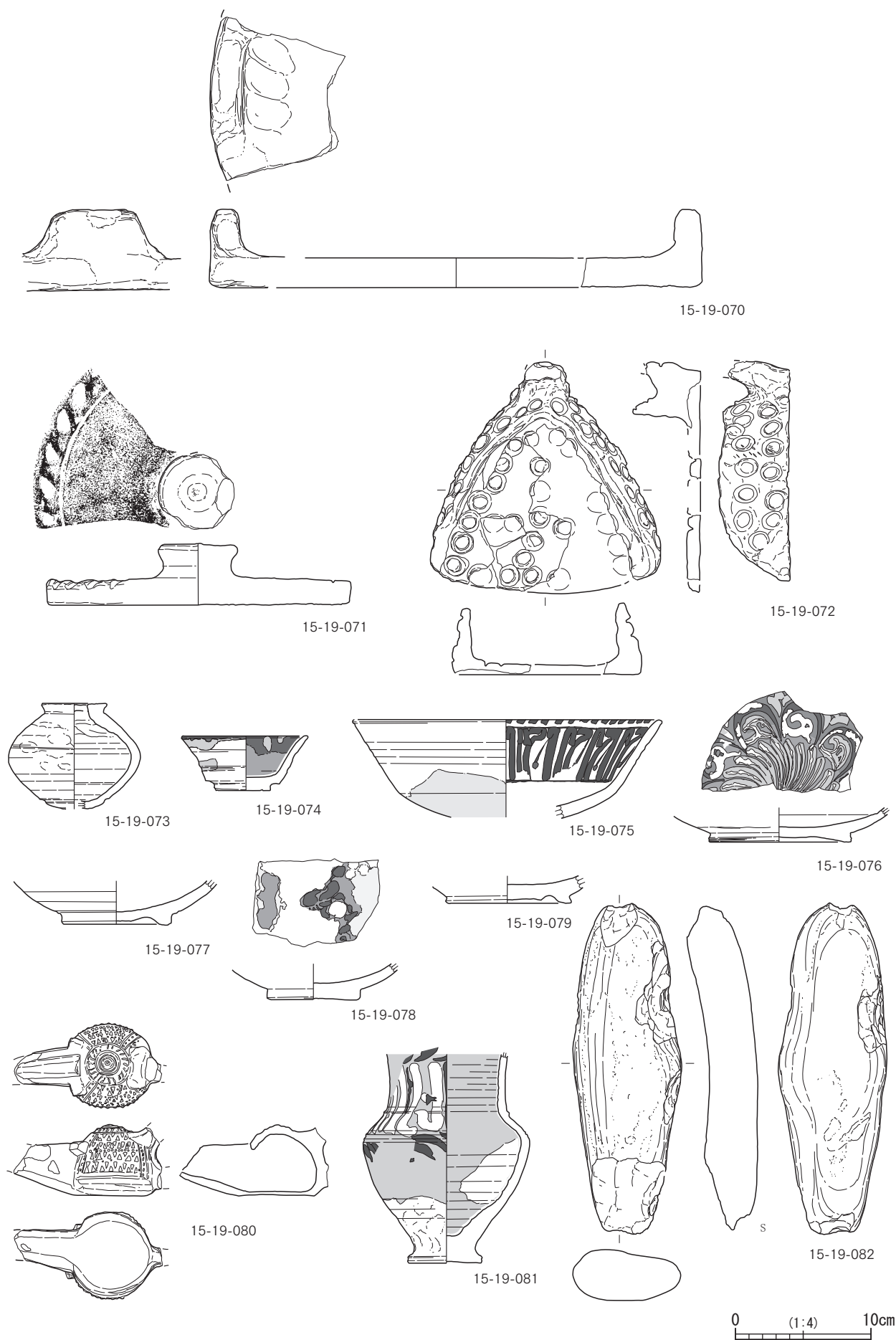


Fig.4.58 Artifacts from AKB-15(7) P1 (15-19-070 - 082)

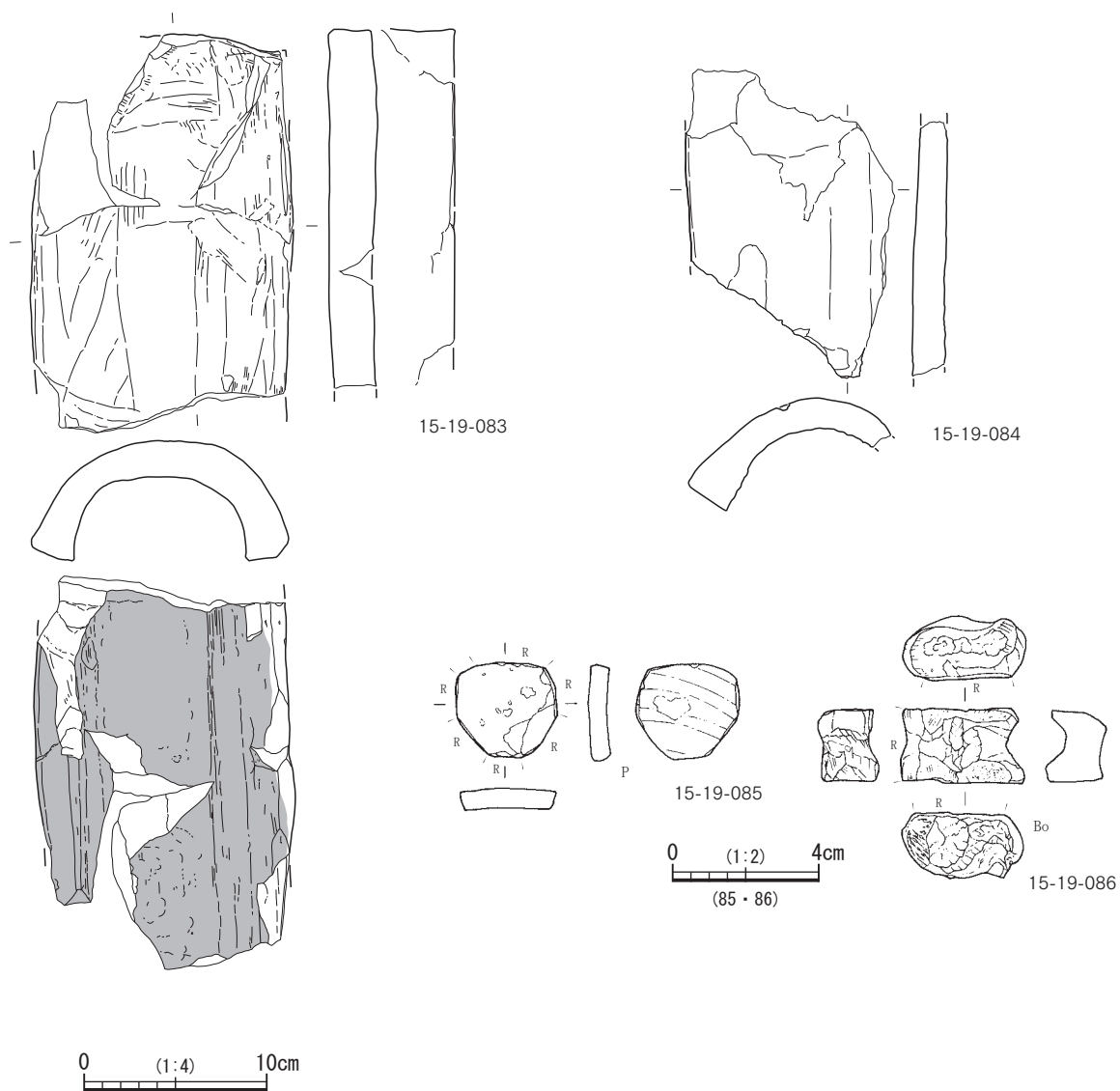


Fig.4.59 Artifacts from AKB-15(8) P1 (15-19-083 - 86)

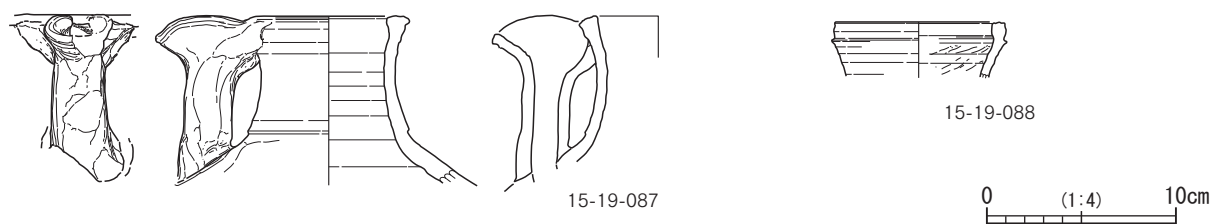


Fig.4.60 Artifacts from AKB-15(9) P2 (15-19-087, 088)

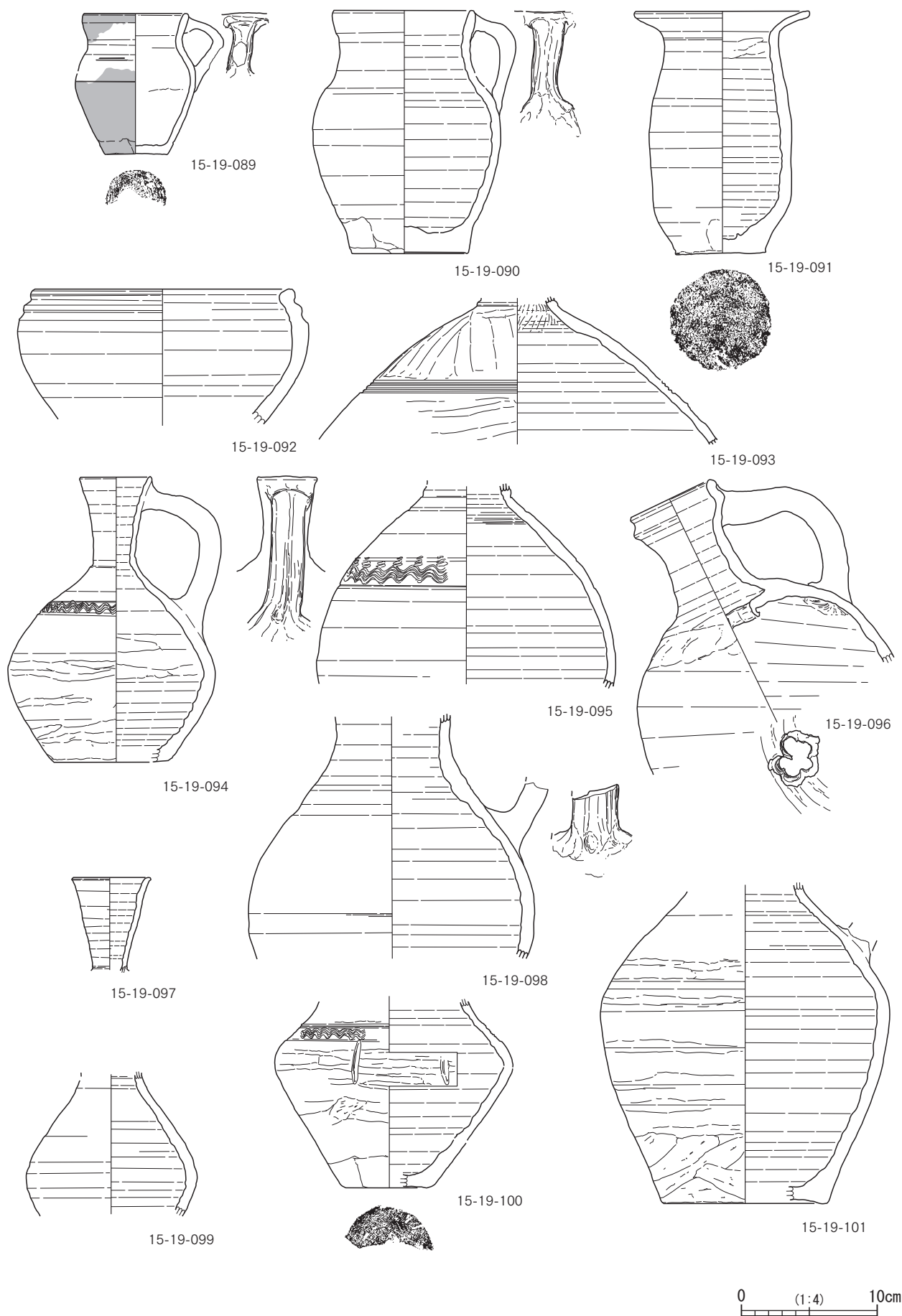


Fig.4.61 Artifacts from AKB-15(10) P3 (15-19-089 - 101)

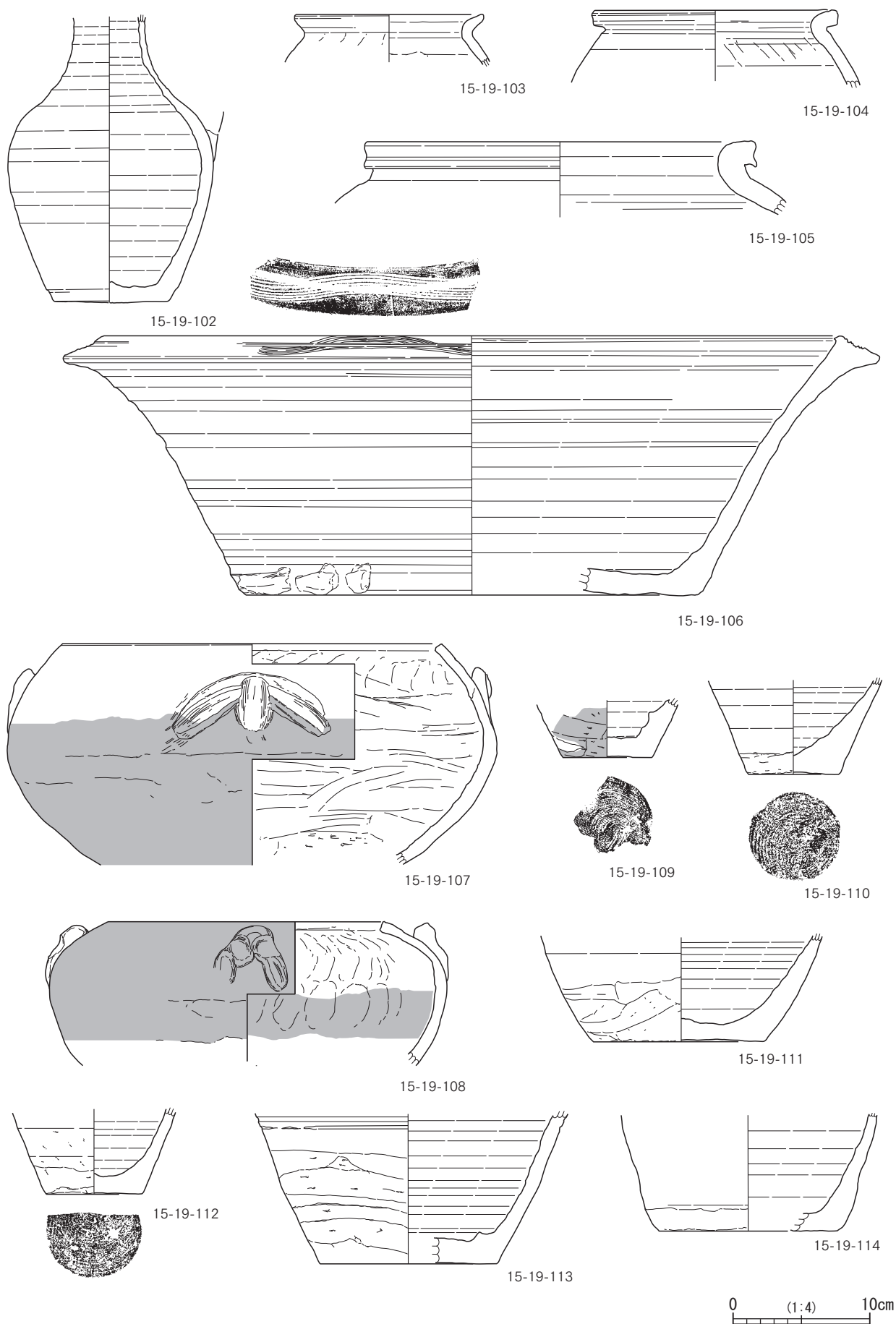


Fig.4.62 Artifacts from AKB-15(11) P3 (15-19-102 - 114)

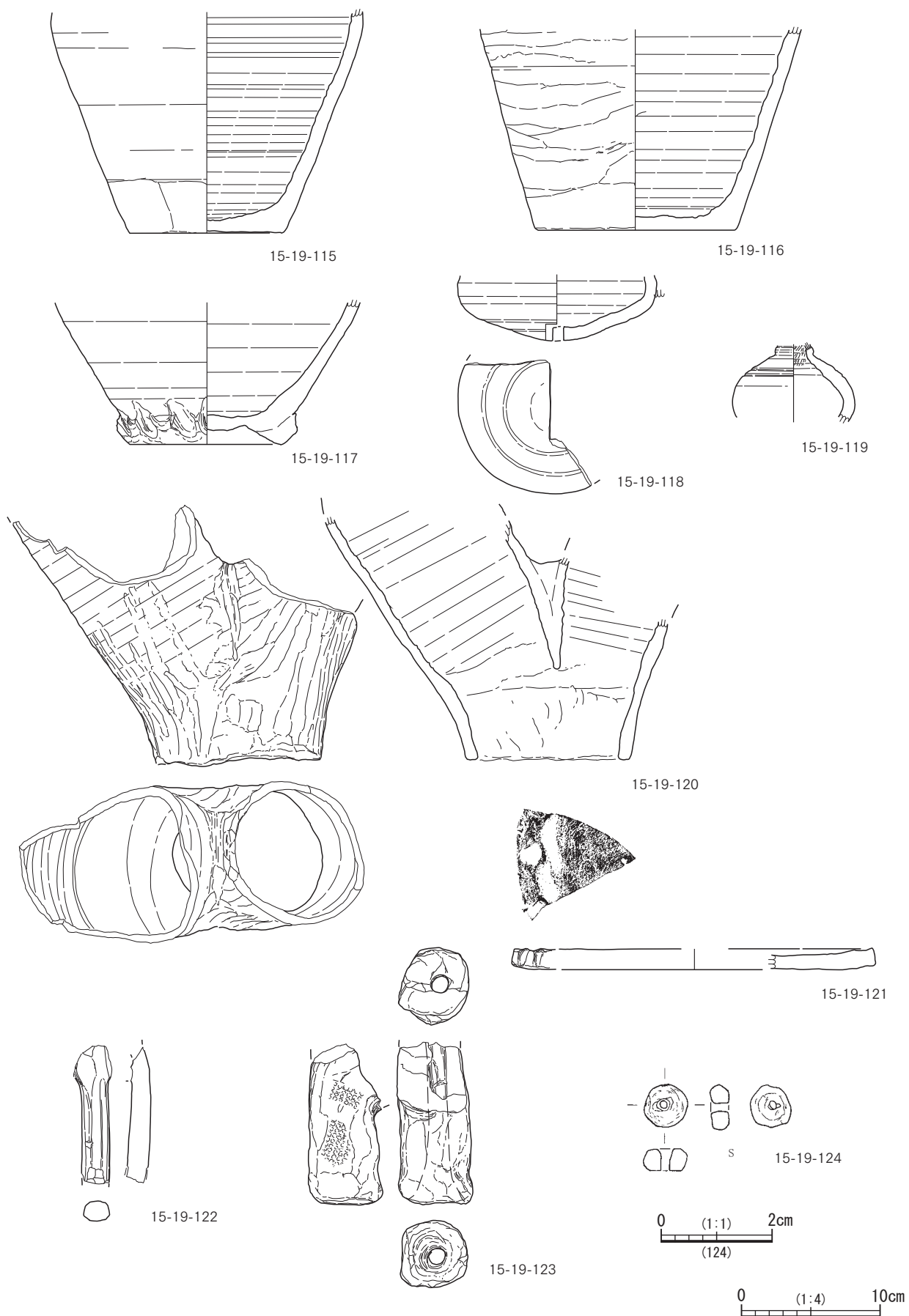


Fig.4.63 Artifacts from AKB-15(12) P3 (15-19-115 - 124)

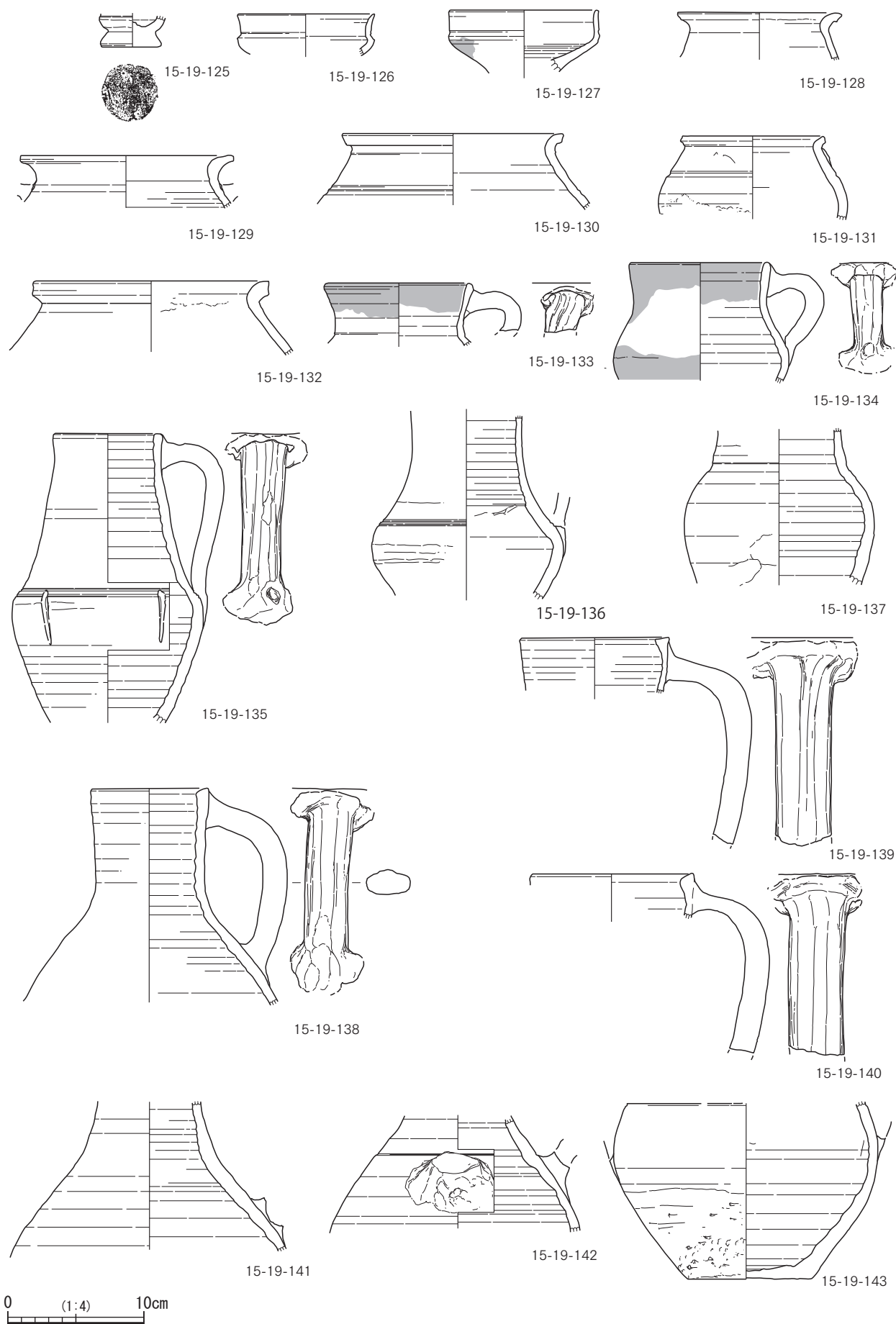


Fig.4.64 Artifacts from AKB-15(13) P7 (15-19-125 - 143)

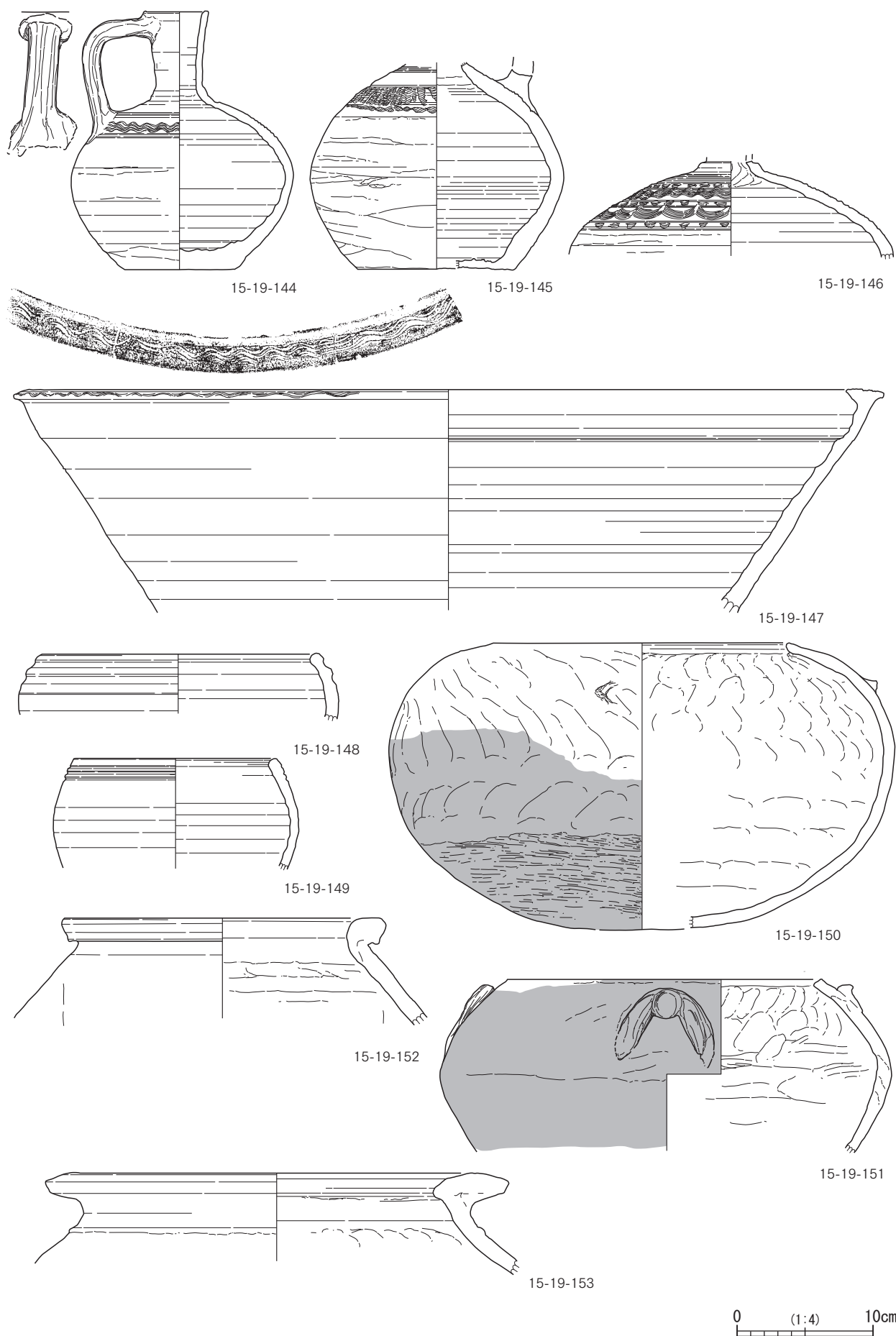


Fig.4.65 Artifacts from AKB-15(14) P7 (15-19-144 - 153)

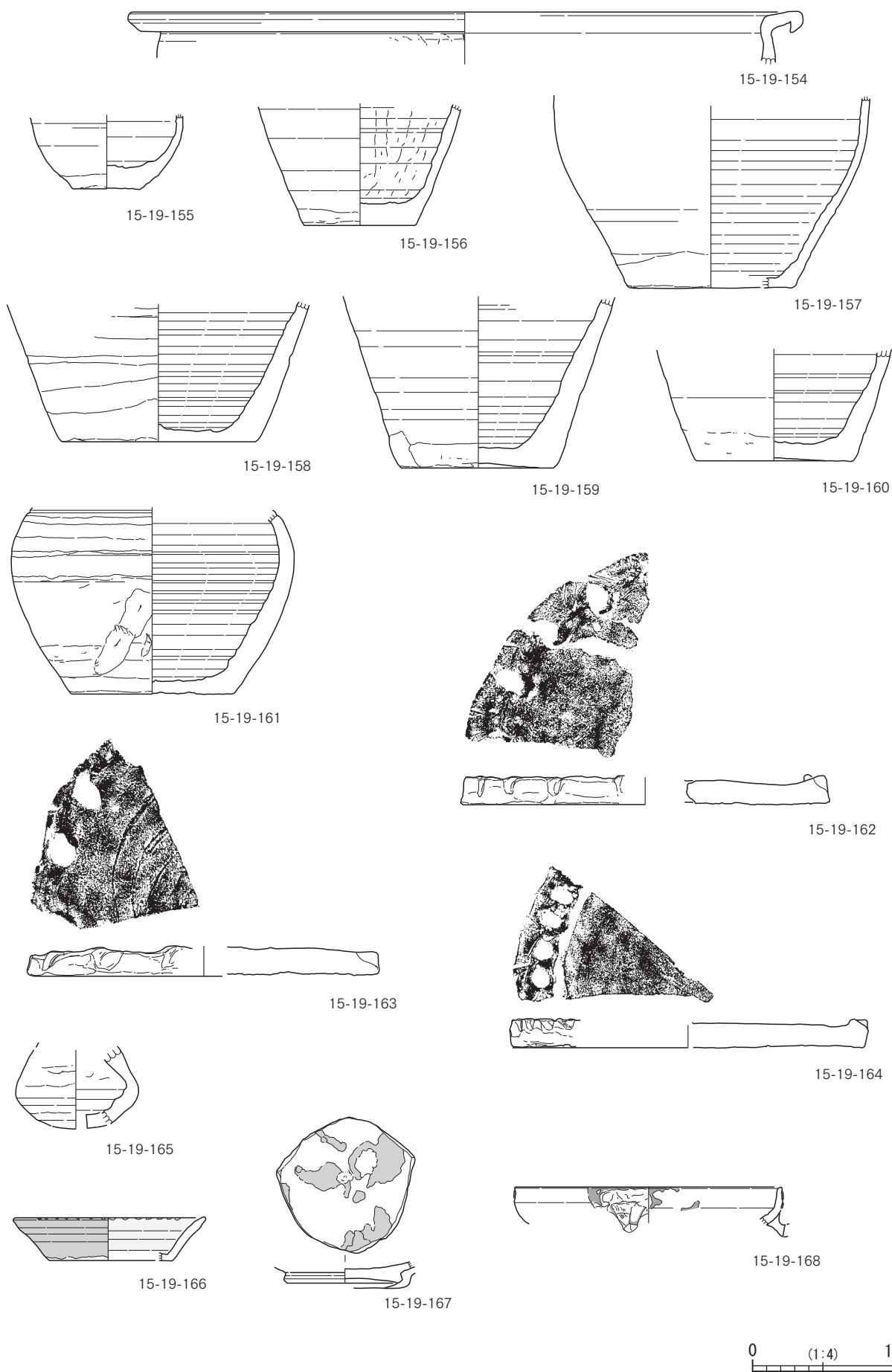


Fig.4.66 Artifacts from AKB-15(15) P7 (15-19-154 - 168)

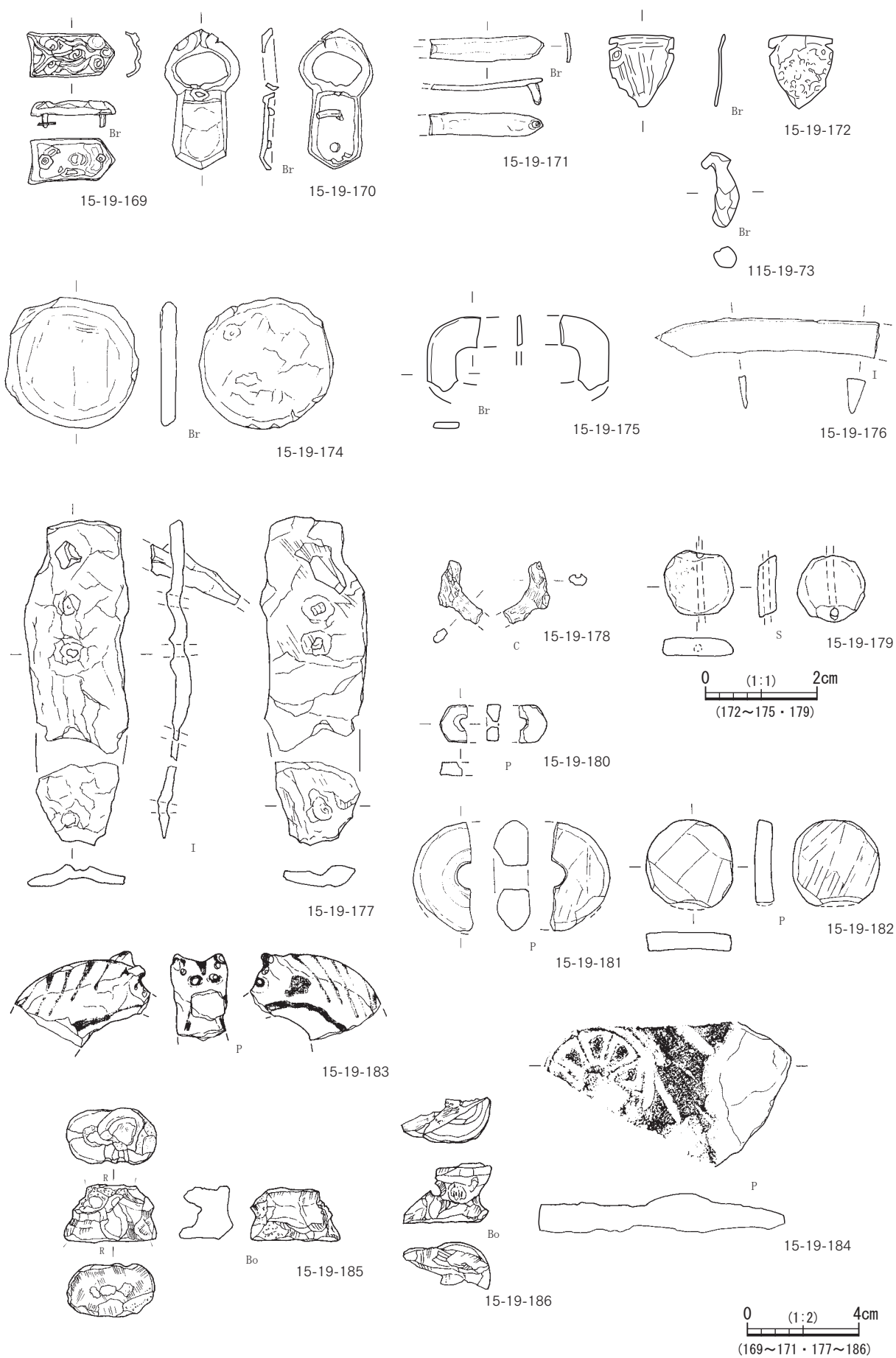


Fig.4.67 Artifacts from AKB-15(16) P7 (15-19-169 - 186)

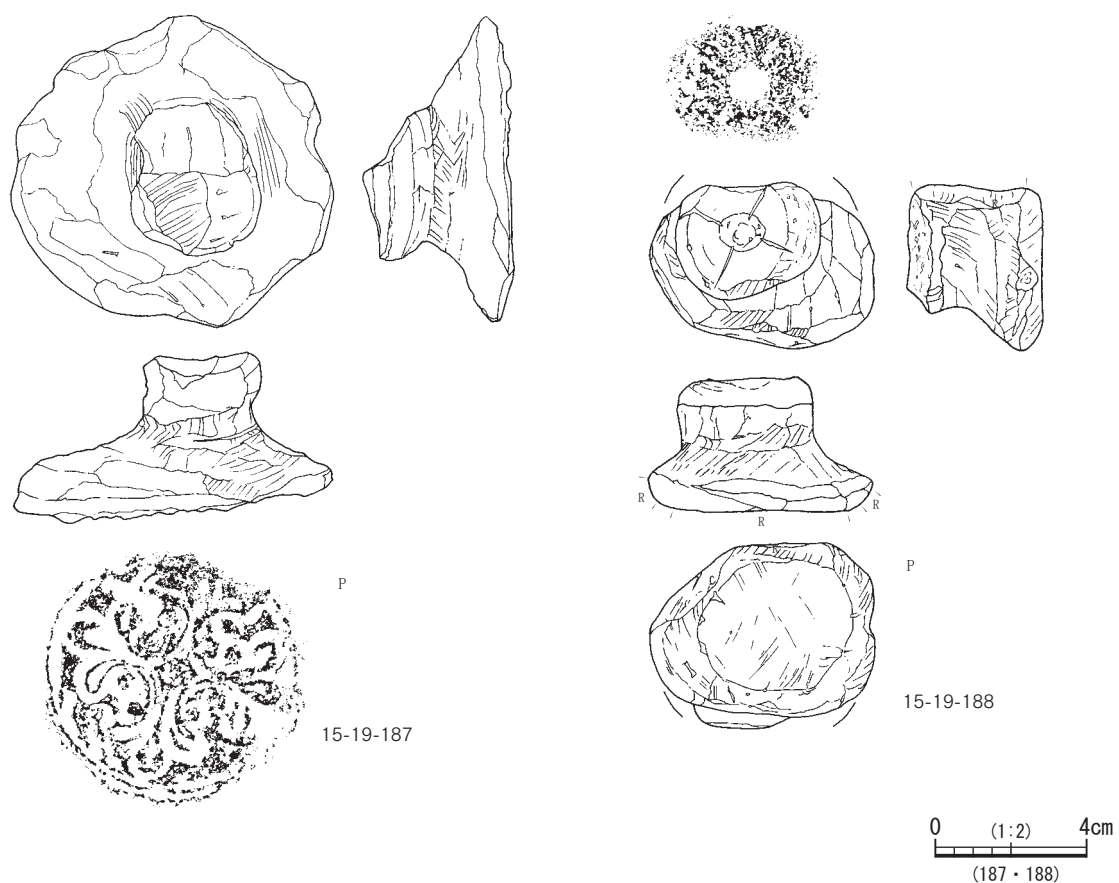


Fig.4.68 Artifacts from AKB-15(17) P7 (15-19-187, 188)

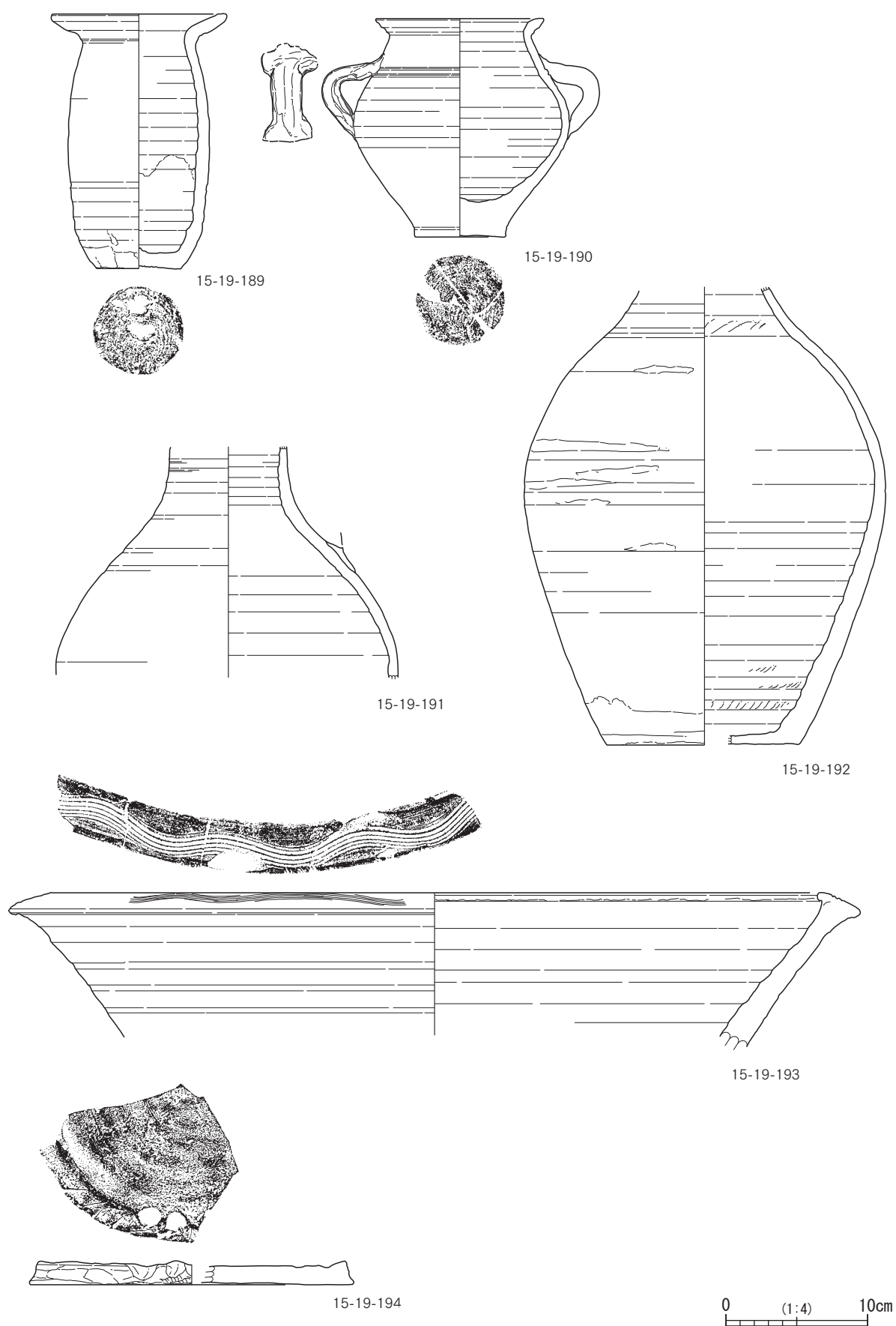


Fig.4.69 Artifacts from AKB-15(18) D1 (15-19-189 - 194)

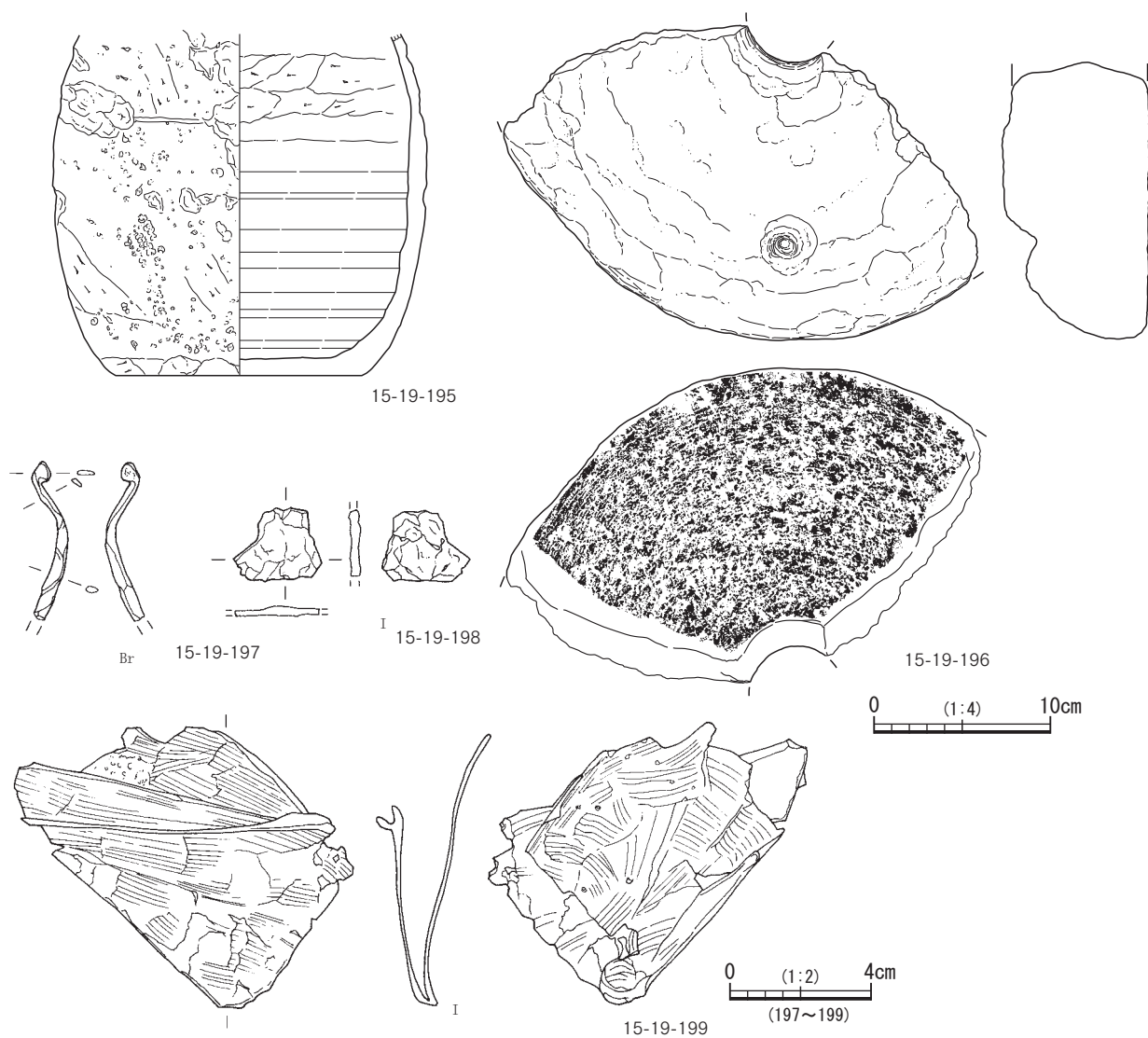


Fig.4.70 Artifacts from AKB-15(19) Tr. 10 (15-19-195), Tr.5 (15-19-196), Roof tile belt (15-19-197), West of roof tile belt (15-19-198), Tr. 13 (15-19-199)

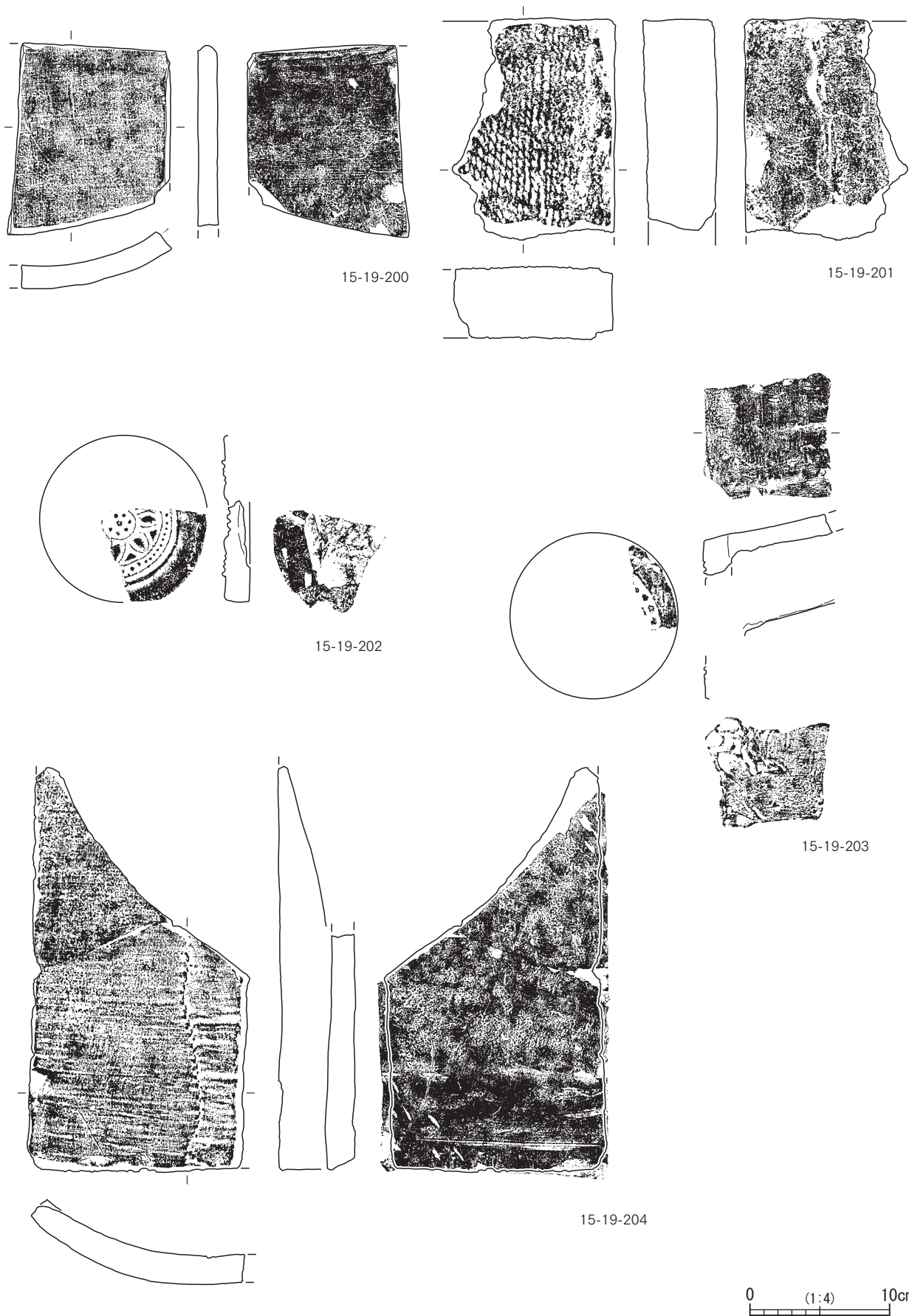


Fig.4.71 Artifacts from AKB-15(20)
P1 (15-19-200, 201), P2 (15-19-202), P3 (15-19-203, 204)

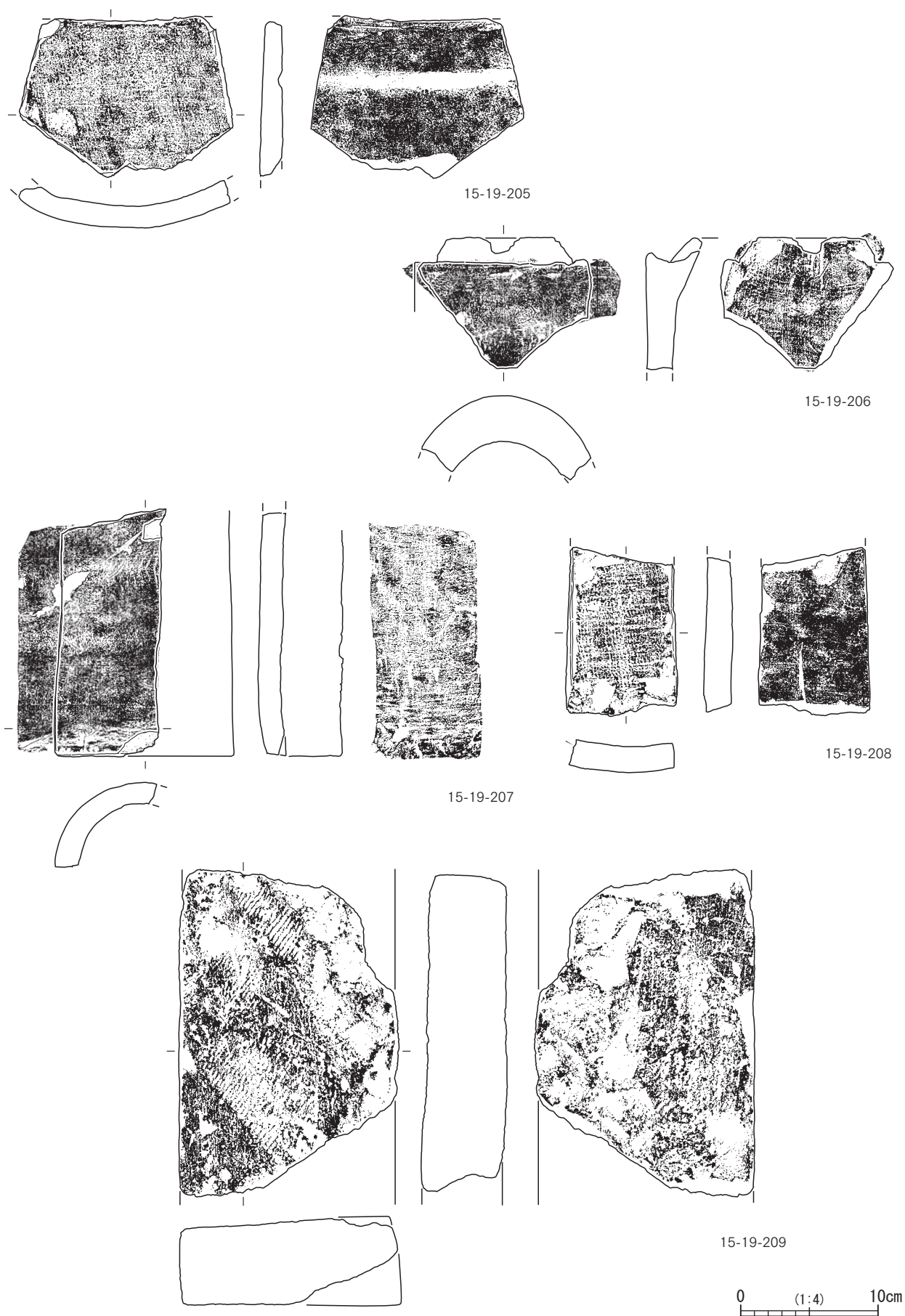


Fig.4.72 Artifacts from AKB-15(21) P3 (15-19-205 - 209)

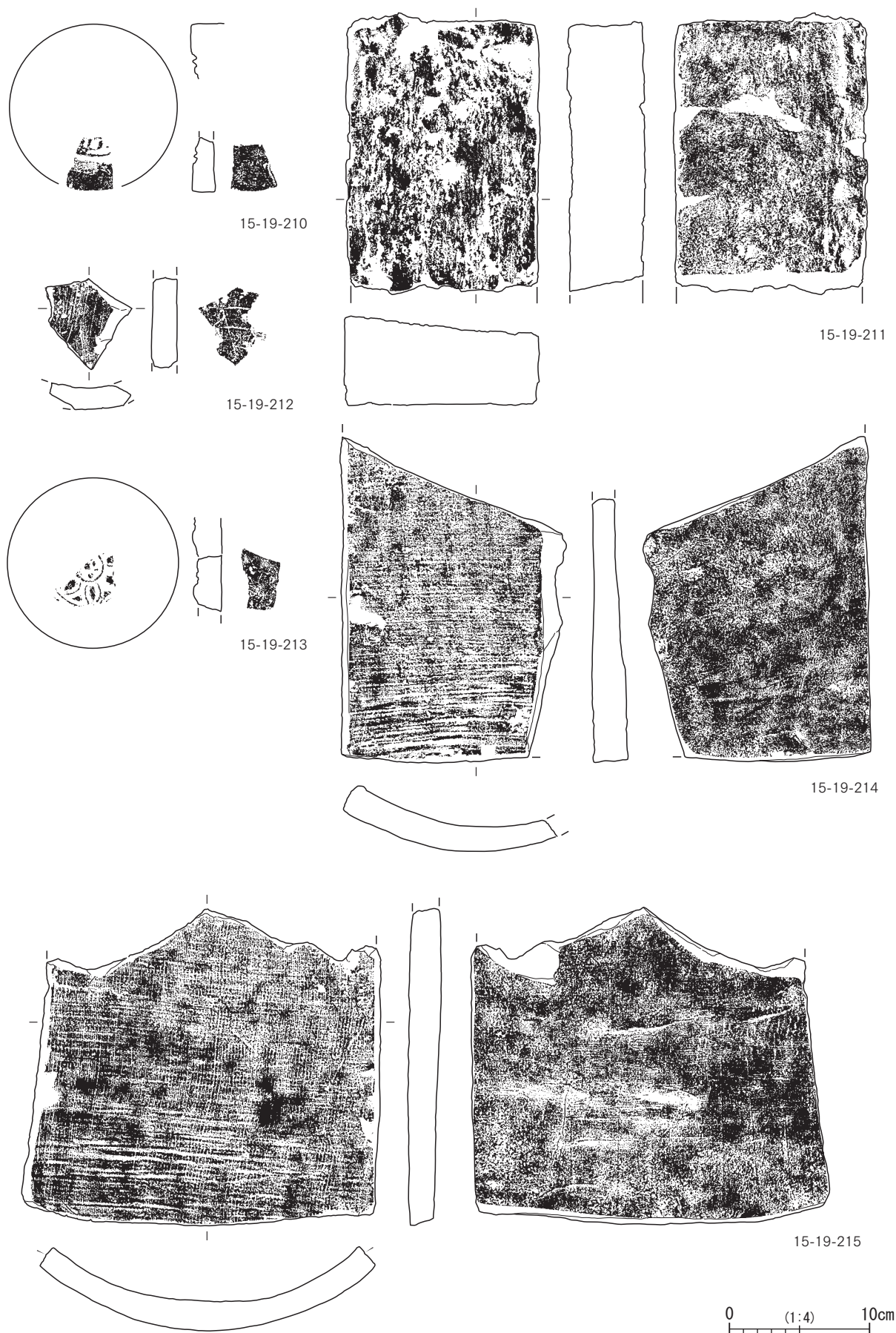


Fig.4.73 Artifacts from AKB-15(22) P7 (15-19-210 - 212), Roof tile belt (15-19-213 - 215)

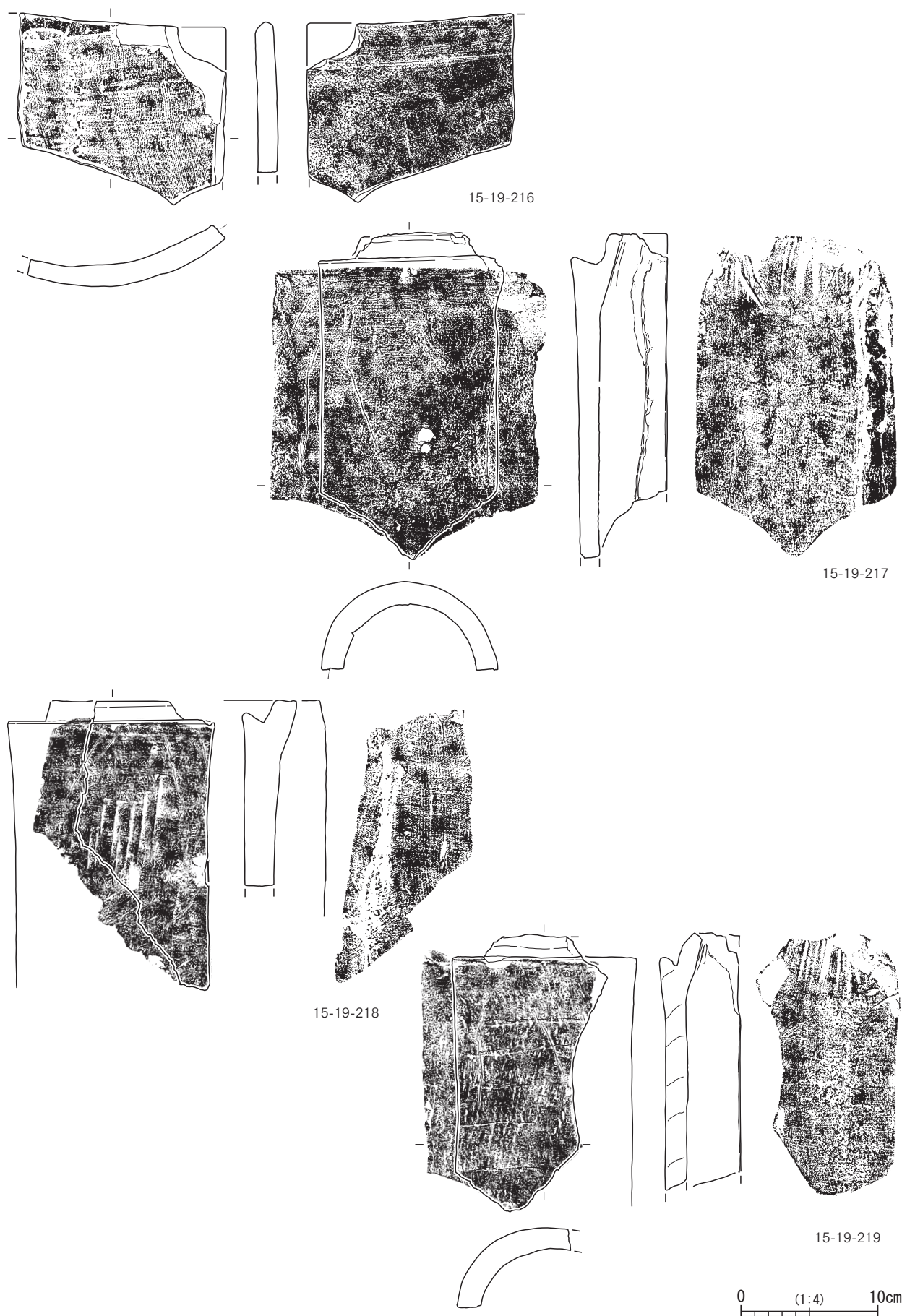


Fig.4.74 Artifacts from AKB-15(23) Roof tile belt (15-19-216 - 219)

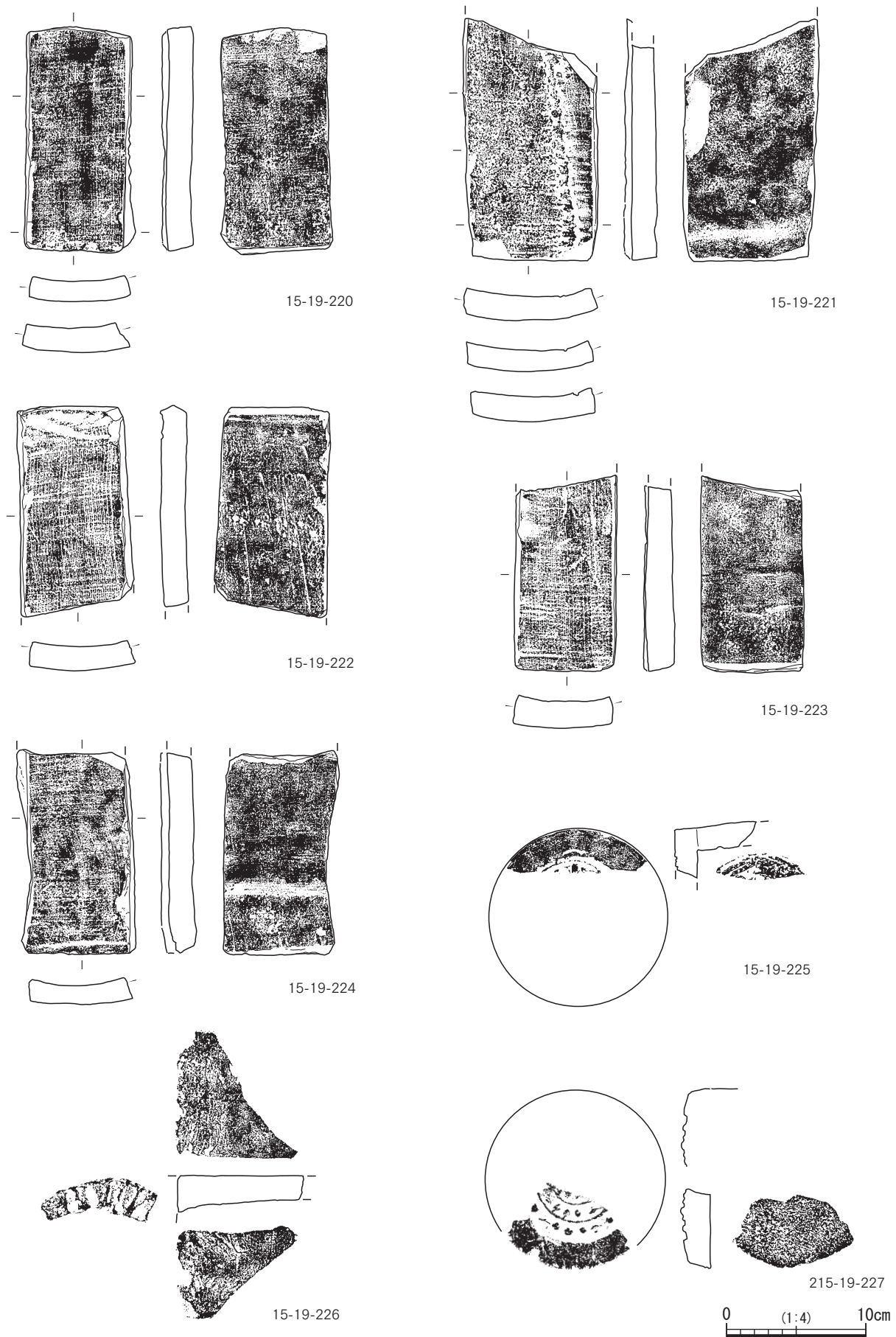


Fig.4.75 Artifacts from AKB-15(24) Roof tile belt (15-19-220 - 224)
North of rain permeable burnt bricks (15-19-225, 226), Cluster of roof tiles 4 (15-19-227)

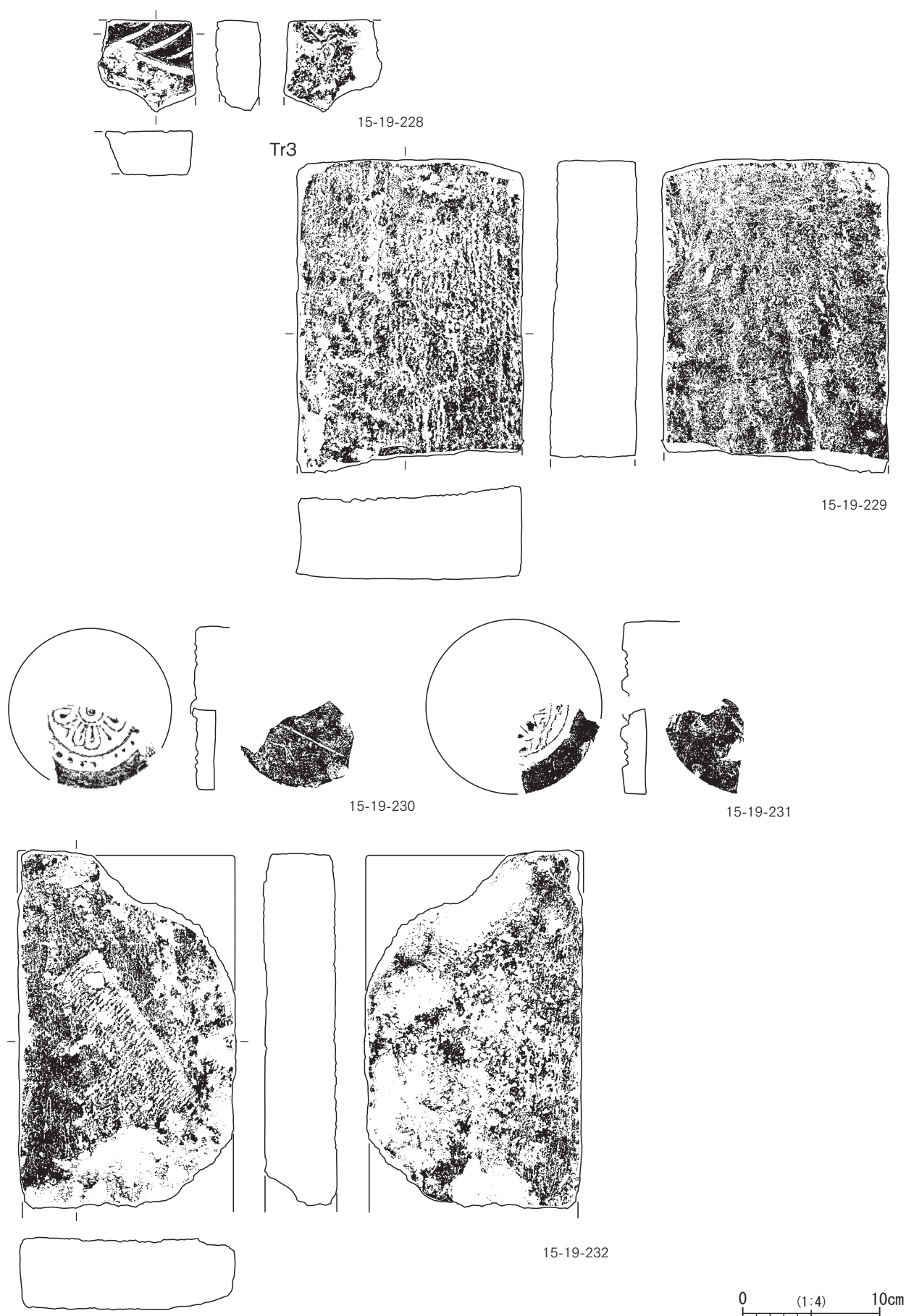
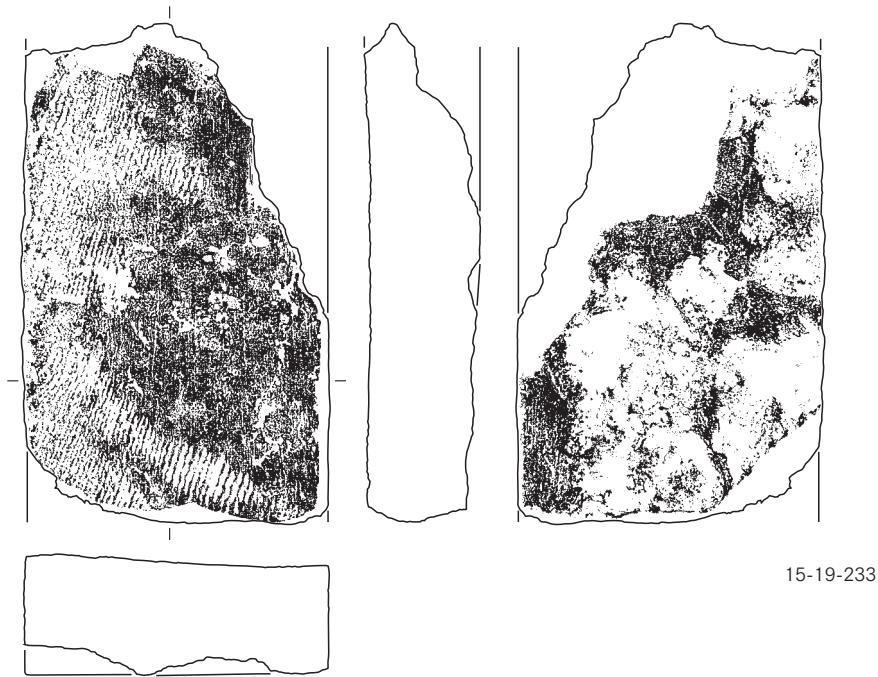
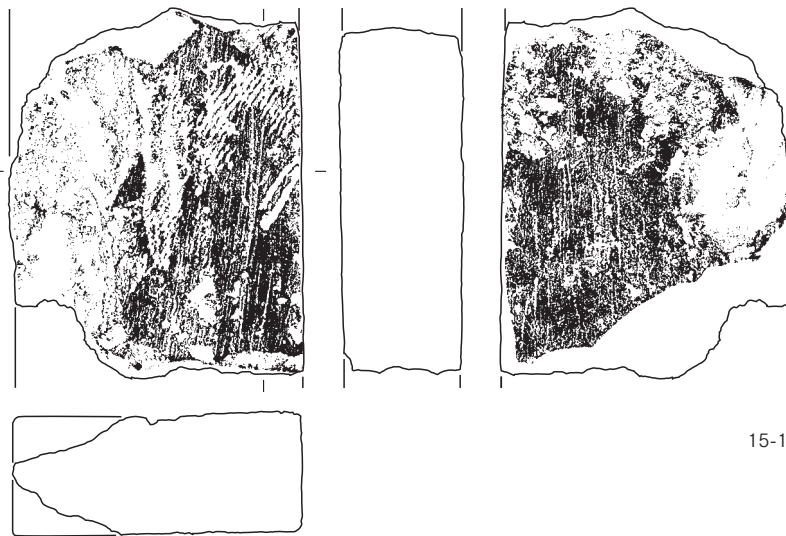


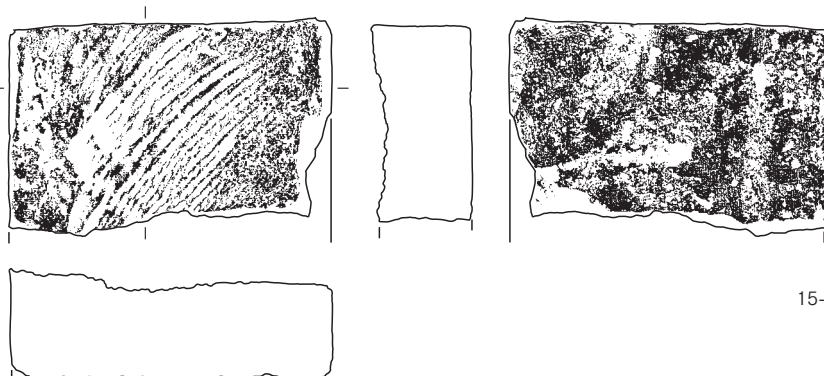
Fig.4.76 Artifacts from AKB-15(25)
West of roof tile belt (15-19-228, Tr.3 (15-19-229), Tr. 5(15-19-230 - 232)



15-19-233



15-19-234



15-19-235

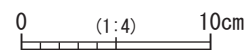


Fig.4.77 Artifacts from AKB-15(26) Tr.5 (15-19-233 - 235)

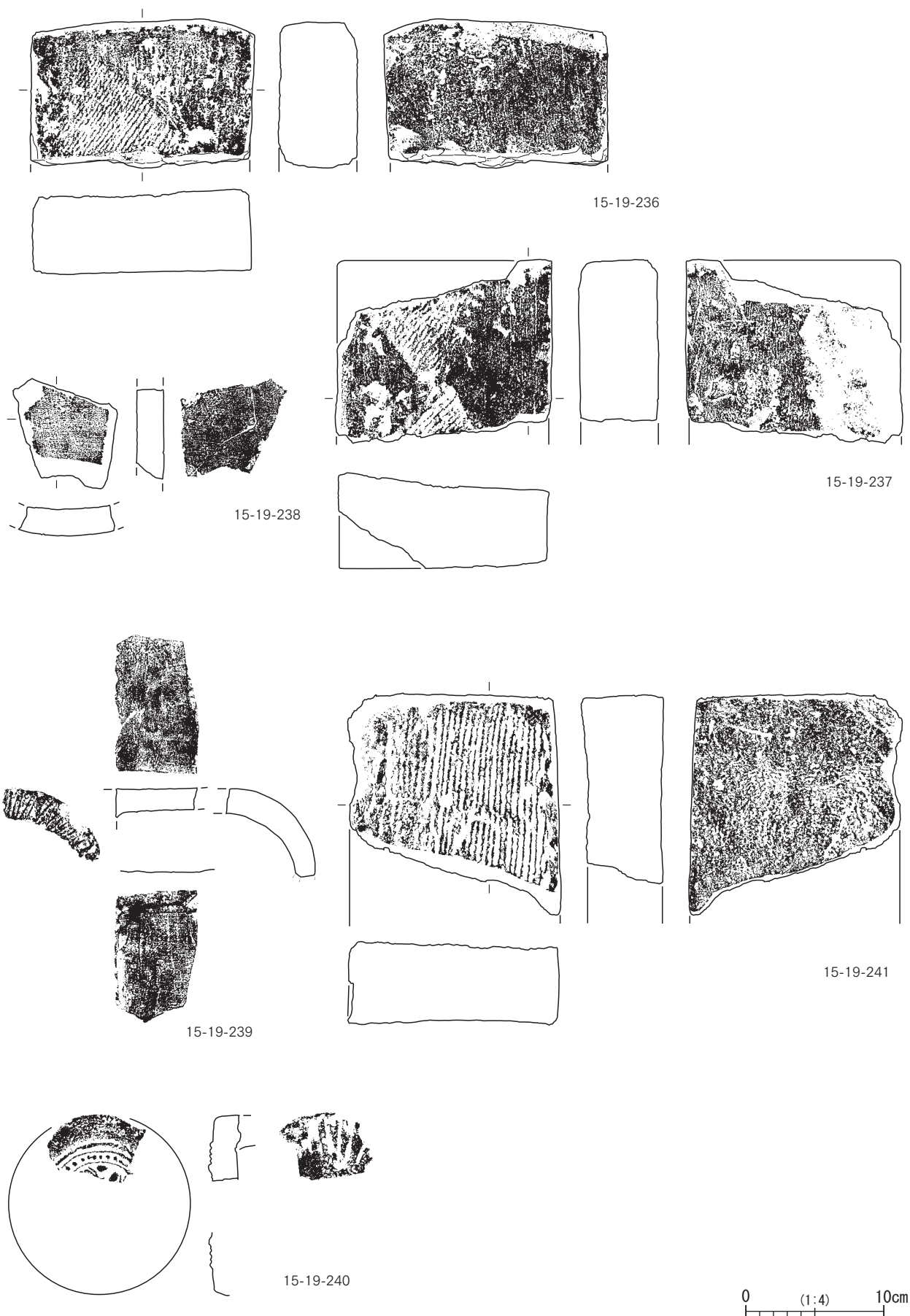


Fig.4.78 Artifacts from AKB-15(27) Tr.5 (15-19-236, 237), Tr.8 (15-19-238), Tr. 10 (15-19-239), Tr.11 (15-19-240) Tr.14 (15-19-241)



Fig.4.79 Artifacts from AKB-15(1) P1 (15-19-001 - 020)



Fig.4.80 Artifacts from AKB-15(2) P1 (15-19-021 - 036)



Fig.4.81 Artifacts from AKB-15(3) P1 (15-19-037 - 051)

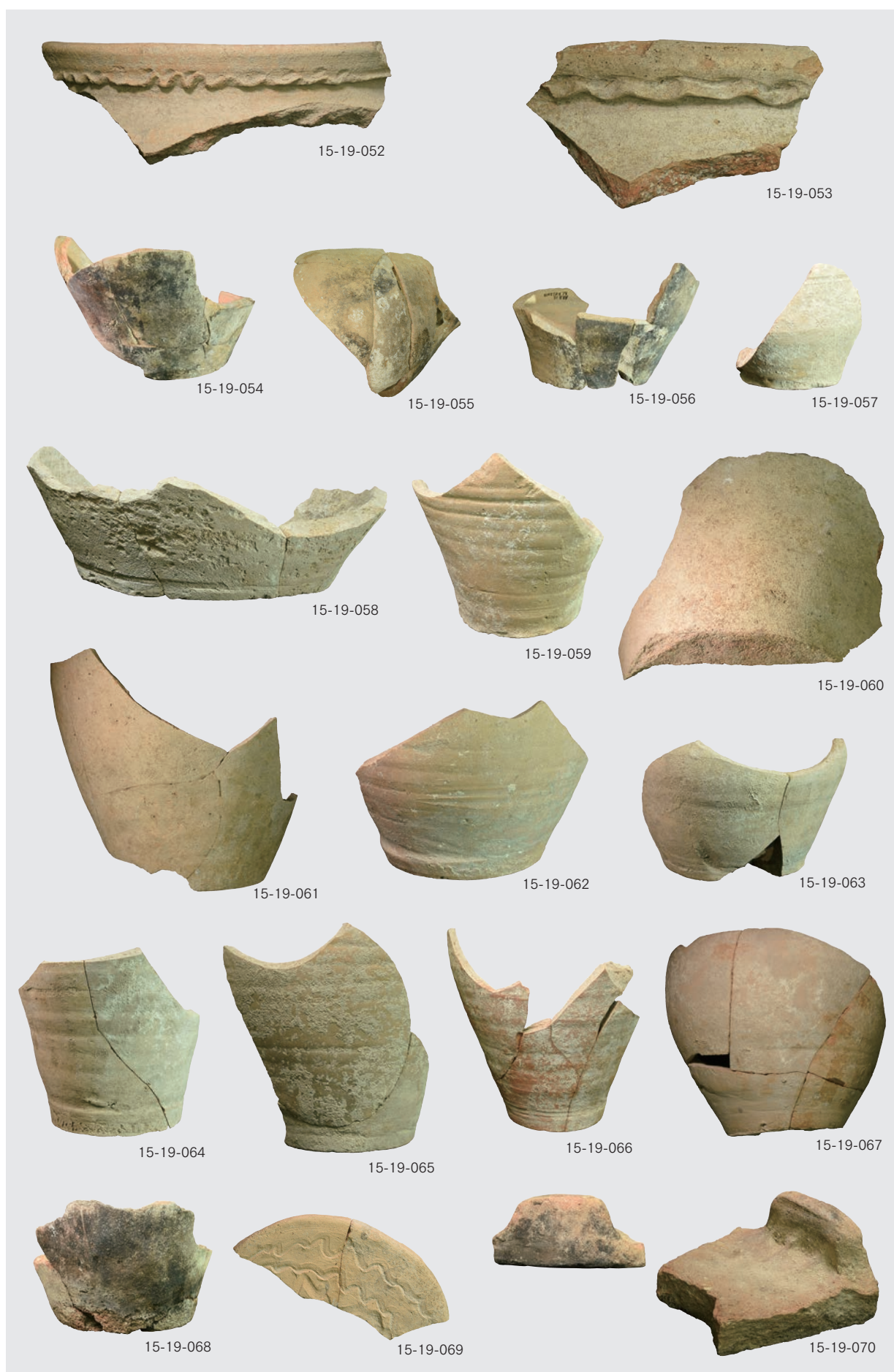


Fig.4.82 Artifacts from AKB-15(4) P1 (15-19-052 - 070)

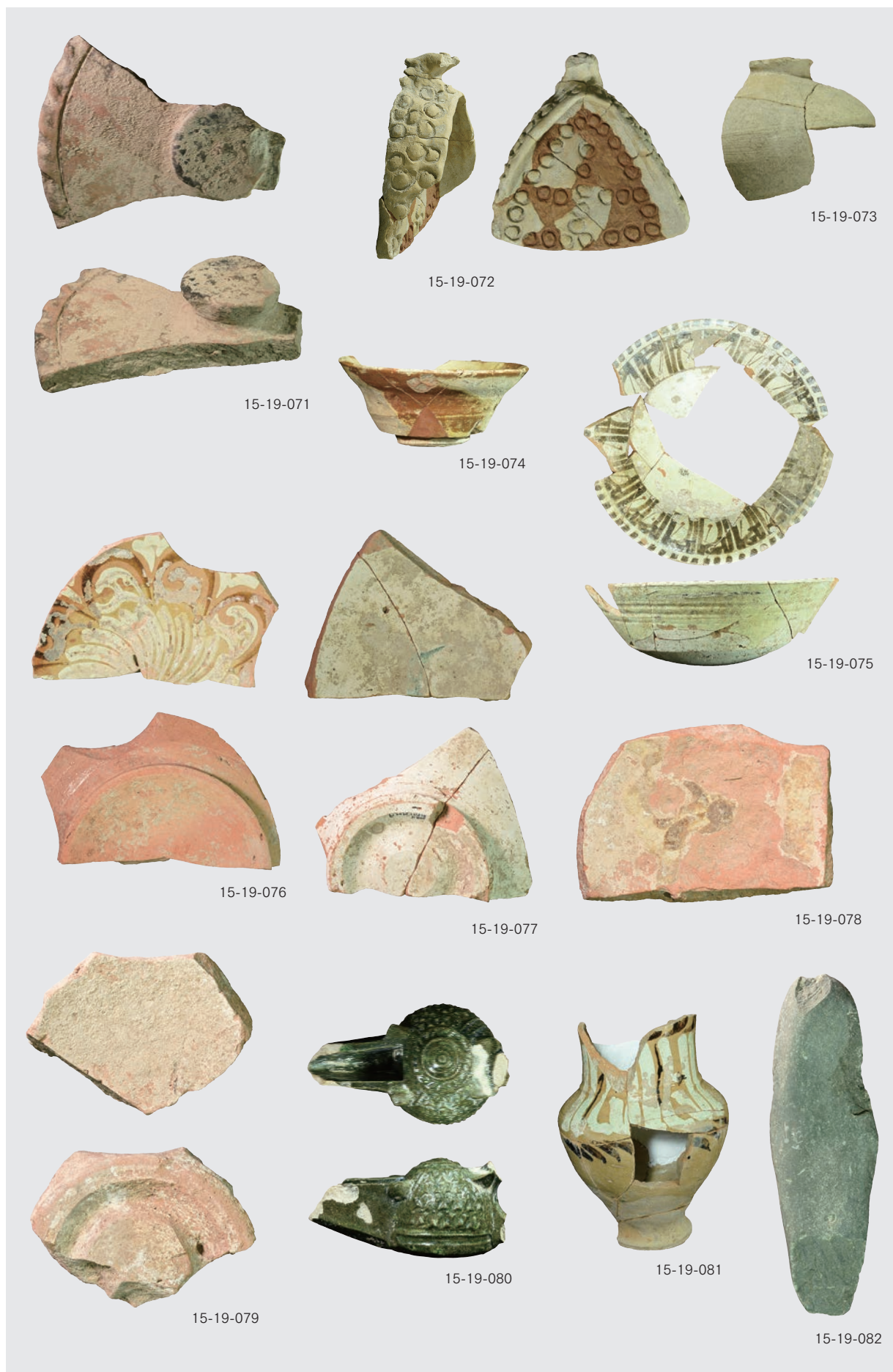


Fig.4.83 Artifacts from AKB-15(5) P1 (15-19-071 - 082)



Fig.4.84 Artifacts from AKB-15(6) P1 (15-19-083 - 0286), P2 (15-19-087, 088)



Fig.4.85 Artifacts from AKB-15(7) P3 (15-19-089 - 106)



Fig.4.86 Artifacts from AKB-15(8) P3 (15-19-107 - 124)

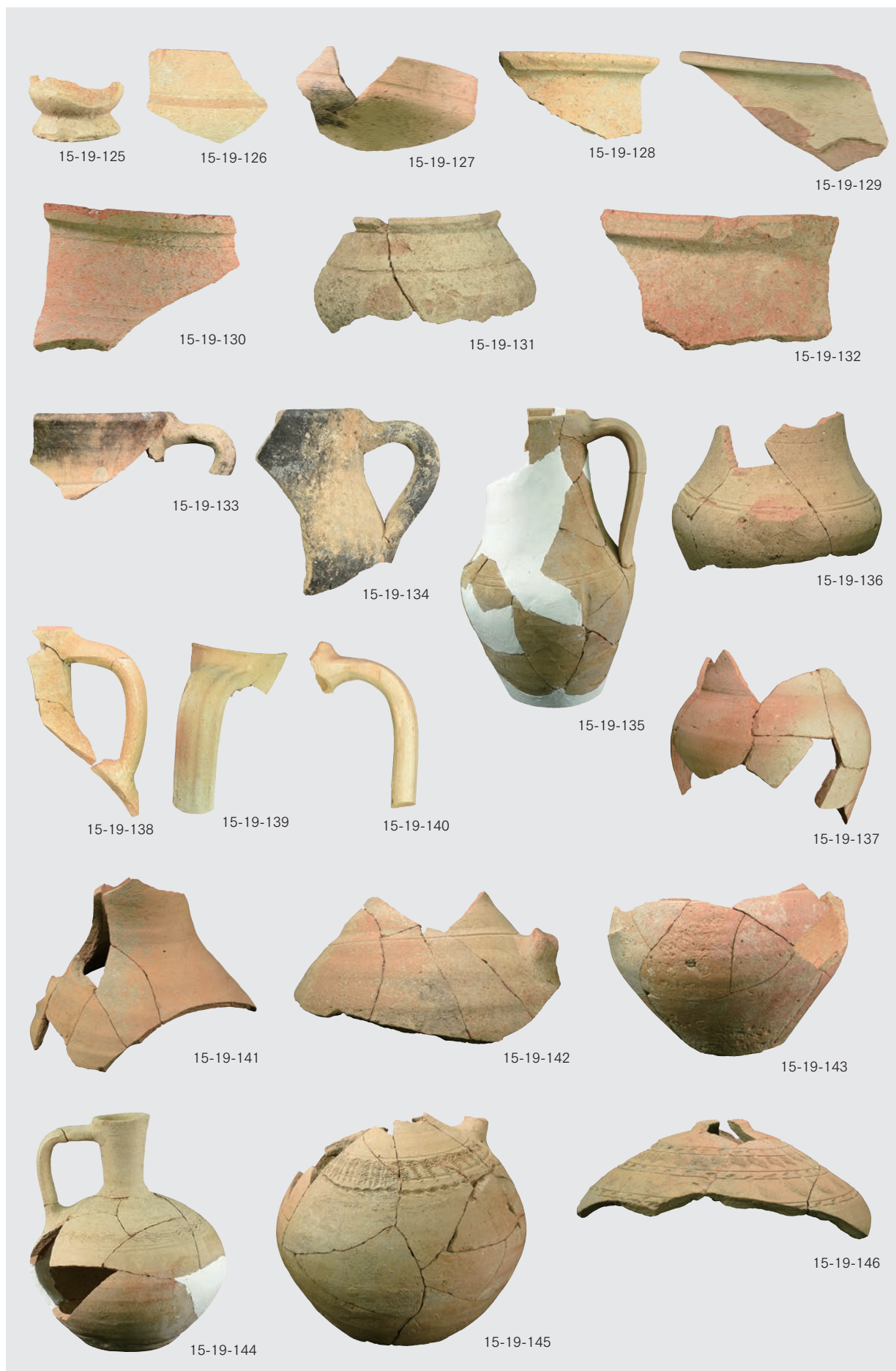


Fig.4.87 Artifacts from AKB-15(9) P7 (15-19-125 - 145)

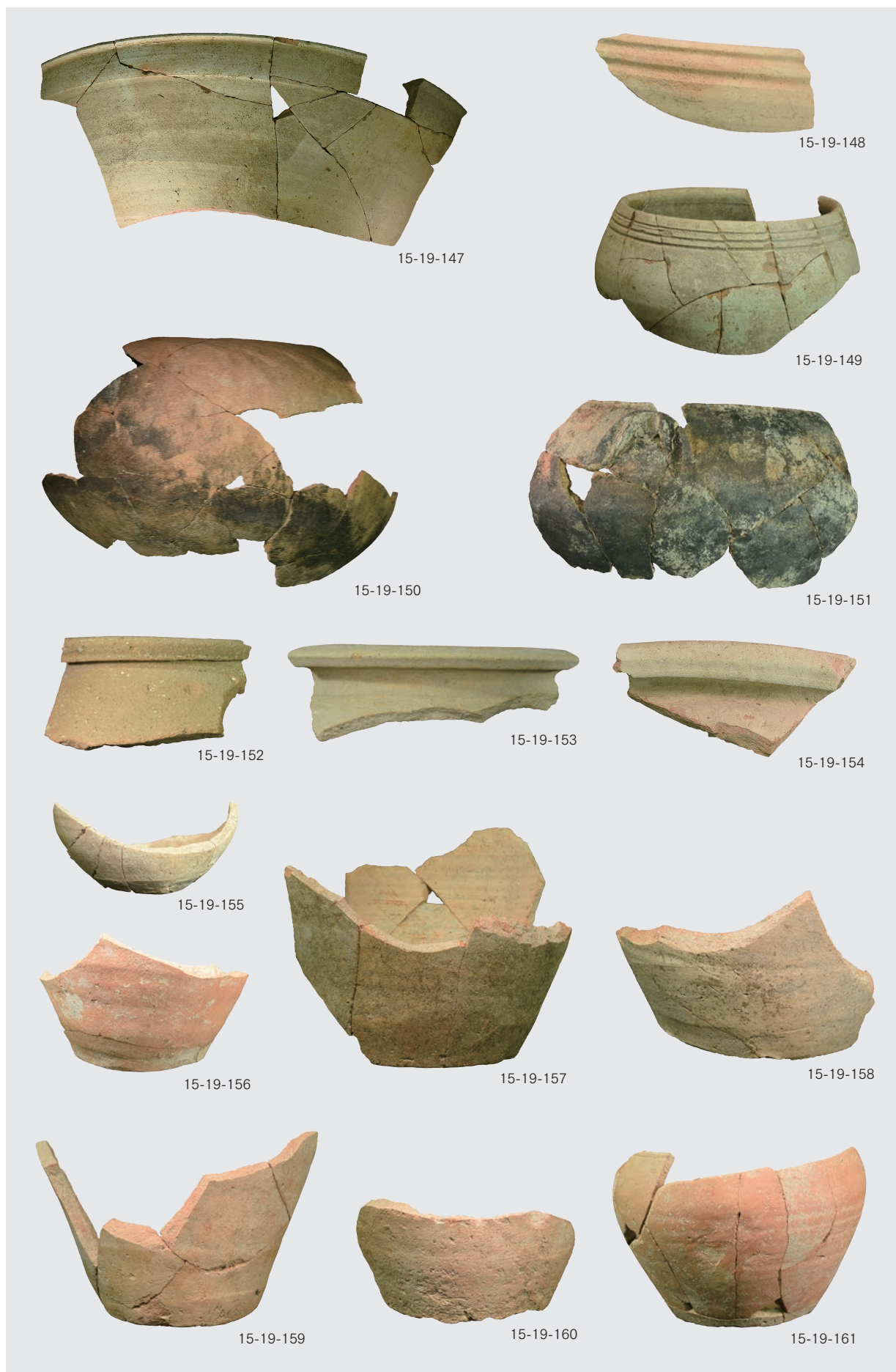


Fig.4.88 Artifacts from AKB-15(10) P7 (15-19-147 - 161)



Fig.4.89 Artifacts from AKB-15(11) P7 (15-19-162 - 176)

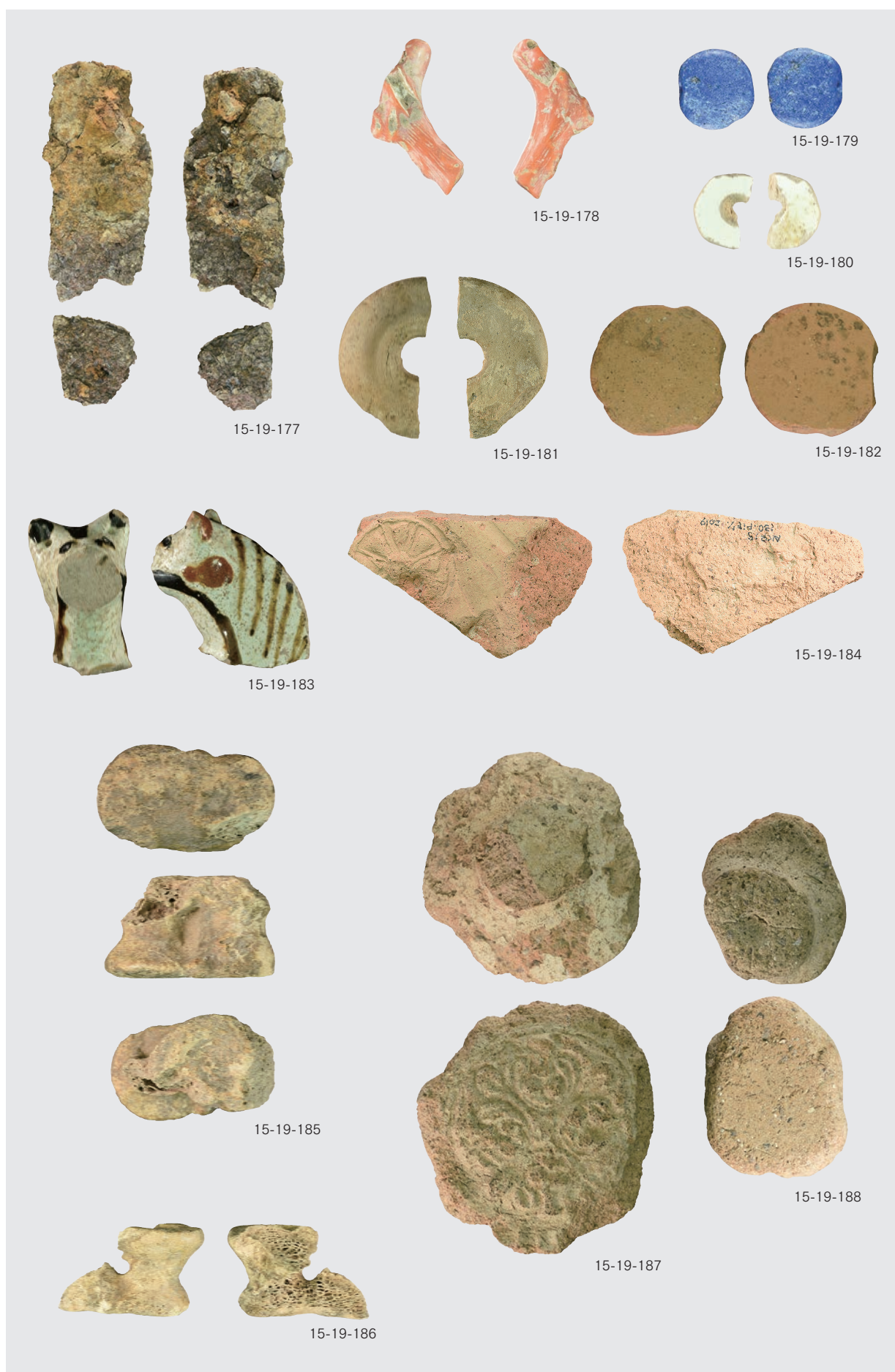


Fig.4.90 Artifacts from AKB-15(12) P7 (15-19-177 - 188)



Fig.4.91 Artifacts from AKB-15(13) D1 (15-19-189 - 194), Tr.10 (15-19-195)
Tr.5 (15-19-196), Roof tile belt (15-19-197), West of roof tile belt (15-19-198), Tr.13 (15-19-199)

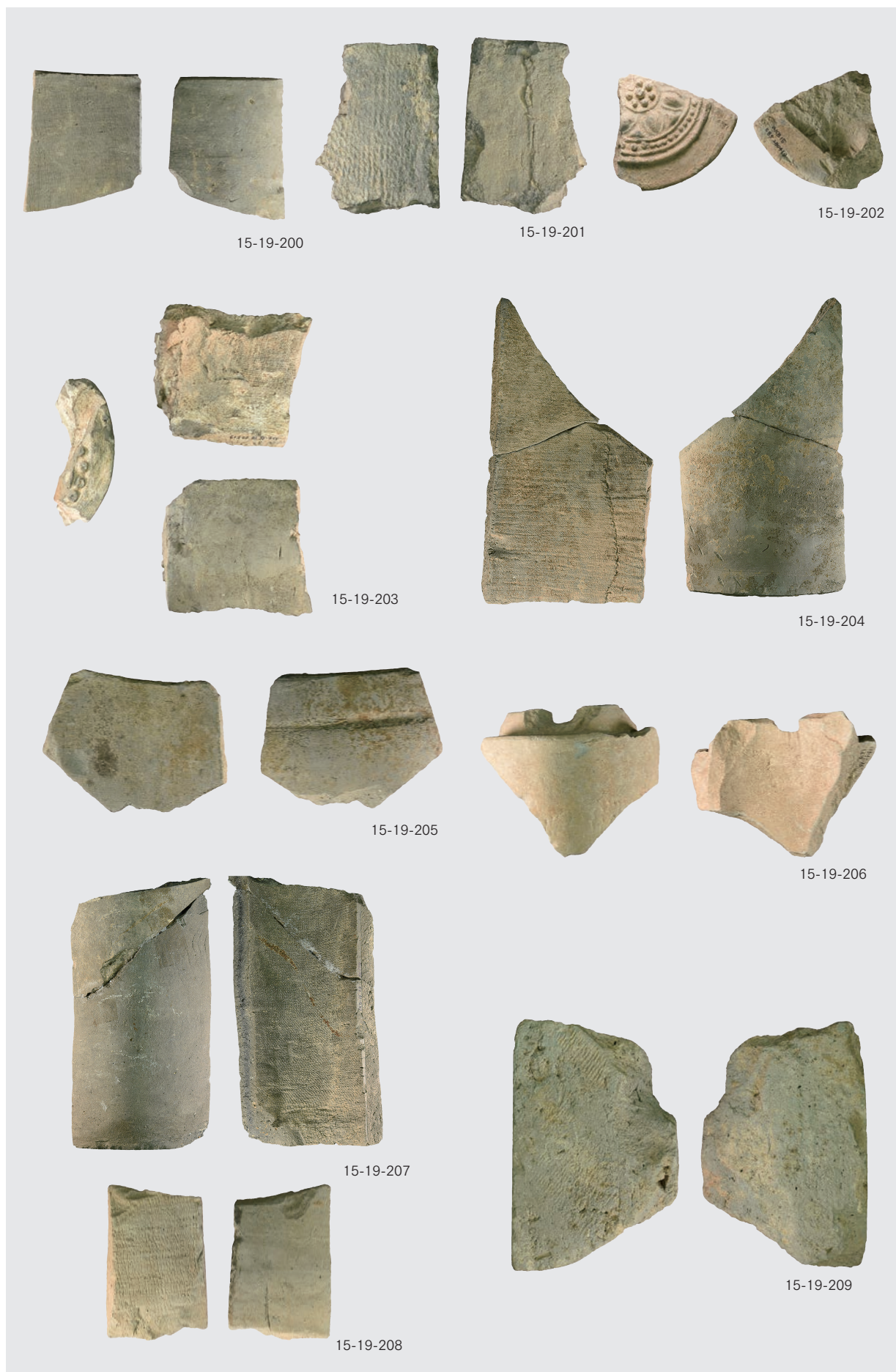


Fig.4.92 Artifacts from AKB-15(14) P1 (15-19-200, 201), P2 (15-19-202), P3 (15-19-203 - 209)



Fig.4.93 Artifacts from AKB-15(15) P7 (15-19-210 - 212), Roof tile belt (15-19-213 - 219)



Fig.4.94 Artifacts from AKB-15(16) roof tile belt (15-19-220 - 224), North of rain permeable burnt brick (15-19-225, 226)
Cluster of roof tiles 4 (15-19-227 - 233)



Fig.4.95 Artifacts from AKB-15(17) Cluster of roof tiles 4 (15-19-234 - 237), Tr.8 (15-19-238)
Tr.10 (15-19-239), Tr.11 (15-19-240), Tr.14 (15-19-241)

Tab.4.2 Observation Sheet of Earthenware from P1, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rimφ/ Bottomφ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.52	15-19-001	81	P1	Earthenware	Jar		Small amount of sand, carefully selected	Light yellow orange 7.5YR8/4	Light yellow orange 7.5YR8/4	
4.52	002	81	P1	Earthenware	Jar		Includes sand, carefully selected	Orange 2.5YR6/8	Orange 2.5YR6/8	Interior : black, gray accretion, Bottom : smoothed
4.52	003	91(81)	P1	Earthenware	Pot	16.5/-/-	Small amount of sand, carefully selected, very dense	Dull orange 5YR7/4	Dull orange 5YR7/4	Exterior : slight change of color. Two handles. Whole circumference of the rim, and 50% of the whole remaining.
4.52	004	81	P1	Earthenware	Pot	11.6/7.7/14.1	Orange, 5YR6/6, almost no particles, very dense, carefully selected	Orange 5YR6/6, scorch, soot	Orange 5YR6/6	Almost natural but crossing striations on the surface
4.52	005		P1	Earthenware	Pot	15.8/-/-	Small amount of inclusions, very dense	Orange 5YR7/6	Dull orange 5YR7/4	Exterior : white clay accretion, Interior : scorched
4.52	006	81	P1	Earthenware	Pot	(13.0)/-/-	Includes sand, carefully selected	Dull orange 7.5 YR7/4	Dull orange 7.5 YR7/4	
4.52	007	81	P1	Earthenware	Pot	(11.2)/-/-	Includes sand, carefully selected	Orange 2.5YR7/6	Orange 2.5YR7/6	
4.52	008	81	P1	Earthenware	Jar	8.8/-/-	Small amount of inclusions, very dense	Dull orange 7.5YR7/3	Orange 5YR7/6	
4.52	009	81	P1	Earthenware	Jar	9.6/7.9/-	Includes sand, carefully selected	Pale reddish orange 2.5YR7/4	Pale reddish orange 2.5YR7/4	Rim : All sooted. Figure reconstructed from partial fragments
4.52	010	81	P1	Earthenware	Jar	7.6/6.8/15.5	Includes white particles, mica etc., dense	Light yellow orange 7.5YR8/6	Orange 5YR6/6	
4.52	011	81	P1	Earthenware	Jar	7.5/-/-	Carefully selected	Dull orange 5YR7/4	Dull orange 5YR7/4	Interior and exterior : slightly sooted
4.52	012	81	P1	Earthenware	Jar	(11.0)/-/-	Carefully selected	Orange 5YR7/6	Orange 5YR7/6	A part of the rim : sooted
4.52	013	81	P1	Earthenware	Jar	(9.2)/-/-	Includes sand, carefully selected	Orange 2.5YR6/8	Orange 2.5YR6/8	
4.52	014	81	P1	Earthenware	Jar	9.0/-/-	Includes sand, carefully selected	Orange 2.5YR6/8	Orange 2.5YR6/8	Partially sooted from the rim to the body
4.52	015	81	P1	Earthenware	Jar	5.9/-/-	Small amount of white particles, carefully selected	Orange 5YR7/6	Orange 2.5YR7/6	About 90% remains
4.52	016	81	P1	Earthenware	Jar		Includes sand, dense	Bright reddish brown 5YR5/6	Bright reddish brown 2.5YR5/8	
4.52	017	81	P1	Earthenware	Jar		Small amount of sand, very dense, carefully selected	Light yellow orange 7.5YR8/4	Dull orange 5YR7/4	Exterior : white coating, only one handle?
4.53	018	81	P1	Earthenware	Jar	9.0/-/-	Includes sand, dense	Dull orange 7.5YR6/4	Dull yellow orange 10YR6/4	Exterior : white coating
4.53	019	81	P1	Earthenware	Jar		Small amount of sand, very dense	Dull orange 7.5Y7/4	Orange 7.5YR7/6	
4.53	020	81	P1	Earthenware	Jar	5.9/-/-	Small amount of sand, very dense	Dull orange 7.5Y7/5	Orange 5YR6/6	Interior and exterior : white clay accretion
4.53	021	81	P1	Earthenware	Jar	4.8/-/-	Includes sand, dense	Orange 7.5YR7/6	Dull orange 5YR7/4	Exterior : white clay accretion
4.53	022	81	P1	Earthenware	Jar		Small amount of sand	Orange 2.5YR6/8	Orange 2.5YR6/8	
4.53	023	81	P1	Earthenware	Jar		Small amount of sand, very dense	Light gray 5YR8/2	Orange 5YR6/6	Interior : white clay accretion
4.53	024	81	P1	Earthenware	Jar		Small amount of sand, dense	Orange 5YR7/6	Orange 5YR7/6	Interior and exterior : white clay accretion
4.53	025	81	P1	Earthenware	Jar	5.0/-/-	Almost no sand, very dense	Dull orange 7.5YR7/3	Dull orange 7.5YR7/3	
4.53	026	81	P1	Earthenware	Jar		Small amount of sand, dense	Dull orange 7.5YR6/3	Orange 2.5YR6/6	
4.53	027	81	P1	Earthenware	Jar	2.0/-/-	Carefully selected	Orange 2.5YR6/6	Orange 2.5YR6/6	
4.53	028	81	P1	Earthenware	Jar		Small amount of sand	Orange 5YR7/6	Orange 2.5YR7/8	
4.53	029	73	P1	Earthenware			Small amount of sand, dense	Bright yellowish brown 10YR6/6	Dull orange 7.5YR6/4	
4.53	030	81	P1	Earthenware				Dull yellow orange 10YR7/3	Dull orange 7.5YR6/3	Stamp- shaped
4.53	031	81	P1	Earthenware	Jar	6.1/-/-	Small amount of sand, dense	Dull brown 7.5YR6/3	Dull orange 7.5YR7/4	Exterior : white clay accretion
4.53	032	81	P1	Earthenware			Fairly large amount of sand like mica etc., dense	Orange 5YR7/6	Orange 5YR7/6	
4.53	033	81	P1	Earthenware	Bowl	1.5/11.5/14.4	Very dense, carefully selected	Light yellow orange 7.5YR8/3	Light yellow orange 7.5YR8/4	Horizontally smoothed, perforation after firing, fully remaining.
4.53	034	81	P1	Earthenware	Bowl	10.9/-/-	Includes white particles, very dense	Light yellow orange 7.5YR8/4	Light yellow orange 7.5YR8/4	Interior and exterior : slight white accretion
4.54	035	96	P1	Earthenware	Bowl	30/(12.4)/12.1	Includes sand, carefully selected	Orange 2.5YR7/8	Orange 2.5YR7/8	
4.54	036	81	P1	Earthenware	Bowl	21.0/-/-	Small amount of white particles, very dense	Dull yellow orange 10YR7/4	Dull orange 7.5YR7 /4	Interior and exterior : white accretion
4.54	037	81	P1	Earthenware	Bowl	22.5/-/-	Includes sand, dense	Orange 5YR7/6	Dull orange 5YR7 /3	
4.54	038	81	P1	Earthenware	Bowl	14.0/-/-	Small amount of sand, very dense, carefully selected	Dull orange 5YR7/4	Dull orange 5YR7/4	Interior and exterior : white accretion
4.54	039	106(81)	P1	Earthenware	Bowl	20.3/-/-	Small amount of sand, very dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/4	Interior and exterior : white clay accretion
4.54	040	81	P1	Earthenware	Bowl		Includes small amount of sand, very dense	Pale reddish orange 2.5YR7/4	Orange 2.5YR7/6	Interior : white accretion
4.54	041	94(81)	P1	Earthenware	Bowl	52.0/-/-	Small amount of sand, very dense	Dull orange 7.5YR6/4	Dull orange 7.5YR6/4	Interior : white clay accretion
4.54	042	81	P1	Earthenware	Round bodied jar	19.8/-/-	Includes sand, feldspar, mica, slightly dense	Dull orange 7.5YR7/4	Orange 5YR7/6	Interior : white accretion, Exterior : sooted
4.54	043	81	P1	Earthenware	Round bodied jar	22.0/-/-	Small amount of sand, very dense	Dull orange 7.5YR7/3	Light yellow orange 7.5YR8/4	

Fig.	No.	Context	Feature	Classification	Vessel type	Rimϕ/ Bottomϕ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.54	044	81	P1	Earthenware		-/14.7/-	Includes sand, dense	Dull orange 7.5YR7/3	Dull orange 5YR7/3 (Bottom Part)	Concentric sandy bottom
4.54	045	81	P1	Earthenware			Almost no sand, very dense	Dull orange 5YR7/4	Dull orange 5YR7/5	
4.55	046	81	P1	Earthenware	Bowl shaped cooking pot	29.4/-/25.4	Fairly large amount of black particles, includes mica	Dull orange 7.5YR7/4	Pale reddish orange 2.5YR7/4	Partial change of color (trace of boiling), accretion of ash, about 90% remaining
4.55	047	81	P1	Earthenware	Bowl shaped cooking pot	22.7/-/-	Fairly large amount of large feldspar, includes mica, slightly coarse	Brownish gray 10YR6/1 soot	Bright yellowish brown 2.5Y6/6, scorch	Only two handles. Most of the circumference of the rim remains, but only about 30% of the rest remains.
4.55	048	81	P1	Earthenware	Jar-shaped cooking pot	17.0/-/-	Includes large amount of black particles, mica, feldspar, slightly dense	Dull yellow orange 10YR7/3	Dull Brown 7.5YR6/3	Interior : partially sooted (scorch), Exterior : partially sooted, Interior and exterior : white accretion
4.55	049	81	P1	Earthenware	Jar-shaped cooking pot	17.1/(8.4)/29	Fairly large amount of white particles, slightly coarse	Dull orange 5YR7/3	Orange 5YR7/6	Interior : slight change of color (no much sign of use), only one handle
4.55	050	81	P1	Earthenware	Large pot	(44.0)/-/-	Includes sand	Light yellow orange 7.5YR8/4	Light yellow orange 7.5YR8/4	
4.55	051	81	P1	Earthenware	Large pot	(55.5)/-/-	Includes sand, small grave	Pale orange 5YR8/3	Orange 2.5YR6/8	
4.56	052	81	P1	Earthenware	Large pot	40.5/-/-	Fairly large amount of sand, dense	Dull orange 5YR7/4	Orange 2.5YR7 /6	
4.56	053	81	P1	Earthenware	Large pot	38.5/-/-	Includes sand, dense	Light gray 7.5YR8/2	Orange 2.5YR6 /6	
4.56	054	81	P1	Earthenware	Jar	-/6.6/-	Includes sand	Dull orange 5YR6/3	Orange 2.5YR7/8	Sooted from outside body to the bottom
4.56	055	81	P1	Earthenware	Jar	-/(6.8)/-	Includes sand, carefully selected	Orange 5YR6/8	Orange 5YR6/8	Exterior : partially sooted, conspicuous devastation of vessel surface
4.56	056	81	P1	Earthenware	Jar		Carefully selected	Dull orange 5YR7/4	Dull orange 5YR7/4	Exterior : sooted
4.56	057	81	P1	Earthenware	Jar	-/6.2/-	Includes sand, carefully selected	Orange 2.5YR7/6	Orange 2.5YR7/6	
4.56	058	81	P1	Earthenware	Bowl	-/25.6/-	Includes sand	Pale orange 5YR8/4	Pale orange 5YR8/4	Interior and exterior : pockmarked weathering prominent
4.56	059	81	P1	Earthenware		-/11.6/-	Small amount of particles, very dense	Dull orange 7.5YR6/4	Light brownish gray 7.5YR7/2	Interior and exterior : white accretion, Bottom : white thick accretion (ash-like)
4.56	060	81	P1	Earthenware		(35.1)/-/-	Large amount of round gravel, slightly coarse	Pale reddish orange 2.5YR7/4	Orange 2.5YR6/8	Exterior : white coating, Bottom : large amount of sand
4.57	061	81	P1	Earthenware		-/(18.8)/-	Including small amount of sand like white particles etc., dense	Dull orange 5YR7/4	Orange 5YR7/8	Exterior : white coating
4.57	062	81	P1	Earthenware	Jar	-/11.2/-	Fairly large amount of sand	Pale orange 5YR8/4	Pale orange 5YR8/4	
4.57	063	81	P1	Earthenware	Jar	-/(12.2)/-	Carefully selected	Orange 2.5YR7/8	Orange 2.5YR7/8	
4.57	064	81	P1	Earthenware	Jar	-/(12.0)/-	Carefully selected	Orange 2.5YR7/8	Orange 2.5YR7/8	
4.57	065	81	P1	Earthenware	Jar	-/(11.2)/-67	Fairly large amount of sand	Orange 5YR6/8	Orange 5YR6/8	
4.57	066	81	P1	Earthenware	Jar	-/(13.4)/-	Fairly large amount of sand	Orange 5YR7/6	Orange 5YR7/6	
4.57	067	81	P1	Earthenware	Jar	-/(11.8)/-	Fairly large amount of sand	Orange 5YR6/8	Orange 5YR6/8	
4.57	068	81	P1	Earthenware	Jar	-/11.5/-	Large amount of sand	Bright reddish brown 2.5YR5/8		Except bottom of exterior : sooted, Interior : heated, conspicuous devastation of vessel surface, Exterior of bottom : not sooted but strongly heated and conspicuous exfoliation and devastation of vessel surface
4.57	069	81	P1	Earthenware	Lid	-/-/-	Including sand, dense	Orange 7.5YR7/6	Dull orange 5YR6/3	
4.58	070	81	P1	Earthenware	Lid?	-/-/-	Fairly large amount of sand, dense	Dull orange 5YR6/3	Brownish black 5YR3/1	
4.58	071	81	P1	Earthenware	Lid	-/-/-	Fairly large amount of round gravel, dense	Light gray 5YR8/2	Grayish brown 5YR6/2	Exterior : accretion of ash, sooted around handle. Interior : sooted
4.58	072	81	P1	Earthenware	Clay object	-/-/-	Includes sand, dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/4	
4.58	073	81	P1	Earthenware	Jar	-/2.0/-	Small amount of sand, carefully selected	Light yellow orange 7.5YR8/3	Orange 2.5YR7/6	Bottom : wheel cut using string, perforation
4.58	074	81	P1	Glazed ware	Cup	9.3/4.0/4.0	Light brown 7.5YR5/6	Glaze on white clay (brown, pale green)	Brown glaze (Brown 7.5YR4/6), yellow (pale green) glaze (Pale yellow 5YR8/4), (7.5YR4/6), (Pale yellow 5YR4/4)	Interior and exterior : white accretion
4.58	075	81	P1	Glazed ware	Dish	-/22.6/-	Brick red, no sand, light reddish brown (5YR5/6), slightly very dense	White clay as base (the same white application as earthenware) + light green glaze (Pale orange 5YR8/3)	Light green glaze (Pale orange 5YR8/3) on base	Characters: Brown to brownish black (7.5YR3/2), Rim : Brown to dark reddish brown (5YR3/6)
4.58	076	81	P1	Glazed ware	Dish	-/10.4/-	Orange (5YR6/6), very dense, no inclusions	Transparent glaze	Pale green, brown, red (the ground) glaze	Glazed ware
4.58	077	81	P1	Glazed ware	Dish	-/7.5/-	Orange (2.5YR6/8)	Light gray 10YR8/2	Light gray 10YR8/2, green glaze on the center	Glazed ware
4.58	078	81	P1	Glazed ware	Dish	-/6.2/-	Brick red, Orange (2.5YR6/9), almost no inclusions, very dense (2.5YR6/9)	Orange 2.5YR6/6	Pale green, brown, white glaze	Glazed ware, prominent surface weathering
4.58	079	81	P1	Glazed ware	Dish	-/9.0/-	Orange (2.5YR6/8), very dense, small amount of sand	Partial white glaze accretion	White glaze? Only powdery base remains	Glazed ware
4.58	080	104	P1	Glazed ware	Lamp	-/-/5.0				Green glazed ware

Fig.	No.	Context	Feature	Classification	Vessel type	Rimϕ/ Bottomϕ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.58	081	81	P1	Glazed ware	Jar	-/5.3/-	Reddish orange 10R6/6	Orange 7.5YR7/6	Orange 2.5YR7/6	
4.59	083	81	P1	Earthenware	Pipe	-/-/-	Includes sand	Orange 2.5YR7/8	Orange 2.5YR7/8	Interior : entirely sooted
4.59	084	81	P1	Earthenware	Pipe?	-/-/-	Small amount of sand, very dense	Dull orange 7.5YR7/3	Dull Brown 7.5YR6/3	

Tab.4.3 Observation Sheet of Earthenware from P2, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rimϕ/ Bottomϕ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.60	15-19-087	90(84)	P2	Earthenware	Jar	(6.7)/-	Slightly large amount of sand (feldspar etc.), dense	Orange 5YR6/6	Orange 5YR6/6	
4.60	088	90(the lower layer of 84)	P2	Earthenware	Jug	(8.4)/-	Small amount of sand, dense	Dull yellow orange 10YR7/3	Dull orange 5YR7/4	Exterior: white application

Tab.4.4 Observation Sheet of Earthenware from P3, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rimϕ/ Bottomϕ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.61	15-19-089	70	P3	Earthenware	Jar	7.4/4.7/9.3	Includes sand	Dull orange 5YR6/4	Dull orange 5YR6/4	The rim of exterior, the lower half of the body, handle : Much sooted, The body of interior : prominent weathering
4.61	090	70(layer 18 lower)	P3	Earthenware	Jar	10.0/8.6/18.0	Includes sand, carefully selected	Light Yellow Orange 7.5YR8/3	Orange 2.5YR6/8	The middle and lower of the exterior body : partially sooted
4.61	091	103	P3	Earthenware	Pot	12.8/6.4/17.9	Comparatively carefully selected	Orange 5YR7/8	Orange 5YR7/8	Interior and exterior : yellow clay accretion
4.61	092	70	P3	Earthenware	Bowl	(19.2)/-	Small amount of sand, carefully selected	Light Yellow Orange 7.5YR8/3	Light yellow orange 7.5YR8/3	Interior : slight pockmarked weathering. Interior and exterior : white coating?
4.61	093	70	P3	Earthenware	Jar		Includes sand, comparatively carefully	Pale yellow 5Y8/3	Orange 2.5YR6/8	Exterior : white coating
4.61	094	110(layer 19)	P3	Earthenware	Jar	4.8/8.3/(21.0)	Includes sand	Orange 5YR7/8	Orange 5YR7/8	
4.61	095	70	P3	Earthenware	Jar		Includes sand, comparatively carefully	Light Yellow Orange 7.5YR8/6	Orange 2.5YR7/6	Interior and exterior : white accretion
4.61	096	70	P3	Earthenware	Jar	6.3/-	Includes sand, carefully selected	Light yellow orange 7.5YR8/3	Orange 2.5YR6/8	Exterior : white coating
4.61	097	70	P3	Earthenware	Jar	(5.8)/-	Includes sand, carefully selected	Orange 7.5Y7/6	Orange 5Y5/6	
4.61	098	70	P3	Earthenware	Jar		Small amount of sand, carefully selected	Orange 7.5Y7/6	Orange 7.5Y7/6	Interior and exterior : fairly weathered
4.61	099	70	P3	Earthenware	Jar		Includes sand, carefully selected	Dull orange 5YR7/4	Greyish yellow 2.5YR5/1	
4.61	100	70	P3	Earthenware	Jar	-(6.2)/-	Small amount of sand, phlogopite	Orange 2.5YR7/8	Orange 2.5YR7/8	Interior of the bottom : slight change of color
4.61	101	30	P3	Earthenware	Jar	-(12)/-	Includes sand, carefully selected	Dull orange 2.5YR6/4	Orange 2.5YR6/6	Exterior : white coating?
4.62	102	114(layer 18)	P3	Earthenware	Jar	-/8.4/-	Includes sand, comparatively carefully	Orange 5YR6/8	Orange 2.5YR4/8	Exterior : white coating. Bottom : brown coating
4.62	103	70	P3	Earthenware	Pot	13.2/-	Fairly large amounts of sand	Orange 2.5Y6/6	Orange 2.5Y6/6	
4.62	104	70	P3	Earthenware	Pot	15.0/-	Includes sand, comparatively carefully	Orange 2.5Y6/6	Orange 2.5Y6/6	
4.62	105	70	P3	Earthenware	Pot	(28.3)/-	Includes sand	Light Yellow Orange 7.5YR8/3	Light yellow orange 7.5YR8/3	Exterior : white coating
4.62	106	70	P3	Earthenware	Bowl	-(32.4)/-	Fairly large amounts of sand	Orange 2.5YR7/8	Orange 2.5YR7/6	
4.62	107	70(layer 18 lower)	P3	Earthenware	Cooking pot	27.6/-	Includes sand, phlogopite	Bright reddish brown 2.5YR5/8	Orange 2.5YR6/8	The lower half of the exterior body : Much
4.62	108	70	P3	Earthenware	Cooking pot	15.6/-	Large amount of sand	Red 10YR4/8	Red 10YR5/8	Interior and exterior : prominent weathering by heating. Interior of body: belt-like soot
4.62	109	70	P3	Earthenware		-/6.6/-	Includes sand, comparatively carefully	Dull orange 5YR6/3	Dull orange 5YR6/4	Exterior : sooted
4.62	110	70	P3	Earthenware		-/6.6/-	Includes sand	Light Yellow Orange 7.5YR8/3	Orange 2.5YR6/8	Exterior : white coating
4.62	111	70(layer 18 lower)	P3	Earthenware		-/12.4/-	Includes sand	Orange 2.5YR7/8	Orange 2.5YR7/8	
4.62	112	70	P3	Earthenware		-/7.2/-	Fairly large amounts of sand	Dull reddish brown 5YR5/4	Dull reddish brown 5YR5/4	
4.62	113	70	P3	Earthenware		-(13)/-	Small amount of sand	Light Yellow Orange 7.5YR8/4	Orange 2.5Y6/68	Exterior : white coating
4.62	114	70	P3	Earthenware	Jar	-(13)/-	Large amount of sand	Orange 2.5Y6/6	Orange 2.5Y6/6	Around bottom : partially sooted
4.63	115	70	P3	Earthenware		-/11.2/-	Includes sand, carefully selected	Orange 2.5YR6/6	Orange 2.5YR6/6	Exterior : white coating
4.63	116	75+15	P3	Earthenware	Bowl	-/14.2/-	Fairly large amount of sand, carefully selected	Bright reddish brown 2.5YR5/8	Bright Reddish Brown 2.5YR5/6	Interior of the bottom : Prominent change of color and traces of use, not boiling but accretion
4.63	117	70	P3	Earthenware	Bowl	-/11.0/-	Includes sand, comparatively carefully	Light Yellow Orange 7.5YR8/3	Light yellow orange 7.5YR8/3	Interior and exterior : white coating
4.63	118	70	P3	Earthenware	Bell		Carefully selected	Light Yellow Orange 7.5YR8/6	Orange 2.5YR6/6	
4.63	119	70	P3	Earthenware	Jar		Carefully selected	Orange 2.5YR7/6	Orange 2.5YR7/6	

Fig.	No.	Context	Feature	Classification	Vessel type	Rimφ/ Bottomφ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.63	120	70	P3	Earthenware	Pipe		Includes sand, carefully selected	Light yellow orange 7.5YR8/3	Light yellow orange 7.5YR8/3	
4.63	121	70	P3	Earthenware	Lid		Fairly large amounts of sand	Orange 2.5Y7/6	Orange 2.5Y6/8	Interior : slightly sooted
4.63	122	70	P3	Earthenware	Handle		Includes small amount of black particles	Gray white 2.5YR8/2	Orange 2.5YR6/6	
4.63	123	70	P3	Earthenware	Leg		Includes sand	Orange 7.5YR6/6		

Tab.4.5 Observation Sheet of Earthenware from P7, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rimφ/ Bottomφ/ Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.64	15-19-125	130	P7	Earthenware	Cup	-/4.2/-	Small amount of sand	Pale orange 5YR8/3	Orange 2.5YR6/8	
4.64	126	130	P7	Earthenware	Cup		Small amount of sand, very dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/4	
4.64	127	130	P7	Earthenware	Cup		Fairy large amount of sand like feldspar etc., slightly coarse	Light yellow orange 7.5YR8/4	Orange 7.5YR7/6	
4.64	128	130	P7	Earthenware	Small pot		Includes sand like white particles etc., dense	Dull yellow orange 10YR7/4	Dull yellow orange 10YR7/4	
4.64	129	130	P7	Earthenware	Small pot		Small amount of sand, dense	Light gray 2.5YR8/2	Orange 5YR7/6	Exterior: white coating
4.64	130	130	P7	Earthenware	Small pot		Small amount of sand, dense	Orange 5YR7/6	Dull orange 7.5YR7/4	
4.64	131	130	P7	Earthenware	Small pot		Fairy large amount of sand like feldspar etc., slightly coarse	Light gray 5YR8/2	Light gray 5YR8/2	
4.64	132	130	P7	Earthenware	Small pot		Fairy large amount of sand like feldspar etc., slightly coarse	Orange 5YR6/6	Pale orange 5YR8/3	Interior : white clay accretion
4.64	133	130	P7	Earthenware	Jar			Dull orange 7.5YR7/4	Dull orange 5YR7/4	
4.64	134	130	P7	Earthenware	Jar		Includes sand, dense	Dull orange 7.5YR7/3	Dull orange 5YR7/4	
4.64	135	130	P7	Earthenware	Jar		Small amount of sand, very dense	Light gray 2.5YR8/2	Orange 2.5YR8/2	Exterior: white coating
4.64	136	130	P7	Earthenware	Jar		Includes sand, dense	Dull yellow orange 10YR7/3	Orange 7.5YR7/6	Exterior: white coating
4.64	137	130	P7	Earthenware	Jar		Small amount of sand, very dense, carefully selected	Dull orange 7.5YR7/4	Orange 7.5YR7/6	
4.64	138	130	P7	Earthenware	Jar		Small amount of sand, very dense	Orange 7.5YR6/8	Orange 2.5YR6/6	Exterior: white coating?(exfoliation)
4.64	139	130	P7	Earthenware	Jar		Fairy large amount of sand, dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/4	
4.64	140	130	P7	Earthenware	Jar		Small amount of sand, very dense	Orange 7.5YR7/6	Orange 7.5YR7/6	
4.64	141	130	P7	Earthenware	Jar		Small amount of sand, dense	Orange 7.5YR6/8	Orange 5YR7/6	
4.64	142	130	P7	Earthenware			Very small amount of sand	Orange 2.5YR6/6	Orange 2.5YR6/6	Interior and Exterior: fairly weathered
4.64	143	130	P7	Earthenware			Fairy large amount of sand, dense	Pale reddish orange 2.5YR7/4	Orange 5YR7/8	
4.65	144	130	P7	Earthenware	Jar		Small amount of sand like feldspar etc., dense	Dull orange 7.5YR7/3~6/4	Orange 5YR7/6	Exterior: white coating
4.65	145	130	P7	Earthenware	Jar		Includes sand like black particles etc., dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/3	
4.65	146	130	P7	Earthenware	Jar		Small amount of sand, dense	Dull orange 5YR7/4	Dull orange 5YR7/4	
4.65	147	130	P7	Earthenware	Pot		Fairy large amount of sand, dense	Pale Yellow 2.5YR8/3	Pale yellow 2.5YR8/3	Interior and Exterior: white coating (Interior : slightly thin)
4.65	148	130	P7	Earthenware	Bowl		Small amount of sand, dense	Light yellow orange 7.5YR8/4	Light yellow orange 7.5YR8/3	
4.65	149	130	P7	Earthenware	Bowl		Includes sand, phlogopite	Light gray 5YR8/2	Dull orange 5YR7/4	Exterior: white coating, Rim: 80% remaining (about 40% of whole remaining)
4.65	150	130	P7	Earthenware	Cooking pot		Fairy large amount of feldspar, sand	Dull yellow orange 10YR7/4	Orange 2.5YR7/6	60% remaining
4.65	151	130	P7	Earthenware	Cooking pot		Fairy large amount of sand like feldspar and mica etc., dense	Dull orange 7.5YR6/4	Dull orange 5YR6/4	Exterior: black (soot)
4.65	152	130	P7	Earthenware	Pot		Fairy large amount of sand, dense	Dull yellow orange 10YR7/4	Dull orange 5YR7/4	Exterior: white coating?
4.65	153	130	P7	Earthenware	Pot		Fairy large amount of sand, dense	Dull orange 5YR7/4	Dull orange 5YR7/4	
4.66	154	130	P7	Earthenware	Pot		Small amount of sand, very dense	Light gray 2.5YR8/2	Light yellow orange 7.5YR8/3	
4.66	155	130	P7	Earthenware			Small amount of sand	Dull orange 5YR7/4	Dull orange 5YR7/4	Interior and Exterior: white clay accretion
4.66	156	130	P7	Earthenware	Jar	-/7.8/-	Small amount of sand	Orange 2.5YR6/8	Orange 2.5YR6/8	
4.66	157	130	P7	Earthenware			Includes sand, dense	Dull orange 7.5YR7/3	Pale reddish orange 2.5YR7/4	Exterior: white coating
4.66	158	130	P7	Earthenware	Jar	-/13.8/-	Fairy large amount of sand	Light yellow orange 7.5YR8/3	Orange 2.5YR7/8	Exterior: white coating
4.66	159	130	P7	Earthenware	Jar	-/10.9/-	Small amount of sand	Light yellow orange 7.5YR8/3	Orange 2.5YR6/8	
4.66	160	130	P7	Earthenware	Jar	-/11.6/-	Small amount of sand	Orange 2.5YR7/6	Orange 2.5YR7/6	
4.66	161	130	P7	Earthenware	Jar	-/11.5/-	Carefully selected	Orange 2.5YR6/6	Orange 2.5YR6/6	
4.66	162	130	P7	Earthenware	Lid		Fairy large amount of sand like feldspar etc., slightly coarse	Dull orange 7.5YR7/3	Dull orange 7.5YR7/3	

Fig.	No.	Context	Feature	Classification	Vessel type	Rim ϕ / Bottom ϕ / Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.66	163	130	P7	Earthenware	Lid		Small amount of sand, carefully selected	Dull orange 7.5YR7/3	Greyish brown 7.5Y6/3	Interior and Exterior: fairly weathered
4.66	164	130	P7	Earthenware	Lid		Fairy large amount of sand, dense	Dull orange 7.5YR7/4	Dull orange 7.5YR7/3	
4.66	165	130	P7	Earthenware			Small amount of sand, dense	Dull orange 7.5YR7/4	Orange 5YR7/6	
4.66	166	130	P7	Glazed ware	Dish	13.8/8.7/3.1	Carefully selected	Light gray 7.1Y7/1	Light gray 10YR8/1	
4.66	167	130	P7	Glazed ware		-/7.9/-	Carefully selected	Light gray 7.1Y7/1	Light gray 10YR8/2	
4.66	168	130	P7	Glazed ware		(19.0)/-/-	Very small amount of sand, carefully selected	Olive yellow 7.5Y6/3		
4.67	184	130	P7	Earthenware	Lid		Small amount of sand, carefully selected	Pale orange 5YR8/3	Orange 2.5YR6/8	Front : stamp impression shaped like decorative cap of an eave-end roof tile
4.68	187	130	P7	Earthenware	Stand (stamp)		Large amount of sand	Pale orange 5YR8/3	Dull orange 5YR7/4	
4.68	188	130	P7	Earthenware	Stand		Large amount of sand	Pale orange 5YR8/3	Dull orange 5YR7/4	Re-used as grinding tool

Tab.4.6 Observation Sheet of Earthenware from D1, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rim ϕ / Bottom ϕ / Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.69	15-19-189	82	D1	Earthenware	Urinal formed	11.7/5.9/18.0	Dense, includes sand	Orange 5YR7/6	Orange 5YR7/6	Almost complete
4.69	190	82	D1	Earthenware	Pot with handles	11.9/6.4/15.5	Dense, includes sand	Orange 5YR7/6	Dull Orange 5YR7/3	Interior: white clay accretion
4.69	191	82	D1	Earthenware	Jar		Dense, includes small amount of sand	Light gray 2.5Y8/2	Dull Orange 5YR6/3	Interior and exterior: white coating
4.69	192	82	D1	Earthenware	Jar		Dense, includes sand	Dull yellow orange 10YR6/3	Orange 5YR6/6	Exterior: white clay accretion
4.69	193	82	D1	Earthenware	Tub-shaped bowl	(54)/-/-	Dense, includes small amount of sand	Light yellow orange 7.5YR8/3	Dull Orange 5YR7/4	
4.69	194	82	D1	Earthenware	Lid		Includes sand, black particles	Orange 2.5YR6/6	Dull Orange 2.5YR6/3	Interior: sooted

Tab.4.7 Observation Sheet of Earthenware from Tr, AKB-15

Fig.	No.	Context	Feature	Classification	Vessel type	Rim ϕ / Bottom ϕ / Height	Fabric	Color (Exterior)	Color (Interior)	Notes
4.70	15-19-195		Tr. 10	Earthenware	Jar	-/14.0/-	Small amounts of sand	Dull orange 5YR6/4	Orange 5YR6/8	Exterior: Prominent weathering

Tab.4.8 Observation Sheet of Eave-end Tiles from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color (Exterior)	Color (Interior)	Notes
4.71	15-19-202	85	P2	Roof tile	Eave-end tile	Small amounts of sand, dense, reduction		Gray 5Y6/1	Yellowish gray 2.5Y6/1	Exterior: white clay accretion
4.71	203	70	P3	Roof tile	Eave-end tile	Small amount of sand, dense		Gray 7.5Y6/1	Gray 7.5Y5/1	
4.73	210	130	P7	Roof tile	Eave-end tile	Small amount of sand, dense		Gray 5Y6/1	Light gray 5Y7/1	
4.73	213	79	Roof-tile belt	Roof tile	Eave-end tile	Includes sand, dense, reduction		Yellowish gray 2.5Y6/1	Gray 5Y6/1	
4.75	225	87	North of rain permeable burnt bricks	Roof tile	Eave-end tile	Small amount of sand, dense		Yellowish gray 2.5Y6/1	Gray 10Y6/1	
4.75	226	87	North of rain permeable burnt bricks	Roof tile	Eave-end tile	Small amount of sand, dense, reduction		Grayish yellow brown 10YR5/2	Brownish gray 10YR5/1	
4.75	227	107	Cluster of tiles	Roof tile	Eave-end tile	Includes sand, slightly dense, reduction		Light gray 7.5Y7/1	Dull yellow orange 10YR7/2	
4.76	230	75	Cluster of tiles	Roof tile	Eave-end tile	Small amount of sand, dense, reduction		Gray 5Y6/1	Gray 5Y6/1	
4.76	231	76	Cluster of tiles	Roof tile	Eave-end tile	Includes sand, dense, reduction		Yellowish gray 2.5Y5/1	Yellowish gray 2.5Y6/1	
4.78	239		Tr. 10	Roof tile	Eave-end tile	Includes sand, dense, reduction		Light gray 2.5Y7/1	Yellowish gray 2.5Y6/1	
4.78	240		Tr. 11	Roof tile	Eave-end tile	Includes sand (feldspar etc.), slightly dense, reduction		Grayish yellow brown 10YR6/2	Grayish yellow brown 10YR6/2	

Tab.4.9 Observation Sheet of Concave Tiles from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color (Exterior)	Color (Interior)	Notes
4.71	15-19-200	81	P1	Roof tile	Concave tile	Slightly large amount of sand	Good	Gray N5/		
4.71	204	70,195	P3	Roof tile	Concave tile	Small amount of sand, slightly dense		Brownish gray 5YR6/1	Yellowish gray 2.5Y6/1	
4.72	205	70	P3	Roof tile	Concave tile	Includes sand, slightly dense		Light gray 10YR7/1	Light gray 7.5Y7/1	
4.73	214	80	Roof-tile belt	Roof tile	Concave tile	Includes very small amount of sand, small gravel	Good	Brownish gray 7.5YR6/1		
4.73	215		Roof-tile belt	Roof tile	Concave tile	Includes sand	Good	Brownish gray 5YR5/1		
4.74	216	78	Roof-tile belt	Roof tile	Concave tile	Includes sand	Good	Gray 7.5Y5/1		Trace of binding

Tab.4.10 Observation Sheet of Convex Tiles from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color (Exterior)	Color (Interior)	Notes
4.72	15-19-206	70	Pit3	Roof tile	Convex tile	Includes sand, dense	Good	Dull yellow 2.5Y6/3	Dull yellow 2.5Y6/3	
4.72	207	70	Pit3	Roof tile	Convex tile	Includes sand, dense	Good	Gray 10Y6/1	Light gray 10Y7/1	
4.74	217	77	Roof-tile belt	Roof tile	Convex tile		Good			Horizontally smoothed
4.74	218	78	Roof-tile belt	Roof tile	Convex tile	Includes sand, dense	Good	Yellowish gray 2.5Y6/1	Yellowish gray 2.5Y6/1	
4.74	219	87	Roof-tile belt	Roof tile	Convex tile	Includes sand, dense, reduction	Good	Brownish gray 5YR6/1	Grayish brown 5YR6/2	Rope-tapping trace

Tab.4.11 Observation Sheet of Ridge Tiles from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color(Exterior)	Color(Interior)	Notes
4.72	15-19-208	70 (layer21)	P3	Roof tile	Ridge tile	Small amount of sand, dense		Light gray 10Y7/1	Gray 5Y6/1	
4.75	220	77	Roof-tile belt	Roof tile	Ridge tile	Includes sand	Good	Light gray 5Y7/1		
4.75	221	78	Roof-tile belt	Roof tile	Ridge tile	Includes sand	Good	Light gray 5Y7/1		Trace of binding
4.75	222	79	Roof-tile belt	Roof tile	Ridge tile	Includes sand	Good	Light gray 5Y7/1		
4.75	223	78	Roof-tile belt	Roof tile	Ridge tile	Includes sand	Good	Gray 5Y6/1		
4.75	224	77	Roof-tile belt	Roof tile	Ridge tile	Includes sand, small gravel	Good	Gray 5Y5/1		

Tab.4.12 Observation Sheet of Inscribed Tiles from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color(凹)	Color(凹)	Notes
4.73	15-19-212	156, 130		Roof tile		Small amount of sand, dense		Dull yellowish brown 10YR5/3	Dull yellowish brown 10YR5/3	
4.78	238	99	Tr8	Roof tile		Small amount of sand, dense		Grayish yellow 2.5Y6/2	Grayish yellow 2.5Y6/2	

Tab.4.13 Observation Sheet of Greyish Burnt Bricks from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Fabric	Firing	Color (Front)	Color(Back)	Notes
4.71	15-19-201	81	P1	Clay object	Greyish burnt brick	Includes sand, dense		Gray 10Y5/1	Gray 10Y6/1	Cord impression
4.72	209	70	P3	Clay object	Greyish burnt brick	Includes sand, soft, slightly coarse		Gray 10Y6/1	Gray 10Y6/1	Grayish brown accretion (coating), cord impression
4.73	211	130	P7	Clay object	Greyish burnt brick	Includes sand, dense		Olive black 5Y3/1	Gray 5Y4/1	
4.76	228	126	West of roof-tile belt	Clay object	Greyish burnt brick	Small amounts of sand, slightly dense		Grayish brown 7.5YR6/2	Grayish yellow brown 10YR6/2	With pattern
4.76	229		Tr.3	Clay object	Greyish burnt brick	Includes sand, slightly dense		Brownish gray 10YR5/1	Brownish gray 10YR5/1	Cord impression
4.76	232	148	Tr.5	Clay object	Greyish burnt brick	Includes sand (feldspar), slightly coarse, reduction		Olive black 5Y3/1	Yellowish gray 2.5Y6/1	Dull orange7.5YR7/3 coating
4.77	233	148	Tr.5	Clay object	Greyish burnt brick	Includes sand, dense, reduction		Brownish gray 10YR6/1	Yellowish gray 2.5Y6/1	
4.77	234	153	Tr.5	Clay object	Greyish burnt brick	Includes sand (feldspar), slightly dense		Grayish yellow 2.5Y6/2	Dark grayish yellow 2.5Y5/2	Cord impression
4.77	235	153	Tr.5	Clay object	Greyish burnt brick	Includes sand, slightly dense, reduction		Yellowish gray 2.5Y6/1	Yellowish gray 2.5Y6/1	Cord impression
4.78	236	148	Tr.5	Clay object	Greyish burnt brick	Includes sand (feldspar), slightly coarse, reduction		Gray 7.5Y6/1	Grayish olive 7.5Y6/2	Cord impression
4.78	237	148	Tr.5	Clay object	Greyish burnt brick	Small amounts of sand, dense		Gray 5Y6/1	Gray 5Y6/1	Cord impression
4.78	241		Tr.14	Clay object	Greyish burnt brick	Includes sand, slightly dense		Gray 10Y4/1	Gray 7.5Y5/1	Cord impression

Tab.4.14 Observation Sheet of Metal Products from AKB-15

Fig.	No.	Context	Feature	Classification	Type	L/ W/ D	Wt.(g)	Notes
4.67	15-19-169	145	P7	Copper	Belt end tip/ horse tack	3.1/1.5/0.1~0.2	6.6	
4.67	170	141	P7	Copper	Horse tack?	5.1/2.6/0.2~0.4	12.0	
4.67	171	130	P7	Copper		(4.0)/07~08/0.2	3.3	
4.67	172	130	P7	Copper	Unknown	1.3/-/	0.3	Small hole
4.67	173	136	P7	Copper	Fragment of tack?	(1.4)/0.5/0.4	0.7	
4.67	174	74	P7	Copper	Unknown	2.3/-/0.25	8.5	
4.67	175	142	P7	Copper	Coin	(1.4)/-/0.1	0.3	Square hole?
4.67	176	134	P7	Iron	Small knife	(7.8)/1.1~1.2/0.2	9.1	
4.67	177	135	P7	Iron	Unknown	(11.5)/3.5/0.2~0.4	51.4	
4.7	197	131	Roof-tile belt	Copper	Handle	4.5/-/0.1	1.0	
4.7	198	132	West of roof-tile belt	Iron	Unknown	4.0/-/0.1~0.2	2.8	
4.7	199		Tr. 13	Iron	Fragment of iron pot?	-/0.1	35.7	

Tab.4.15 Observation Sheet of Clay Objects from AKB-15

Fig.	No.	Context	Feature	Classification	Type	L/ W/ D	Wt.(g)	Fabric	Color(Exterior)	Color (Interior)	Notes
4.59	15-19-085	81	P1	Glazed ware	Pierced disc	2.7/2.5/0.55	5.1	Carefully selected	Light Gray 2.5Y8/2		Reuse of glazed ware fragment
4.67	180	139	P7	Glazed ware	Pierced disc	(1.3)/-/0.5	0.6	No inclusions	Dull Orange7.5YR7/3		Reuse of glazed ware fragment
4.67	181	138	P7	Clay object	Pierced disc	(3.9)/-/1.1	9.1	Includes sand	Dull Orange 7.5YR7/4		
4.67	182	146		Clay object	Clay disc	3.1/-/0.5	8.7	Includes sand	Dull Orange 7.5YR7/3		
4.67	183	140		Glazed ware	Horse figurine		20	No inclusions	Dull Yellow Orange 10/3		Reuse of glazed ware fragment

Tab.4.16 Observation Sheet of Bone/Coral Artifacts from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Wt.(g)	L/ W/ D	Notes
4.59	15-19-086	81		Animal bone	Chuko		3/20/1.5	Astragalus of sheep
4.67	178	137		Coral		1.2	2.2/-/-	Coral
4.67	185	130		Animal bone	Chuko	6.7	3.2/2.0/1.9	Astragalus of sheep
4.67	186	130		Animal bone	Chuko	3.8	2.9/2.1/-	Astragalus of sheep, perforation

Tab.4.17 Observation Sheet of Stone Tools from AKB-15

Fig.	No.	Context	Feature	Classification	Type	Stone Material	Diameter/ Thickness(cm)	Wt.(g)	Color (Exterior)	Notes
4.58	15-19-082	81		Stone tool	Grinding stone	Sandstone			Black	
4.63	124	70	P3	Stone product	Bead		0.7/0.4	0.2	Dark green	
4.67	179	143	P7	Stone product	Bead	Lapis lazuli	1.2/0.3	0.9	Indigo blue/ deep blue	
4.7	196		Tr. 5	Stone tool	Mill stone	Granite				

Tab.4.18 Weight of Unearthed Materials from AKB-15

Area	Feature	Earthenware	Glazed ware	Convex tile	Concave tile	Eave-end tile	Ridge tile	Greyish burnt brick	Red brick	Bone	Stone artifact	Metal	Slag	Wall clay	Clay object
15	Tr. 10	798		236	9,438	147		3,845							
15	Tr. 10	723			2,028					27					
15	Tr. 10	109		109	2,070					13					
15	Tr. 10	11								238					
15	Tr. 11	195		165	3,976	75				21					
15	Tr. 12	66			323										
15	Tr. 13	473		129	971			2,119		3		81			
15	Tr. 14	2,021	60		820			1,760							
15	Tr. 15	926		426	920										
15	Tr. 16	1,002		662	8,269		382	100		4			60		
15	Tr. 17	1,071		295	3,900			1,652		22					
15	Tr. 18				455										
15	Tr. 19	21			43										
15	Tr. 1	238			140										
15	D1	25,726		246	5,326			753		194					
15	Tr.2	12,419	74	357	909			317		1,942			156		
15	Tr.3	2,636		102	3,037			385		31					
15	Tr.4	7,927	9	2,157	34,091		496	9,003		81			114		
15	Tr.5	519		1,518	6,008	75	114	4,230			5,185		78	245	
15	Tr.6	511		184	3,538			259	488		39				
15	Tr.7	40		2,860	2,896			880							
15	Tr.8	86			16,745	93	60			14				6	
15	Tr.9	298			2,444										
15	Tr. 9 gravel surface	34			1,215					147				32	
15	P1	138,818	773	2,008	16,474	234	315	13,839	480	2,072	1,115		3,970	44	
15	P2	1,305	8	38	1,934				26	115					
15	P3	25,923	51	2,643	103,126	1,723	811	21,177		882	1		155	124	
15	P5	415			560			4,323							
15	P6									55					
15	P7	66,232	207	2,454	62,505		315	26,491	270	15,565	3,365	101	885	2,816	294
15	Roof-tile belt	5,508		126,964	413,443	983	54,343	9,377		132	228	1		1,216	
15	Cluster of tiles No.5, 6	34			2,602					13					
15	Cluster of tiles west	2,584		10,672	102,201	2,557	2,549	3,597	600	226		8		60	
15	laid greyish burnt brick	8,264		6,369	39,272	274	903	4,149					113		
15	Cluster of tiles No.9	151			558										
15	Stone pavement	575			4,042			14,012		22					
15	Stone pavement east	52		443	1,271										
Total		307,711	1,182	161,037	857,550	6,161	60,288	122,268	1,864	21,819	9,933	191	5,531	4,543	294

Tab.4.19 AKB-15 List of Contexts

No.	Date	Area/ feature	Discription	No.	Date	Area/ feature	Discription
70	4/28	P3	Tr. 5	115	5/4	P3	Below layer 18. Earthenware. 2.47m deep.
71	4/23	Tr. 4	Greyish burnt brick	116	5/4	Tr. 8	Cluster of roof tiles No.4
72	4/23	Tr. 4	Greyish burnt brick	117	5/4	Tr. 8	East of cluster of roof tiles No.4. Upper layer of small gravel.
73	4/23	Tr. 4	Tr. 4 SW corner. Area containing charcoal and burnt soil particles	118	5/4	P3	Cranium of horse. 2.53m deep.
74	4/23	Tr. 3	Coin	119	5/5	Tr. 10c	Roof tile row in the north east corner
75	4/24	Tr. 5	Roof tile and others	120	5/5	Tr. 10c	Roof tile row in the south
76	4/24	Tr. 5	Roof tile and others	121	5/5	P1	Pit overlapping P1. Older than P1. Long axis
77	4/26~5/2	Roof-tile belt	Tr. 5	122	5/5	Tr. 4	Custer of roof tiles No.5 NW
78	4/26	Roof-tile belt	Tr. 5	123	5/5	Tr. 4	Custer of roof tiles No.6 near west wall
79	4/26	Roof-tile belt	Tr. 6	124	5/6	P1	Cranium of horse. 2.81m deep.
80	4/26~5/11	Roof-tile belt	Tr. 6	125	5/6	Tr. 17	Near the center, accumulation of roof tile and
81	4/29~5/3	P1		126	5/8	Roof-tile belt west	Tr. 6
82	4/27~28	D1		127	5/8	P7	Destroys stone mosaic partially
83	4/28	Stone mosaic	Stone mosaic surface	128	5/8	P4	Trash pit, yielding earthenware, roof tile, bone.
84	4/28	P2	Lower layer of ditch 1	129	5/8	P5	Cooking stove-like feature. Includes charcoal, burnt soil, earthenware, roof tile, bones.
85	4/28	P2	In ditch 1	130	5/8	P7	Easewest sub trench
86	4/29~5/11	Roof-tile belt west	Tr. 6	131	5/8	Roof-tile belt	Bronze object
87	4/29	Burnt brick ditch north	Cluster of roof tiles	132	5/8	Roof-tile belt west	Tr. 5 SW
88	4/29	East of roof-tile belt	Tr. 5	133	5/10	P7	Iron product
89	4/29	Roof-tile belt	Tr. 5, bone artifact	134	5/10	P7	Iron product (knife?)
90	4/29	P2	Below context 84. Levelled surface of a platform?	135	5/10	P7	Iron product
91	4/29	Tr. 7	Tr. 7 western half	136	5/10	P7	Bronze object
92	5/1	P1	Recorded in cross section figure	137	5/10	P7	Ornament?
93	5/1	P1	Recorded in cross section figure	138	5/10	P7	Clay object
94	5/1	P1	Recorded in cross section figure	139	5/11	P7	Ceramic object
95	5/1	P1	Recorded in cross section figure	140	5/11	P7	Ceramic horse
96	5/1	P1	Recorded in cross section figure	141	5/11	P7	Bronze belt fitting
97	5/1	P1	Recorded in cross section figure	142	5/11	P7	Coin
98	5/1	P1	Recorded in cross section figure	143	5/11	P7	Stone artifact
99	5/1	Tr.8 cluster of tiles		144	5/11	Roof-tile belt west	Tr. 5, metal object
100	5/1	Tr.8 sub-trench	Ditch-like feature in the eastern end of sub trench	145	5/11	P7	Bronze belt fitting
101	5/2	P3	Fragment of wood	146	5/11	P7	Clay disc made of pottery fragment
102	5/2	P3	Deep bowl-shaped earthenware in complete	147	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
103	5/2	P3	Animal bone	148	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
104	5/2	P1	Ceramic lamp	149	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
105	5/3	P1	Earthenware with adhesion of charcoal, C14	150	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
106	5/3	P1	Earthenware with adhesion of charcoal, C14	151	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
107	5/4	Tr. 8	Eave-end tile	152	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
108	5/4	Tr. 8	Cluster of roof tiles No.4	153	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
109	5/4	P3	Horse mandible from ash layer	154	5/11	Stone mosaic	Greyish burnt brick from burnt brick ditch
110	5/4	P3	Earthenware from ash layer	155	5/11	P7	Bronze object
111	5/4	P3	Bone from ash layer	156	5/12	P7	Round feature from lower layer with blackish brown fill.
112	5/4	P3	Earthenware from ash layer	157	5/12	P7	Mid-layer, iron product
113	5/4	P3	Bone from ash layer	158	5/12	P7	Northern end of the pit
114	5/4	P3	Bone from ash layer				

5. Investigation of AKB-19

5.1 Location of Excavation Area (Fig.1.5)

AKB-19 is situated on the southeast part of the south wall of the First Shahrستان, on the south-west side of the Christian church remains. The point where the excavation area was set up had a cut as a pathway of local people to enter the First Shahrستان, and a part of the wall was largely scraped off.

5.2. Objective of Investigation

- To confirm the framework, construction, and the refurbishment status of the exterior wall of the First Shahrستان, especially the southeast part of the south wall.
- To obtain information to determine the timing of the wall construction.

5.3. Summary of Investigation

The First Shahrستان is a city built by the Sughd, and its exterior wall is thought to have been built in the same period. On the other hand, it is presumed that the First Shahrستان was partially refurbished when the Second Shahrستان was built in the latter half of the 7th century under the domination of the Tang Dynasty (Yamauchi, et al., 2019). Therefore, we set up a trench perpendicular to the wall direction, along the pathway already cut through, and vertically incised the wall and observed the cross-section.

This location, where a wall built by the Sughd had existed, and the refurbishment is presumed to have been made during the construction of Suyab Garrison by the Tang Dynasty, is the most appropriate point to investigate the relation between the two events.

5.3.1. Wall of Sun-dried Bricks (Fig.5.1)

At the central part, we detected a wall made of sun-dried bricks. The width was 2.2m, and the height was 0.9m at the place and time of the excavation.

The size of each sun-dried brick is 21 - 22cm wide and 10 - 12cm thick. The length is unknown because we only confirmed the header of the bricks on the cross-section surface. The bricks were laid with fairly thick joint sealer, but the soil for jointing bricks is very soft, so at present, a lot of void space is confirmed between the bricks. Some parts have cracks like earth fissure, assumed to have been caused by an earthquake, which will be described later. This makes the brick work slightly irregular.

Below the layer of the sun-dried bricks, we confirmed layers of tightly hardened pahsa bricks of 10 - 12cm thick. It is possible that the wall was built by laying sun-dried bricks and pahsa bricks alternately.

5.3.2. Wall of Pahsa Bricks (Fig.5.1)

On the southern side (outside) of the wall of sun-dried bricks described above, we confirmed a structure of lined pahsa bricks. Three tightly hardened pahsa bricks were laid sideways almost contacting the southern side of the wall of sun-dried bricks. The width of a pahsa brick was 52 - 54cm, but it was not possible to confirm the height within the excavation area.

It is not easy to determine whether this structure had been built as a part of the sun-dried-brick wall at once, or added later to maintain the wall. However, it is highly probable that it was built together with the wall, since the walls of the same structure were unearthed in the citadel of the First Shahrستان and at the point between R4 and R5 of AKB-13.

5.3.3. Wall by Rammed Earth Method (Fig.5.1)

On the northern side of the wall of sun-dried bricks (inside the wall), a wall thought to have been made by rammed earth method was confirmed. The width at the detecting point was 0.8m, and the height confirmable in the excavation area was 0.6m. The thicknesses of the rammed earth layer varies from 6 - 14cm, but all of them are firmly tightened to make solid layers.

The rammed earth technique has not been confirmed in the Sughd region, and considering that this was a civil engineering technique generally used in China, it is presumed that this rammed-earth wall is the remains of the refurbishment made under the domination of the Tang Dynasty.

5.3.4. Structure of Wall Body (Fig.5.2)

As described above, the wall bodies include three construction methods.

The first method is to lay sun-dried bricks and pahsa bricks alternately, as in the primary walls in the Sughd period. The second method is the one used in a large pahsa-brick wall on the south, adjacent to the primary wall. It is highly possible that the wall was a part of the sun-dried-brick wall. The third one is the rammed-earth method, presumably used to repair the primary wall.

Therefore, it was clarified that the walls were at first built with sun-dried bricks and pahsa bricks at the time of the construction of the First Shahristan. Then, under the domination of the Tang Dynasty, the inside was repaired by the civil engineering method uniquely Chinese, and was broadened a little, and further hardened.

5.3.5. Cracks in Wall

Traces of landslide have been confirmed in the investigation of the east wall of the First Shahristan (AKB-16), which make us presume that there was a large earthquake in the vicinity of Ak-Beshim in the past.

The walls of sun-dried bricks confirmed in this investigation is cracked, have weak joints and large gaps in various points, with many fractured bricks. Therefore, it is presumable that this exterior wall was also greatly damaged by the same earthquake. However, it is unknown if the maintenance by the rammed-earth method is related to the earthquake.

5.4. Artifacts from AKB-19 (Fig.5.4:19-19-001 - 005)

From this excavation area, pieces of earthenware, bronze products, and animal bones were unearthed.

The vessel types of the earthenware are: a large pot (001), a jug (002), and a fragment assumed to have been a leg of a pottery with raised lines expressing grape foliage scrolls (003).

The bronze products are: small-sized bronze product of unknown usage (004), and a bronze coin (005). This square-holed bronze coin with the diameter of 2.6cm was unearthed near the pahsa-brick wall on the south of the excavation area. The characters on it are uncertain due to rust.

The animal bones were all small fragments, and some were unearthed from the inside of the sun-dried-brick wall.

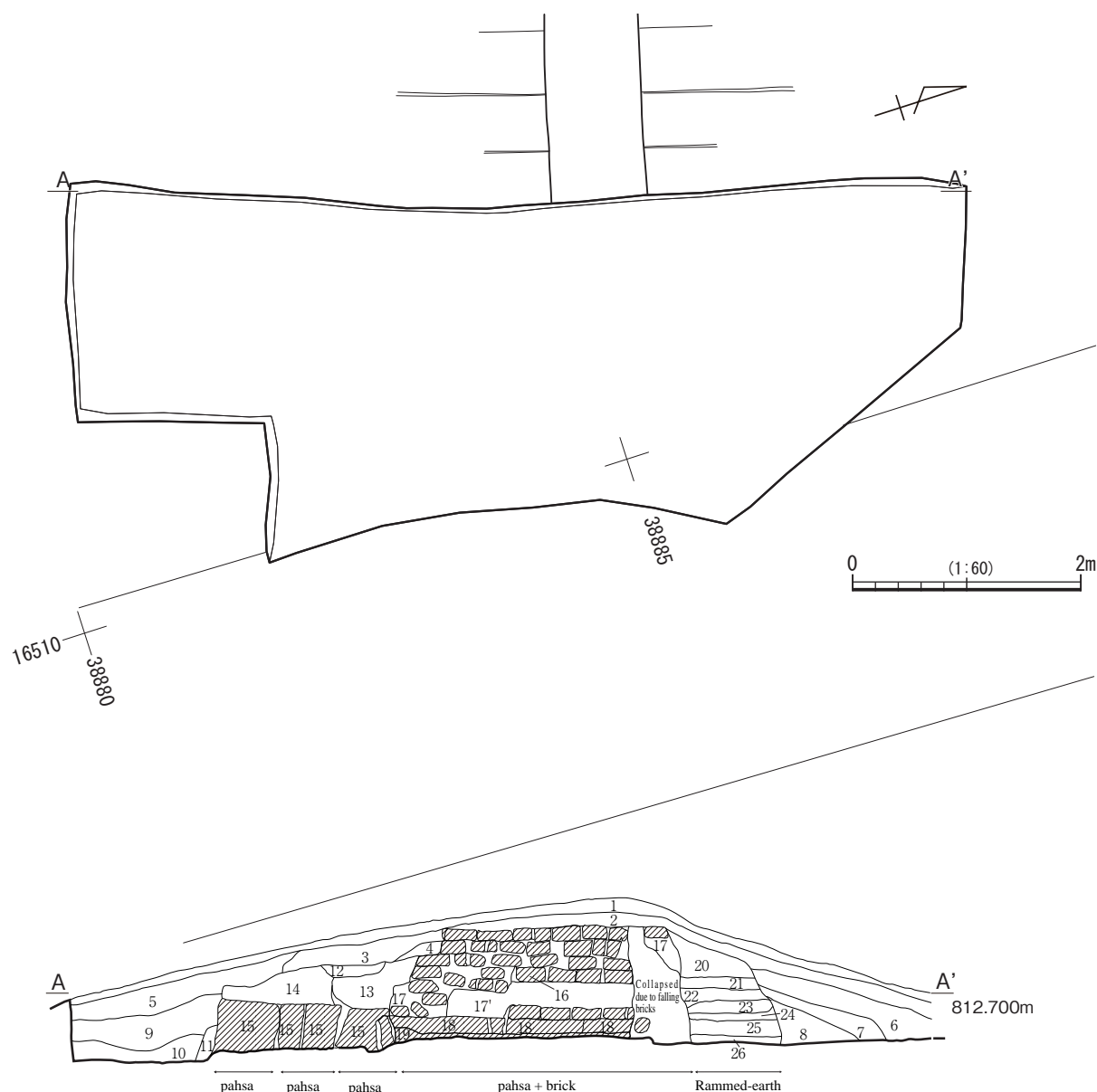
5.5. Summary of AKB-19

According to the observation of the cross-section, the unearthed wall was made of sun-dried bricks in the center, pahsa bricks (kneaded clay blocks) on the south, and soil piled in rammed earth method on the north. From these facts, it was assumed that the wall of sun-dried bricks and pahsa bricks built by Sughd people had been reinforced with rammed earth method by Chinese people. Since the wall is presumed to have been renovated at the time of the construction of the wall of the Second Shahristan, namely, the Suyab Garrison, the renovation is thought to have made in the Tang

era.

As for the fissures on the wall, a dislocation of rammed-earth layer was also confirmed at the wall on the east (AKB-16) of the Christian church remains (AKB-8) in the First Shahristan. AKB-16 is a wall made of rammed-earth, presumed to have been built in the end of the 7th century. The fault is thought to have been generated later than the end of the 7th century. This fault may be contemporaneous with the fissures in AKB-19.

The observed structure of sun-dried bricks has unevenness in their arrangement, with quite a few void spaces between the bricks. Therefore, it is possible that this part also was refurbished in the later period.



- | | |
|--|--|
| 1 10YR3/1 Brownish black soil: topsoil layer. | 15 7.5YR5/3 Dull brown soil: π ry hard clay. Pahsa composing the wall, easy to break into large blocks. |
| 2 7.5YR6/2 Grayish brown soil: compact sandy soil. | 16 7.5YR6/3 Dull brown soil: sun-dried bricks. |
| 3 10YR7/2 Dull yellow orange soil: π ry hard, contains clay particles, parts of wall. | 17 10YR5/3 Dull yellowish brown soil: joints of brick, fragile sandy soil. |
| 4 10YR7/2 Dull yellow orange soil: hard layer, contains fragments of brick. Collapsed wall? | 17' 10YR5/3 Dull yellowish brown soil: wide joints, not pahsa because it is π ry fragile. |
| 5 7.5YR5/2 Grayish brown soil: compact sandy soil. | 18 10Y R6/2 Grayish yellow brown soil: compact π ry scous soil, considered pahsa, but slightly weaker than layer 15 and contains large amount of sand. |
| 6 7.5YR5/4 Dull brown soil: less compact sandy soil, contains small amount of earthenware. | 19 7.5YR6/3 Dull brown soil: difficult to distinguish units on the section, but may be sun-dried brick. Possibility of pahsa also remains. |
| 7 7.5YR6/2 Grayish brown soil: less compact sandy soil, contains small amount of earthenware. | 20 7.5YR5/3 Dull brown soil: fragile sandy soil and contains large amount of clay blocks. Collapsed wall? |
| 8 10Y R6/3 Dull yellow orange soil: fairly hard sandy soil. | 21 7.5YR7/6 Orange soil: π ry compact soil. Layer of rammed-earth. |
| 9 7.5YR7/3 Dull orange soil: loose sandy soil, rather rough and contains small amount of clay particles, fragments of earthenware. | 22 7.5YR6/6 Orange soil: π ry compact soil. Layer of rammed-earth. |
| 10 10YR6/2 Grayish yellow brown soil: loose sandy soil, fragile and contains large amount of clay. | 23 7.5YR7/3 Dull orange soil: π ry compact soil. Layer of rammed-earth. |
| 11 10YR6/3 Dull yellow orange soil: fairly hard, contains large amount of fragments of clay (pahsa), white lime. | 24 7.5YR8 4 Light yellow orange soil: π ry compact soil. Layer of rammed-earth. |
| 12 7.5YR6/4 Dull orange soil: π ry compact and contains brown clay. | 25 7.5YR8 4 Light yellow orange soil: π ry compact soil, contains small amount of charred particles. Layer of rammed-earth. |
| 13 10YR7/3 Dull yellow orange soil: π ry hard clay, contains brown clay. Collapsed pahsa on the upper part? | 26 7.5YR8 2 Light gray soil: π ry compact soil, contains small amount of charred particles. Layer of rammed-earth. |
| 14 10YR7/3 Dull yellow orange soil: similar to layer 13, contains slightly more sand than layer 13. | |

Fig.5.1 General View of AKB-19



Fig.5.2 Full View of AKB-19



Fig.5.3 Construction Structure Observed on Cross-section of the South Wall in AKB-19

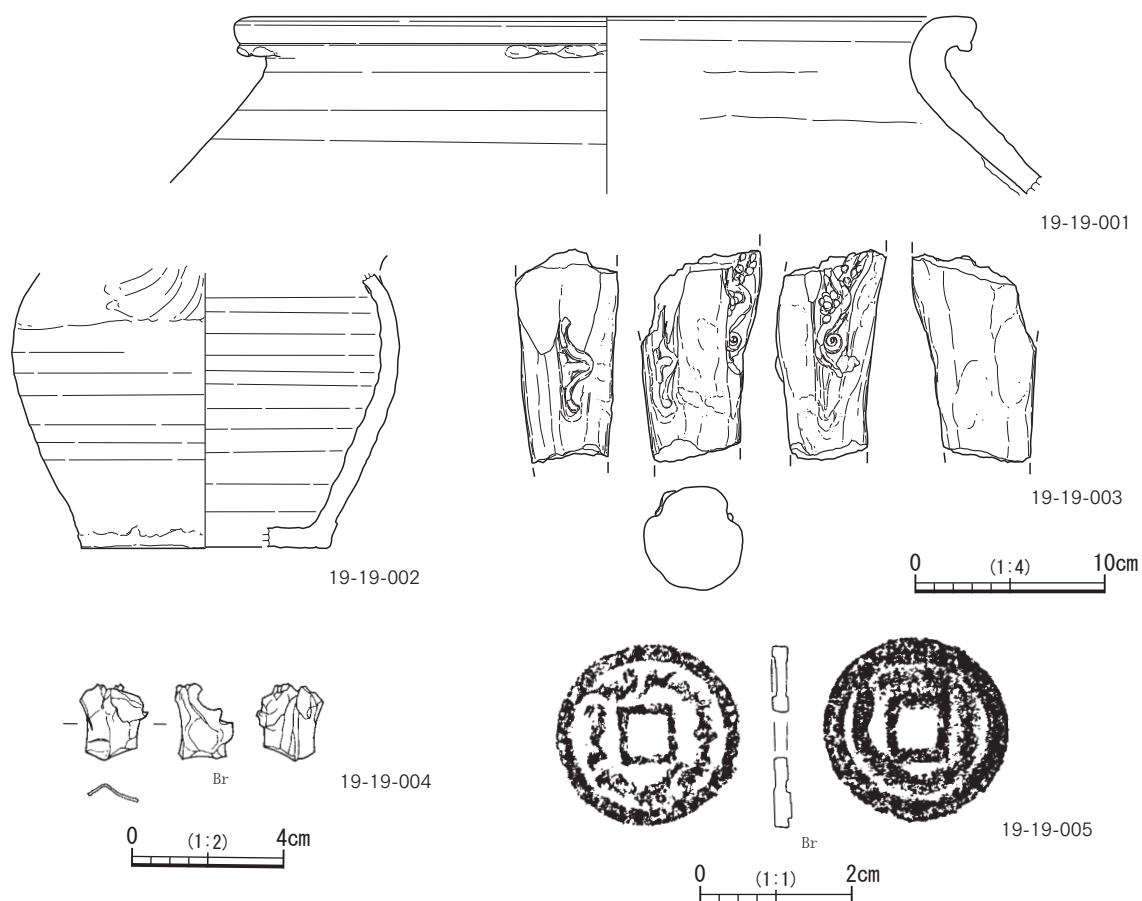


Fig.5.4 Artifacts from AKB-19 19-19-001 - 005



Fig.5.5 Artifacts from AKB-19 19-19-001 - 005

Tab.5.1 List of Unearthed Materials from AKB-19

No.	fig	Feature	Classification	Type	Rimφ/Bottomφ/Height/Length/Width/Depth	Weight(g)
19-19-001	5.4		Earthenware		(39.0)/-/	
19-19-002	5.4		Earthenware			
19-19-003	5.4		Earthenware	Leg	/-(54)	
19-19-004	5.4		Copper	Fragment of a vessel?	-/-/0.1	2.1
19-19-005	5.4	South of Sogdian wall (Pafsa)	Copper	Coin	2.4/-/0.15	5.4

Tab.5.2 Observation Sheet of Earthenware from AKB-19

Fig.	No.	Context	Feature	Classification	Vessel type	Rimφ/Bottom φ/Height	Fabric	Color (Exterior)	Color (Interior)	Notes
5.4	19-19-001			Earthenware	Pot	(39.0) /-/	Fairly large amount of sand, dense	Dull yellow orange 10YR7/2	Dull orange 5YR7/3	
5.4	002			Earthenware	Jug		Small amount of sand, dense	Dull orange 2.5YR6/4	Orange 7.5YR7/6	Interior : white clay accretion
5.4	003			Earthenware	Leg	/-/ (54)	Large amount of sand, slightly dense	Pale reddish orange 2.5YR7/3		White coating

Tab.5.3 Observation Sheet of Metal Products from AKB-19

Fig.	No.	Context	Feature	Classification	Type	Wt.(g)	L/ W/ D	Notes
5.4	19-19-004	1		Copper	Vessel fragment?	2.1	-/-/0.1	
5.4	005		South of Sogdian wall (Pafsa)	Copper	Coin	5.4	2.4/-/0.15	Square-holed coin

Tab.5.4 Weight of Unearthed Materials from AKB-19

Area	Feature	Earthenware	Glazed ware	Convex tile	Concave tile	Eave-end tile	Ridge tile	Greyish burnt brick	Red brick	Bone	Stone artifact	Metal	Slag	Wall clay	Clay object
19	AKB19	7,945	43		185				78	602					

Tab.5.5 AKB-19 List of Contexts

No.	Date	Area/ feature	Description
1	5/2	East wall	Cutting of wall on the east side
2	5/3	East wall	Artifacts from laid brick part at the center of the wall
3	5/4	East wall	1.5m extension to the south

6. Ground Penetrating Radar Survey

At each point in the First and the Second Shahrستان, we conducted ground penetrating radar surveys. For details, see Addendum 4.

6.1. AKB-13

At AKB-13 of the First Shahrستان, we implemented ground penetrating radar surveys to probe features buried underground of the extended area at the southeast extended area of AKB-13 (GPR2019-1a), the northeast extended area (GPR2019-1b), the northwest extended area (GPR2019-1c), southwest extended area (GPR2019-1d), and the south side (GPR2019-1e) and the north side (GPR2019-1f) of AKB-13. As a result, we obtained distinctive response to indicate passages, rooms and inner spaces sectioned by some structures such as walls, and we assumed a situation that a city structure made of buildings and streets had been buried.

6.2. AKB-15

At the Second Shahrستان, ground penetrating radar surveys were implemented at points (GPR2019-3—GPR2019-5) for the purpose of detecting buried structures and probing the potential points for archaeological investigation. At AKB-15, we had implemented ground penetrating radar surveys before starting the 2017 investigation and had checked the actually excavated structure against the data to enhance the accuracy of exploration information. This time, we obtained good response to assume the structure of features especially at GPR2019-5. At the Second Shahrستان, we implemented new explorations on the south and the east of the pond (Point GPR2019-3), and the northwest corner of the Garrison?wall (Point GPR2019-4).

6.3. AKB-19

AKB-19 at the south wall of the First Shahrستان, we implemented the radar survey prior to the investigation (at the Point GPR2019-2), obtained the response of the building frame of a wall at the depth of about 1m, and further clarified structure at the depth of about 2m. Also, a low-density response was obtained from the end section of the wall, but as a result of an investigation, it was proved that the inside of the wall had been fixed by a rammed-earth structure.

7. Zooarchaeological Analysis

In the 2019 investigation, a large amount of animal remains were unearthed from AKB-13 of the First Shahristan and AKB-15 of the Second Shahristan. As for the former district, there exists a report of the past excavation (Arai, 2016). Therefore, in 2019, we gave priority to the latter, which yielded only a small number of animal remains in the past. The summary of the analysis results is as below. The details of the results are reported separately (Uestuki & Arai 2020).

7.1. Materials and Methods

At AKB-15, our analysis focused mainly on P1, P3, and P7 where animal remains had been unearthed in large numbers. The animal remains from P1 and P7 were collected by hand collection during excavation. Some of the animal remains from P3 were collected by hand collection, and some were obtained from the soil samples of layer 19 to 22 (see section 8. plant remains for the method and the amount of the samples). The samples were water-sieved with test sieves of 4, 2, 1, and 0.5mm, and bones were collected by naked eye. Identification of the major elements except skulls, vertebral bones, and loose teeth have almost completed.

7.2. Results

Of the remains from the three features, a total of about 700 specimens were identified (Tab.7.1). The taxonomic composition from all features were dominated by *Ovis/Capra* (specimens identifiable to species were mostly *Ovis aries*), followed by *Bos taurus*, then *Equus* (mainly *caballus*, but a few small-sized specimens possibility of *asinus* exists). In total, the ratio was about 60, 20, and a little less than 10% for each taxon (see the Number of Identified Specimen, Fig.7.1). The component of major species is common with the result of 2018 First Shahristan analysis. However, at the First Shahristan, the ratio of *Equus* was as high as about 40%, so the ratio varies among districts. As for other specimens, a very small amount of *Felis*, *Camelus*, and *Cervidae* were identified (Tab.7.1). From P3 and P7, almost entire elements of *Canis familiaris* were recovered. The unearthed situation is not clear, but it is possible that it was a burial, or a disposal of the whole body. Thus, although the NISP (number of identified specimens) for *Canis* is large, its MNI (minimum number of individuals) is only four. A juvenile individual was confirmed at P3, and an adult animal and two juveniles were confirmed at P7 (Tab.7.1).

Tab.7.1 Taxonomic Distribution of Animal Remains

	NISP								MNI			
	Pit 1		Pit 3		Pit 7		total		Pit 1	Pit 3	Pit 7	total
	N	%	N	%	N	%	N	%	N			
Anura	0	-	+	-	0	-	0	-	0	+	0	+
Aves	0	-	27	-	0	-	27	-	0	2	0	2
<i>Felis silvestrius catus</i>	5	2%	0	0%	0	0%	5	1%	1	0	0	1
<i>Canis familiaris</i>	0	0%	31	32%	52	18%	83	12%	0	1	3	4
<i>Equus sp.</i>	22	7%	11	11%	10	3%	43	6%	3	2	2	7
<i>Camelus</i>	1	0%	0	0%	1	0%	2	0%	1	0	1	2
<i>Cervidae</i>	1	0%	0	0%	0	0%	1	0%	1	0	0	1
<i>Bos taurus</i>	55	18%	21	22%	52	18%	128	18%	4	2	4	10
<i>Ovis/Capra</i>	212	68%	20	21%	161	56%	393	56%	22	2	20	44
<i>Ovis aries</i>	17	5%	5	5%	12	4%	34	5%	-	-	-	-
<i>Capra hircus</i>	0	0%	0	0%	2	1%	2	0%	-	-	-	-
Indet.	0	0%	8	8%	0	0%	8	1%	-	-	-	-
Mammalia total	313	100%	96	100%	290	100%	699	100%	32	7	30	69

P3 was deep and in good preservation environment, so small specimens such as frogs (*Anura*), pigeons (*Columbidae*) and hedgehogs (*Hemiechinus*), all rare in past excavations were unearthed from in excellent condition. Analysis is ongoing to clarify the environment and the animal resource utilization.

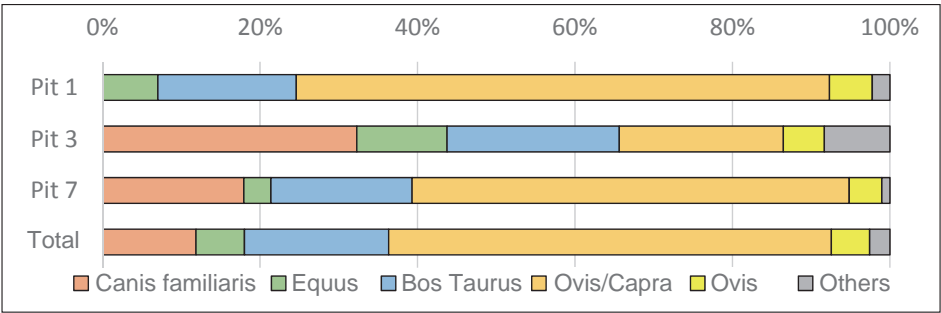


Fig.7.1 Mammal Assemblage (NISP)



Fig.7.2 Sheep Mandible Unearthed in P1



Fig.7.3 Horse Skull Unearthed in P3



Fig.7.4 Horse Mandible and Other Bones Unearthed in P3

8. Archaeobotanical Analysis

In the 2019 investigation, we conducted an archaeobotanical investigation to find out the plants eaten or utilized in the two districts, AKB-13 and AKB-15 and to reconstruct the dietary life in each period. The major results are as below. The detailed contents is reported separately (Nakayama & Akashi 2020).

8.1. Investigation Methods

The investigation started from the collection of the soil deposited in the features. The soil was water sieved and screened with the test sieves of 0.5, 1, 2, 4mm to collect plant remains. Then, at our lodging, we observed the collected plant remains with a portable digital microscope, and implemented basic classification. Afterwards, at the Research Institute of Cultural Properties, Teikyo University, we conducted more detailed analysis using a digital microscope.

In the investigation in 2019, we collected soil samples from 28 locations. The amount of soil had been set as 4 liters in principle. However, as we confirmed layers of carbonized materials in layer 19 to 22 of Pit3 of AKB-15, we anticipated the existence of a large amount of plant remains. Therefore, we collected entire sediment for each layer and conducted water sieving.

8.2. Summary of Results

As a result of the analysis, a large amount of plants such as grains and fruits were identified (Tab.8.1). The following are the names of their family, genus or species.

- (1) Poaceae
Hordeum vulgare L.
Triticum durum/aestivum L.
Setaria italica
- (2) Fabaceae
Lens culinaris
- (3) Vitaceae
Vitis
- (4) Cucurbitaceae
Cucumis melo
- (5) Rosaceae
Malus
Pyrus
cf.Sorbus
- (6) Lythraceae
Punica granatum
- (7) Cornaceae
Cornus officinalis
- (8) Convolvulaceae
Calystegia
- (9) Rubiaceae
Galium sp.

A point to be noted is that a huge amount of seeds of fruits such as *Vitis*, *Cucumis melo*, *Malus* and *Pyrus* of Rosaceae to note some were identified. From these remains, we may be able to clarify the fruits eaten by the people, and the seasonality of the disposal.



Fig.8.1 Plant Remains from AKB-15

Tab.8.1 Ak-Beshim Archaeological Site Plant Remains Collection Location

Division	Remains	Collection Point	Soil Amount	Qty of Sample Bottle
SH1	Main Street 1	2019 South-wall Section, Layer 1	4L	0
SH1	Main Street 1	2019 South-wall Section, Layer 3	4L	1
SH1	Main Street 1	2019 South-wall Section, Layer 6	4L	1
SH1	Main Street 1	2019 South-wall Section, Layer 9	4L	0
SH1	Main Street 1	2018 South-wall Section, Layer 2	4L	1
SH1	Main Street 1	2018 South-wall Section, Layer 7	4L	1
SH1	Main Street 1	2018 South-wall Section, Layer 9	4L	1
SH1	Main Street 1	2018 South-wall Section, Layer 10	4L	1
SH1	Main Street 1	2018 South-wall Section, Layer 21	4L	1
SH1	Context 127	P11	2L	1
SH1	Context 128	P12	2L	1
SH2	Pit1	Column Sample 1	4L	1
SH2	Pit1	Column Sample 2	4L	1
SH2	Pit1	Column Sample 3	4L	1
SH2	Pit1	Column Sample 4	4L	1
SH2	Pit1	Column Sample 5	4L	1
SH2	Pit3	Pit3, Layer 1, Section	4L	1
SH2	Pit3	Pit3, Layer 6, Section	4L	1
SH2	Pit3	Pit3, Layer 12, Section	4L	1
SH2	Pit3	Pit3, Layer 14, Section	4L	1
SH2	Pit3	Pit3, Layer 18, Section	4L	3
SH2	Pit3	Pit3, Layer 19	165L	33+ 2 cases
SH2	Pit3	Pit3, Layer 19, Pottery No.110	4L	1
SH2	Pit3	Pit3, Layer 19, Pottery No.114	4L	1
SH2	Pit3	Pit3, Layer 20	135L	8
SH2	Pit3	Pit3, Layer 21	15L	1
SH2	Pit3	Pit3, Layer 22	45L	3
SH2	Pit3	Pit3, Layer 23	4L	0

9. Radiocarbon dating and wood charcoal identification

Radiocarbon dating of charcoal wood, carbonized seeds and charred residues on pottery from Pit1 (P1), Pit3 (P3) and Pit7 (P7) of the 2nd Shahristan (AKB15) were conducted. The results indicate that P3 and P7 were contemporaneous, followed by P1. The report is divided into two volumes as it was commissioned separately (see Addendum 3 and 4 for details).

9.1. Pit 1(P1)

Charred residues on the inner surface of a pottery fragment and two charcoal woods all excavated from layer 1 were measured. The calibrated dates for sample No. 7 and No.10 were both the late 11th to the early 12th century. No.5 was slightly older, but since the sample is not from the outside ring, this may have been a result of the old-wood effect and shows older date than the actual date of logging or dying. Species of wood charcoal were identified as *Maloideae* and *Salix* sp.

9.2. Pit 3 (P3)

A charcoal from layer 18, 2 carbonized seeds from layer 19, and charred residues on the outer surface of a pot from layer 21 were measured. Except for one sample from layer 19 (No. 26), all three samples were from the late 10th century to the early 11th century. Layer 21 to 18 can be regarded as buried in a relatively short period. It is presumed that the only sample, , dated to the 7th -8th centuries was a contamination of a remain from older period. No.25 from layer 21 shows the date of pottery use. It is difficult to envisage a large duration of time for the earthenware assemblage based on typological study. Therefore, it is estimated that the formation of the lower layers is from the late 10th century to the early 11th century, and the earthenware contained is also from the same period. However, with regard to the roof tiles observed as fallen into the upper layers, it is inevitable that the Tang dynasty roof tiles were mixed during the burial process. The species of wood charcoal was identified as *Salix* sp. as in P1.

9.3. Pit 7(P7)

The date of charcoal in the fill was from the late 10th century to the early 11th century, similar to that of the adjacent P3. Since the sample was from the outside ring, it indicates the age of logging or dying. The species of wood charcoal was identified as *Rosa* sp

Tab.9.1 Result list of Radiocarbon Dating and Wood Species Identification

Feature	Layer, No.		Sample Description	Calendar year (2σerror range)
Pit1	Layer 1 C14-No.5	PLD-39432	Charcoal (<i>Maloideae</i>) Not final ring	906- 916 cal AD (2.8%) 967-1023 cal AD (92.6%)
	Layer 1 C14-No.7	PLD-40149	Charred residue on pottery (inside) Vessel type unknown. Body fragment	1022-1059 cal AD (29.1%) 1065-1155 cal AD (66.3%)
	Layer 1 C14-No.10	PLD-40150	Charcoal (<i>Salix</i>) Not final ring	1023-1059 cal AD (27.0%) 1065-1155 cal AD (68.4%)
Pit3	Layer 18	PLD-40148	Charcoal (<i>Salix</i>) Not final ring	900- 923 cal AD (17.6%) 947-1018 cal AD (77.8%)
	Layer 19 No.26	PLD-39433	Carbonized seed (<i>Triticum aestivum</i>)	665-725 cal AD (62.4%) 739-769 cal AD (33.0%)
	Layer 19	PLD-39434	Carbonized seed (<i>Triticum aestivum</i>)	902- 920 cal AD (4.7%) 964-1025 cal AD (90.7%)
	Layer 21 No.25	PLD-40147	Charred residue on pottery (outside) Cokking pot body (AKB15-19-107)	975-1030 cal AD (95.4%)
Pit7	-		Charcoal (<i>Rosa</i>) Final ring	985-1028 cal AD (95.4%)

10. Conservation

The conservation work for metal products and earthenware was implemented in the 2019 Second Investigation in the city of Bishkek.

10.1. Conservation of Metal Products

The metal products unearthed in 2018 and 2019 had been left untreated, so we conducted photographing and visual observation of actual conditions of the products before treatment, with the following work.

In order to create accurate drawings of the materials unearthed in 2019, first we removed the soil, gravels and rust, without affecting the shape of the materials. To clean iron products we used a router, and for copper alloy products, we worked with bamboo skewers and art knives under a stereomicroscope.

As for the materials unearthed in 2018, we had taken X-ray photos in Japan in February 2019, and based on the photos, we cleaned some of the materials.

It was impossible to conduct full-scale conservation due to time constraint, but we were permitted to work on the conservation treatment of the materials back in Japan, except for coins, thanks to Dr. Bakit AMANVAEVA of the National Academy of Sciences of the Kyrgyz Republic. The materials brought to Japan are in the process of conservation treatment since September 2019. The coin materials preserved in Kyrgyz were put in gas-barrier bags with oxygen scavenger to prevent deterioration.

10.2. Conservation of Earthenware

We also conducted experiment on the filler for the lost parts of potteries. Since it is difficult to bring epoxy resin into Kyrgyz from Japan, we made filler by purchasing epoxy resin in the local stores, mixing it with phenolic microballoon and diatom earth. After reviewing it, we added some colorant to adjust the tint. The color of the filler we made reflects the tint of phenolic microballoon, making it darker than that of the unearthed earthenware. It is necessary to study further about the selection of the materials, the tint, etc. for the filler.

As for the conservation of metal products and the filling work for the lost parts of potteries, we held workshops to provide technical guidance for local students.



Fig.10.1 Filling the Lost Parts of Potteries



Fig.10.2 Cleaning of Metal Products



Fig.10.3 Copper Alloy Product before Treatment



Fig.10.4 Copper Alloy Product after Cleaning

11. Afterword

The joint research by the Research Institute of Cultural Properties, Teikyo University (Teikyo University Silk Road Scientific Investigation Team) and the Institute of History and Cultural Heritage, National Academy of Sciences of the Kyrgyz Republic, which started in 2016, made the fourth year in 2019.

In the year 2019, we resumed the investigation of AKB-13 of the First Shahristan and AKB-15 of the Second Shahristan, and newly investigated AKB-19 (the southeast end of the south wall of the First Shahristan), and gained new insights at each point.

AKB-13

At AKB-13, we had set up the excavation area according to the grids in azimuth direction. Thus, the direction differed from those of the main street and the building cluster on the both sides detected in the previous investigations. In 2019, in order to align these directions, we partially extended and reconfigured the excavation area to be almost in the same direction with that of the features. This made it easier for visitors at Ak-Beshim archaeological site to understand the excavated features. This reconfiguration will also be meaningful for the utilization of this spot as an field museum in the future.

Meanwhile, while extending the area, we investigated the occupation layer existing right beneath the topsoil. In the First Shahristan, a large-scale ground leveling had not been implemented, so this layer may be the last occupation layer of the final period of the First Shahristan of Ak-Beshim site. Therefore, the artifacts collected in this investigation will be important in understanding the phase of the material culture in the final period of this area.

AKB-19

At AKB-19, also in the First Shahristan, we investigated the structure of the southern wall at its southeast end. We disassembled the wall at the point now used as an entrance for vehicles, and investigated the inner structure and the construction method. As a result, we confirmed a sun-dried brick wall in its center, with pashed bricks laid on the exterior. Interestingly, it was clarified that the inside had been constructed by the rammed earth method. This location was presumed to have been the place where the wall had been refurbished along with the construction of the Second Shahristan, namely, the Suyab Garrison, so a part of the evidence was obtained by this investigation. On the other hand, it was observed that the sun-dried brick work at the center had a vertical fissure on it. A future study will be necessary to determine whether this was caused by an earthquake.

AKB-15

At AKB-15, we conducted observation of the cross-section of the trenches excavated so far, along with the investigations of the trenches at some new points. We were able to gain insight into the existence and the configuration of the platforms built in the Tang era. It has been gradually clarified that the rectangular platforms with the long side in the east-west direction had been built in the Tang era, and was situated along the center line of the First Shahristan-a, which used to be the pivotal part of the Suyab Garrison, lined from north to south. Also, it is being revealed that the evidence of living until the mid 11th century is left between the platforms.

The finds indicate that when the Suyab Garrison was built as a militant stronghold of the Tang Dynasty, they built buildings with the platforms in the pivotal part. After the withdrawal of the military, people kept on living there using the place. If the platforms and buildings built by the Tang Dynasty had been left in those times, people must have used not only between the platforms but

also the buildings themselves, for the purpose of living, etc.

However, after 1970's, a massive ground-leveling by bulldozer was conducted, and all of the upper structure were scraped off and lost. Consequently, what were confirmed in the confirmation surface of the remains under the topsoil layer are the platforms (the Tang era), the features, and the accumulated soil of the later period left between them. In order to confirm the subsurface at the construction time of the Suyab Garrison and the structures constructed on the ground surface (except for the platforms), it is necessary to excavate between the platforms.

In 2019, we excavated several pits located mainly between the platforms. A large amount of earthenware fragments and animal remains were unearthed. These are estimated to belong to the so-called Kara-Khanid Khanate (dynasty) from the types of the earthenware. The assemblage is an important reference in studying the material culture of the 10th to 11th century. Based on the unearthed materials, it is possible to characterize these pits as "trash pits". However, at the same time, it is a task to study in future whether these "trash pits" were dug solely for the purpose of waste disposal, or a reuse of the pits for mining clay to make sun-dried bricks.

Pit3 (P3) detected in 2018 was at first assumed to be a well-like feature of the Tang era. However, it was clarified that it is highly possible that it had belonged to the early 11th century, based on the unearthed earthenware and radiocarbon dating. We state this now and correct the previous assumptions. At the same time, a large amount of plant remains was discovered together with animal remains. These organic remains discovered near the bottom of the pits are the most important materials ever found to reconstruct the dietary habit of those times (10th to 11th century).

In the four years since the excavation started, there have been many achievements and our understanding of the city that once flourished here has become clearer. The Research Institute of Cultural Properties, Teikyo University, and the National Academy of Sciences of the Kyrgyz Republic are planning to continue the excavation and the investigation of artifacts in cooperation, in order to reveal the whole picture of Ak-Beshim archaeological site, which used to be called Suyab.



Fig.11.1 3D Model of P3, AKB-15 (1)



Fig.11.2 3D Model of P3, AKB-15 (2)

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Addendum



1. Investigation Journal

1.1. The First Investigation in 2019

- 19 April (Fri): Departure of investigators from Japan (Yamauchi, Kushiara, Hirano, Seiji Nakayama, Chie Nakayama, Mochizuki, Mihashi, Kato, Araki). Departure from Narita, transfer at Incheon (South Korea), to Almaty (Kazakhstan).
- 20 April (Sat): Arrival in Bishkek (Kyrgyz) via Almaty by car. Morning: meeting at the National Academy of Sciences. Afternoon: Transfer to Tokmok conveying equipment. Preparation of environment at two lodgings (in Jubek, Suusamir), installation of equipment in Suusamir. The lodging in Suusamir is chartered. Check of equipment.
- 21 April (Sun): The first day of the investigation. Installation of equipment. SH1 investigation by Kushiara, Seiji Nakayama, Mihashi, Akjol, and 10 local workers. Setting up of the excavation area to be extended. SH2 investigation by Yamauchi, Chie Nakayama, Mochizuki, Hirano, Askat, and 11 local workers. Jurta building yurta and a toilet at the site. Weeding the excavation area. A visit by Taiwanese tourists.
- 22 April (Mon): A day off for rain. Tidying up of equipment.
- 23 April (Tue): Excavation starts at the extended area of SH1. Digging down for about 20cm all around. Reexamination of MS1. Close investigation in the trenches at SH2. Recognition of a platform-like rise. A visit by the tourists from China and other countries.
- 24 April (Wed): Excavation at the extended area of SH1. Reexamination of Main Street and pits by 15 workers. Further close investigation in the trenches at SH2 by 15 workers. A visit by Chinese tourists.
- 25 April (Thu): Recess for rain. Visit to National History Museum. Arrival of Denis Sorokin.
- 26 April (Fri): Investigation of extended area at SH1. At SH2, 40 boxes of roof tiles are collected from the surface of the roof tile belt. Investigation of Pit3. Implementation of ground penetrating radar survey near the pond. A visit by Japanese and Taiwanese tourists.
- 27 April (Sat): Arrival of Uetsuki and Fukuda. Investigation of the south wall and main street at SH1. Reexamination of the roof tile belt at SH2. Digging down trenches. Ground penetrating radar survey.
- 28 April (Sun): Investigation of main street road surface at SH1. Digging down the extended area of R2. Close examination of the trench's inner wall at SH2. Reexamination of the roof tile belt. The washing of artifacts starts at the hotel. A visit by Chinese spectators.
- 29 April (Mon): Arrival of Professor Keiji Imamura. Investigation of the main street face of extended area. Setting up a trench. Investigation of pit at SH2. Washing the artifacts at the hotel.
- 30 April (Tue): Recess for rain. Visit to small-scale provincial museums guided by Bakit.
- 1 May (Wed): A May Day. Arrival of Iwai. Investigation of MS extended area at SH1. Investigation of extended area, R2. Ground penetrating radar survey in the vicinity of the excavation area. The number of the workers is reduced. Digging down a pit at SH2. A visit by Japanese tourists.
- 2 May (Thu): Investigation of the extended area MS at SH1. Investigation of pits at SH2.
- 3 May (Fri): Soil sampling at the cross-section of MS at SH1. Investigation of Pit3, setting up and digging down the trench at SH2. Professor Imamura and Denis departed.
- 4 May (Sat): Close examination of the road surface at SH1. Investigation of south wall (AKB19) (Iwai). Investigating Pit3 and digging down the trench at SH2. Start water sieving soil samples (Seiji Nakayama). A visit by the spectators from the National Science Academy.
- 5 May (Sun): Close examination of the extended area and pits at SH1. Investigation of Pit3 at SH2. Removal of soil with heavy machinery. Soil water sieving, artifact sorting, weighing, etc. A

- visit by Japanese, Chinese, and Kazakh tourists.
- 6 May (Mon): Decision of the excavation range and lowering of the slag face of MS1 at SH1. Setting up and digging down a new trench at SH2. Investigation of pits. Sorting and weighing the artifacts.
- 7 May (Tue): Excavation and close examination of MS1 at SH1. Conveyance of removed soil with heavy machinery and a dump truck. Investigation of Pit 3 at SH2. Excavation of Tr.7. A visit by many spectators, such as Kyrgyz university students, Chinese groups, etc. Washing and weighing of artifacts.
- 8 May (Wed): Close examination of MS1 at SH1. Investigation of the pit. The number of workers is reduced to 5. Creation of the cross-section drawing at SH2. Removal of soil with heavy machine. A visit by about 50 Canadian tourists. Sorting and weighing the artifacts.
- 9 May (Thu): Washing the artifacts, creation of reports, etc.
- 10 May (Fri): Investigation of MS1, pits, etc. at SH1. Investigation of pits at SH2. Planting of stakes. Iwai, Seiji Nakayama and Uetsuki depart for home.
- 11 May (Sat): Reexamination of the pits inside R1 and R2 at SH1. Cleaning of the entire place. Investigation of pits at SH2. Arrival of researcher Kenichiro Niitsu.
- 12 May (Sun): Investigation of pits, etc. at SH1. Cleaning of entire place, and drone photographing at SH2. Start a partial backfill at excavated areas.
- 13 May (Mon): Removal of tents. Installation of a fence. Washing the artifacts at the hotel. Sampling of river sand (Mihashi).
- 14 May (Tue): Backfill and cleanup of SH2. Washing of equipment.
- 15 May (Wed): Recollection of cornerstones. Equipment and artifacts are transported to the National Academy of Sciences by two cars and stored in the storehouse. Mr. Niitsu departs for home.
- 16 May (Thu): Staying at a hotel in Bishkek. Fukuda, Mihashi and others visit Issyk-Kul lake area for observation of archaeological sites. Sorting of photographed data, and other work.
- 17 May (Fri): Organizing luggage, departure from Bishkek, transfer at Almaty to Incheon.
- 18 May (Sat): Transfer at Incheon, and return home (arrival at Narita).

1.2. The Second Investigation in 2019

- 6 August (Tue): Investigation team from Japan (Chie Nakayama, Hirano, Uetsuki) departs from Japan. Arrival in Almaty. Travel by car.
- 7 August (Wed): Arrival in Bishkek. Afternoon: Meeting at the National Academy of Sciences, sorting artifacts at the storehouse, start weighing artifacts.
- 8 August (Thu): Sorting and weighing of artifacts.
- 9 August (Fri): Sorting and weighing of artifacts.
- 10 August (Sat): Sorting and weighing of artifacts.
- 11 August (Sun): Sorting and weighing of artifacts.
- 12 August (Mon): Conveyance of artifacts to the basement of the Rich Hotel. Jointing, drawing, and analyzing animal bones in a conference room in the basement.
- 13 August (Tue): Jointing and drawing of artifacts, Analysis of animal bones.
- 14 August (Wed): Jointing and drawing of artifacts, Analysis of animal bones.
- 15 August (Thu): Jointing and drawing of artifacts, Analysis of animal bones.
- 16 August (Fri): Departure of investigation team from Japan (Yamauchi, Kushihara, Miura, Iwasaki, Sano). Transfer at Incheon, arrival at Almaty. Travel to Bishkek by car.
- 17 August (Sat): The team's arrival in Bishkek. Jointing, drawing, sorting of animal bones. Afternoon: Meeting at the Academy of Sciences.
- 18 August (Sun): Jointing, drawing, analysis of animal bones.

- 19 August (Mon): Arrival of Kakinuma. Yamauchi and Kakinuma explore Ken-Bulun. Drawing instruction for local students.
- 20 August (Tue): Yamauchi, Sano, Miura, Kakinuma, and Bakit visit Ak-Beshim site. Kakinuma goes to Vladivostok for investigation. Other investigators work on jointing, drawing, and animal bone analysis. The jointing of artifacts is almost completed.
- 21 August (Wed): Drawing, analysis of animal bones. Yamauchi visits the Japanese Embassy and JICA.
- 22 August (Thu): Drawing, analysis of animal bones. The staff members of the History Museum volunteer for the jointing of the artifacts. Akjol ends his job this day. Yamauchi repairs fence at Ak-Beshim.
- 23 August (Fri): Drawing, analysis of animal bones. Yamauchi continues to repair the fence at Ak-Beshim and guides JICA staff. Collection of artifacts from the ground surface at Ken-Bulun.
- 24 August (Sat): Drawing.
- 25 August (Sun): Drawing.
- 26 August (Mon): Drawing. Visit to Ken-Bulun.
- 27 August (Tue): Drawing.
- 28 August (Wed): Drawing of burnt bricks.
- 29 August (Thu): Local students end the work. Investigation team from Japan (Hirano, Uetsuki, Miura, Iwasaki, Sano) returns to Japan. Departs from Bishkek, transfers at Almaty, flies to Incheon.
- 30 August (Fri): The investigation team arrives at Narita and returns home. The drawing of the artifacts is almost finished. The photographing of the artifacts starts in the afternoon.
- 31 August (Sat): Photographing, rubbed copy, etc.
- 1 September (Sun): Yamauchi, Nakayama and Bakit visit Ken-Bulun. Repair of the storehouse. photographing, rubbed copy, etc.
- 2 September (Mon): Yamauchi leaves Almaty by car, to Tadzhikistan. Photographing and rubbed copy. Repair of the storehouse.
- 3 September (Tue): Repair of the storehouse. Photographing completed. Correction of drawings, creation of observation sheet.
- 4 September (Wed): Morning: Meeting at the National Academy of Sciences.
- 5 September (Thu): Afternoon: Conveyance of artifacts from the hotel to the Academy of Sciences.
- 6 September (Fri): Nakayama and Kushiara return home. Departure from Bishkek, transfer at Almaty to Incheon.
- 7 September (Sat): Transfer at Incheon, and return home (arrival at Narita).

2. Radiocarbon Dating

Paleo Labo AMS Age Measurement Group

2.1. Introduction

On the samples collected at the Ak-Beshim archaeological site of the Kyrgyz Republic, we conducted radiocarbon dating using the accelerator mass spectrometry (AMS) method, and the identification of the seeds and the wood species.

2.2. Samples and Methods

2.2.1. Radiocarbon Dating

The samples are three items: a carbonized wood unearthed from Pit1 of AKB15 (Sample No. 5: PLD-39432), a carbonized seed unearthed from the wall of Pit3 (Sample No. 26: PLD-39433), and a carbonized seed from Pit3 (PLD-39434). The information and the treatment data of the samples are as in Table 1.

The samples were measured with an accelerator mass spectrometry (Paleo Labo Compact AMS: NEC-1.5SDH) after pretreated. The gained ^{14}C densities were calibrated with an isotope fractionation effect to calculate the ^{14}C age and the corresponding calendar year.

2.2.2. Wood Species Identification

The sample is one carbonized wood unearthed from Pit2 of AKB15. For the wood species identification, we dried the sample first, then made torn surfaces of cross section (butt end), tangent section (flat grain), and radial section (edge grain), and formed and fixed it on the sample table with carbon conductive adhesive tape. The sample was then gold-coated with ion sputtering, examined by speculum using a scanning electron microscope (KEYENCE VE-9800), and photographed.

2.2.3. Plant Seed Species Identification

The samples are two items of carbonized seed collected from Pit3 of AKB15. We identified them with stereoscopic microscope.

Tab.App.2.1 Measured Samples and the Treatment

Measurement No.	Remains data	Sample data	Pretreatment
PLD-39432	Sample No. 5 Division: SH2 Location: Pit1 Context Artifact No. 81	Type: carbonized tree (Maloideae) Property: region unknown except for the finally formed annual ring Condition: dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-39433	Sample No. 26 Division: SH2 Location: Pit3, wall Stratum: 19 th layer	Type: carbonized seed (Triticum aestivum) Condition: dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-39434	Division: SH2 Location: Pit3 Stratum: 19 th layer	Type: carbonized seed (Triticum aestivum) Condition: dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)

2.3. Results

2.3.1. Radiocarbon Dating

On Table 2 are the carbon isotope ratios ($\delta^{13}\text{C}$) for the correction of the isotope fractionation effect, the chronological values used in the dating calibration after the correction of the isotope fractionation effect, the age range gained from the calibration, and a conventional display of ^{14}C age together with chronological values and errors. Figure 1 presents the result of the calendar year calibration. The chronological values used for the calendar-year calibration are the values with the last digit not rounded off. We wrote them in so that these values can be used in case the calibration

curves are revised.

^{14}C age indicates the number of years before AD1950. In the calculation of ^{14}C age (yrBP) half-life, we used the Libby half-life of 5568 years. The appended ^{14}C age error ($\pm 1\sigma$) was calculated based on statistical error and standard deviation, etc., and it shows that the probability of the samples being within the ^{14}C age error is 68.2%.

The calendar year calibration details are as follows:

The calendar year calibration is a tool to calculate the closest value to the actual chronological value by calibrating the past cosmic ray intensity, the fluctuations of aerial ^{14}C density due to the fluctuation of geomagnetic field, and the difference of half-life (^{14}C half-life: 5730 ± 40) against the ^{14}C age calculated in the condition that the aerial ^{14}C density is constant and the half-life is 5568 years.

For the ^{14}C age calendar year calibration, we used OxCal4.3 (calibration curve data: IntCal13). 1σ calendar year range is in the range of 68.2% confidence limits that corresponds to the ^{14}C age error calculated using the OxCal probability method, and a 2σ calendar year range is in the range of 95.4% confidence limits in the same manner. The percentages inside the parentheses indicate the probability of the calendar year being within the range. The curves on the vertical axis of the graph indicate the probabilistic distribution of ^{14}C age, and the double curves are the calendar year calibration curves.

2.3.2. Wood Species Identification

As the result of identification, the sample was confirmed to be Maloideae, a broad-leaf tree (Table 1). The features of the identified material are described below. The photograph taken with a scanning electron microscope is pictorially presented.

(1) Subfamily *Maloideae*, *Rosaceae*. Figure 1.1a-1c (Sample No.5)

A diffuse-porous wood with small-sized vessels distributing densely, almost independently. The vessel perforation is singular. The medullary ray is isomeric and in 1~4 rows.

The Subfamily *Maloideae* includes twelve genus such as *Crataegus*, *Eriobotrya*, *Photinia*, *Sorbus*, and *Malus*.

2.3.3. Plant Seed Species Identification

As the result of the sample identification, all were determined to be herbaceous plant: carbonized seeds of wheat (grain) (Table 1).

The following is the description with the photos in Figure to account for the identification.

(1) Wheat: *Triticum aestivum* L. Carbonized seed (grain), Gramineae

The upper view is round, and the lateral view is long ellipse. On the center of the ventral surface is a vertical groove. On the lower end of the center of the back is a sector-formed germ. The length is shorter than barley (*Hordeum vulgare*), and the width is thick, so the whole shape is stubby. The shape of the cross-section is concave on the ventral side, and round on the back. Wheat's widest part comes near to the basal portion when viewed from the side. 4.2mm long, 3.4mm wide, and 2.3mm thick (Figure App.3.2-A), 5.3mm long, 3.0mm wide, and 2.8mm thick (Figure App.3.3).

2.4. Discussion

Now we organize the results focusing on the 2σ calendar year range (probability 95.4%).

Sample No. 5 unearthed from Pit1 (PLD-39432) was calibrated as in the range of 906-916 cal AD (2.8%) and 967-1023 cal AD (92.6%) and indicated the calendar era of the early 10th century to the former half of the 11th century. The final annual growth ring did not remain on the sample No.5.

The year of the apoptosis or the cutting of the wood can be determined by measuring the finally

formed annual growth ring, but from inner annual rings, older years would be obtained (old wood effect). As the result of the measurement, sample No.5 is presumed to have had the old wood effect, and the year of its apoptosis or the cutting of the wood can be thought to have been later than the measurement result. Sample No. 26 unearthed from the wall of Pit3 (PLD-39433) was in the range of 665-725 cal AD (62.4%) and 739-769 cal AD (33.0%) and indicated the calendar era of the latter part of the 7th century to the latter part of the 8th century.

The sample unearthed from Pit3 (PLD-39434) was in the range of 902-920 cal AD (4.7%) and 964-1025 cal AD (90.7%), indicating the calendar era of the early 10th century to the former half of the 11th century. The samples are carbonized plant seeds, and the measurement results indicate the fruiting period of the seeds.

The two carbonized seeds unearthed from Pit3 indicated different time periods, but one indicating older period than the other, the sample No.26 (PLD-39433), has the possibility of being from redeposition.

(Paleo Labo AMS Age Measurement Group: Shigeru ITO, Masanori SATO, Masashi HIROTA, Hideki YAMAGATA, Zaur LOMTATIDZE, Katsuya KOBAYASHI, Sudarshan BHANDARI)

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Tab.App.2.2 Results of Radiocarbon Dating and Calendar Year Calibration

Measurement No.	$\delta^{13}\text{C}$ (‰)	Age for dating calibration (yrBP $\pm 1\sigma$)	¹⁴ C age (yrBP $\pm 1\sigma$)	Age range of ¹⁴ C age calibrated into calendar year	
				1 σ calendar year range	2 σ calendar year range
PLD-39432 Sample No. 5 Pit1	-20.88 ± 0.24	1056 ± 19	1055 ± 20	985-1015 cal AD (68.2%)	906-916 cal AD (2.8%) 967-1023 cal AD (92.6%)
PLD-39433 Sample No. R26 Pit3	-22.80 ± 0.27	1296 ± 22	1295 ± 20	672-710 cal AD (44.9%) 746-764 cal AD (23.3%)	665-725 cal AD (62.4%) 739-769 cal AD (33.0%)
PLD-39434 Pit3	-22.99 ± 0.29	1051 ± 23	1050 ± 25	986-1017 cal AD (68.2%)	902-920 cal AD (4.7%) 964-1025 cal AD (90.7%)

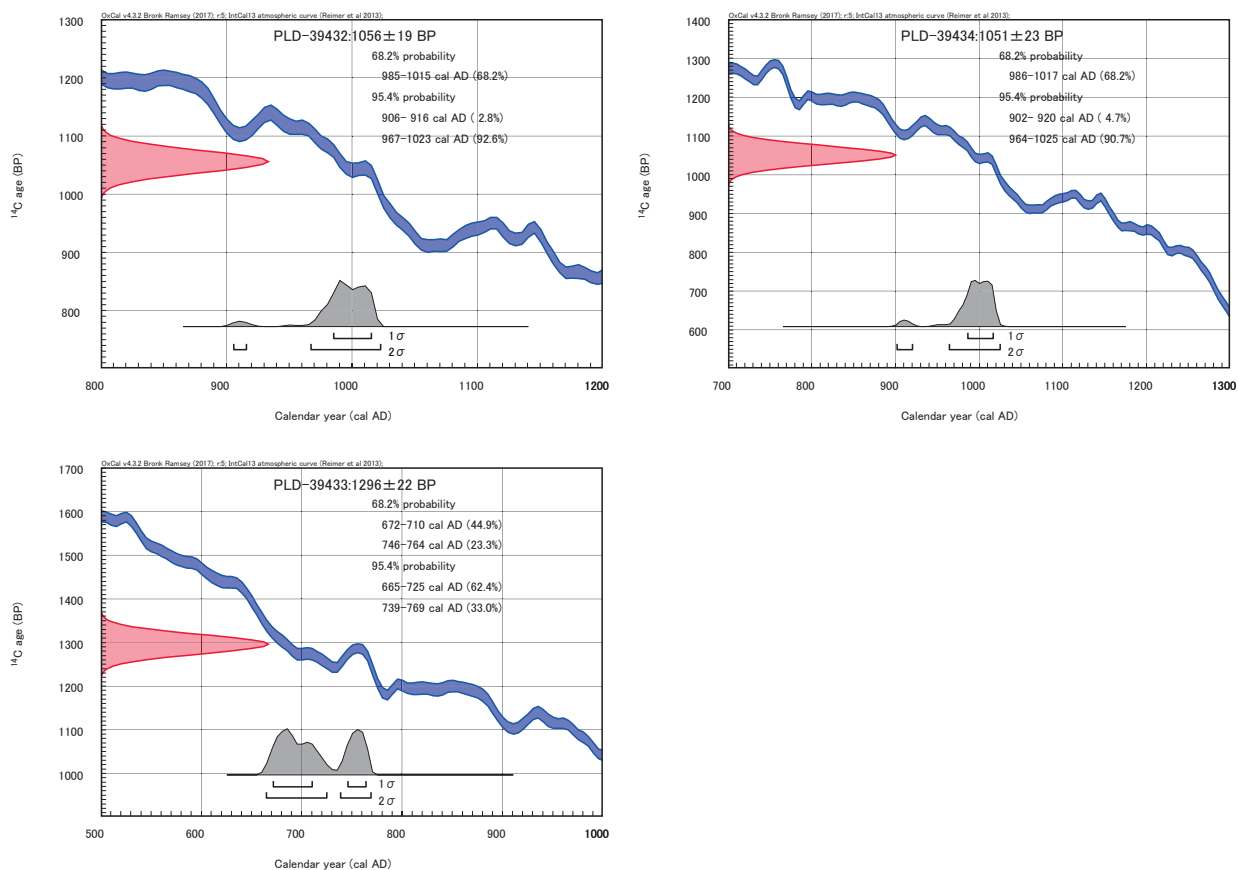


Fig.App.2.1 Result of the Calendar Year Calibration

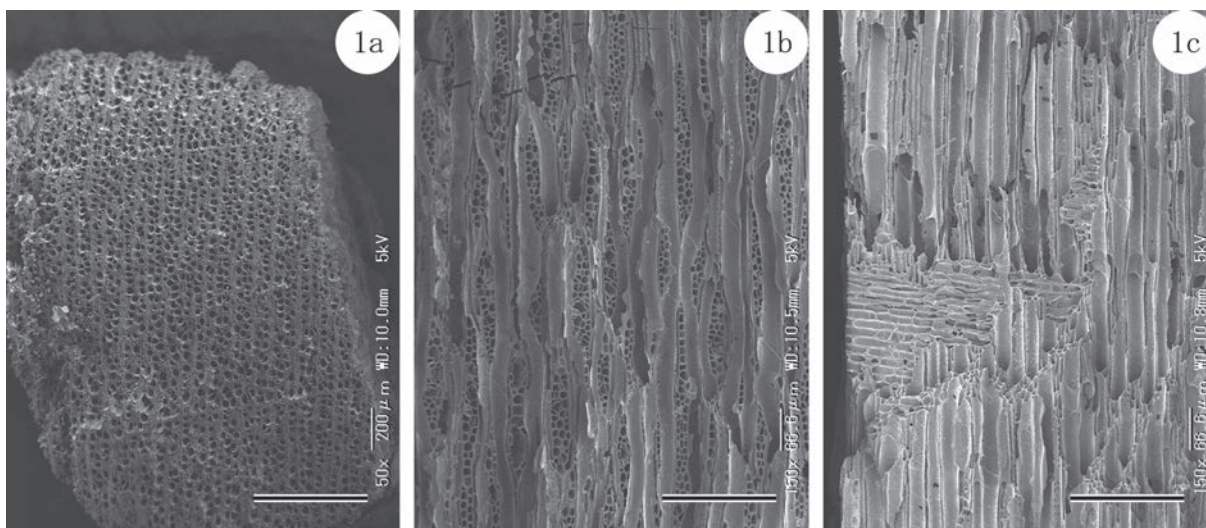


Fig.App.2.2 Scanning Electron Microscope Photographs of a Carbonized Wood Discovered in Ak-Beshim Archaeological Site
1a–1c. *Maloideae* (No.5)

a: Cross-section, b: Tangent cross-section, c: Radiation cross-section



Fig.App.2.3 Carbonized Seed Discovered in Ak-Beshim Archaeological Site

1. Carbonized seed (caryopsis) of *Triticum aestivum* (SH2, P3, layer 19, No.26, PLD-39433)
2. Carbonized seed (caryopsis) of *Triticum aestivum* (SH2, P3, layer 19, PLD-39434)

3. Radiocarbon Dating and Wood Species Identification

3.1. Introduction

On the samples collected at the Ak-Beshim archaeological site of the Kyrgyz Republic, we conducted radiocarbon dating, using the accelerator mass spectrometry (AMS) method, and the identification of the wood species.

3.2. Samples and Methods

3.2.1. Radiocarbon Dating

The samples are five items: two charred residues on pottery and three charcoal. carbonized wood. Charred residue was recovered from the outside of a pottery (No.25) unearthed from layer 21 of Pit3 (Sample No. 25: PLD-40147), and from inside of a pottery unearthed from layer 1 of Pit1 (Sample No.7: PLD-40149). Carbonized woods were from layer 18 in Pit3 (Sample No.1: PLD-40148), layer 1 in Pit1 (Sample No.10: PLD-40150), and Pit7 (Sample No.1: PLD-40151). The part of the wood is unclear sample from Pit3 (Sample No.1: PLD-40148) and Pit1 (Sample No.10: PLD-40150). The sample from Pit7 (Sample No.1: PLD-40151) has its final annual growth ring remaining.

The information and the treatment data of the samples are as in Table App. 5.1. The samples were measured with an accelerator mass spectrometry (Paleo Labo Compact AMS: NEC-1.5SDH), after pretreated. The gained ^{14}C densities were calibrated with an isotope fractionation effect to calculate the ^{14}C age and the corresponding calendar year.

Tab.App.3.1 Measured Samples and the Treatment

Measurement No.	Context	Sample data	Pretreatment
PLD-40147	Feature : Pit3(Context No.70) Layer : 21 SampleNo.25	Type : Charred residue on pottery (outside)(soot) Part adhered : Body Vessel type : Cooking pot Condition : dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-40148	Feature : Pit3(Context No.70) Layer : 18 SampleNo.1	Type : Carbonated wood (<i>Salix</i>) Sample property : Not final ring, part indet. Condition : dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-40149	Feature : Pit1(Context No.81) Layer : 1 SampleNo.7	Type : Charred residue on pottery (inside) (scorch) Part adhered : Body Vessel type : Unknown Condition : dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-40150	Feature : Pit1(Context No.81) Layer : 1 SampleNo.10	Type : Carbonated wood (<i>Salix</i>) Sample property : Not final ring, part indet. Condition : dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)
PLD-40151	Feature : Pit7(Context No.130) SampleNo.1	Type : Carbonated wood (<i>Rosa</i>) Sample property : Final ring Condition : dry	Ultrasonic cleansing Organic solvent treatment: acetone Acid-alkali-acid washing (hydrochloric acid: 1.2mol/L, sodium hydrate: 1.0mol/L, hydrochloric acid: 1.2mol/L)

3.2.2. Wood Species Identification

The samples are one carbonized wood unearthed from layer 18 of Pit3 (Sample No.1: PLD-40148), layer 1 in Pit1 (Sample No.10: PLD-40150), and Pit7 (Sample No.1: PLD-40151).

For the wood species identification, we made torn surfaces of cross section (butt end), tangent section (flat grain), and radial section (edge grain), formed and fixed it on the sample table with carbon conductive adhesive tape. Then we gold-coated them with ion sputtering, examined and photographed them using a scanning electron microscope (KEYENCE VE-9800).

3.3. Results

3.3.1. Radiocarbon Dating

On Table 2 are the carbon isotope ratios ($\delta^{13}\text{C}$) for the correction of the isotope fractionation effect, the chronological values used in the dating calibration after the correction of the isotope fractionation effect, the age range gained from the calibration, and a conventional display of ^{14}C age together with chronological values and errors. On Figure 1 is the result of the calendar year calibration. The chronological values used for the calendar-year calibration are the values with the last digit not rounded off. We wrote them in so that future calendar-year calibrations will be possible using these values when the calibration curves are revised.

^{14}C age indicates the number of years before AD1950. In the calculation of ^{14}C age (yrBP) half-life, we used the Libby half-life of 5568 years. The appended ^{14}C age error ($\pm 1\sigma$) was calculated based on statistical error and standard deviation, etc., and it shows that the probability of the samples being within the ^{14}C age error is 68.2%.

The calendar year calibration details are as follows:

The calendar year calibration is a tool to calculate the closest value to the actual chronological value by calibrating the past cosmic ray intensity, the fluctuations of aerial ^{14}C density due to the fluctuation of geomagnetic field, and the difference of half-life (^{14}C half-life: 5730 ± 40) against the ^{14}C age calculated in the condition that the aerial ^{14}C density is constant and the half-life is 5568 years.

For the ^{14}C age calendar year calibration, we used OxCal4.3 (calibration curve data: IntCal13). 1σ calendar year range is in the range of 68.2% confidence limits that corresponds to the ^{14}C age error calculated using the OxCal probability method, and a 2σ calendar year range is in the range of 95.4% confidence limits in the same manner. The percentages inside parentheses indicate the probability of the calendar year being within the range. The curves on the vertical axis of the graph indicate the probabilistic distribution of ^{14}C age, and the double curves are the calendar year calibration curves.

Tab.App.3.2 Results of Radiocarbon Dating and Calendar Year Calibration

Measurement No.	$\delta^{13}\text{C}$ (‰)	Age for dating calibration (yrBP $\pm 1\sigma$)	^{14}C date (yrBP $\pm 1\sigma$)	Age range of ^{14}C age calibrated into calendar year	
				1σ calendar year range	2σ calendar year range
PLD-40147 Pit3(Context No.70) SampleNo.25	-27.64 ± 0.60	1030 ± 24	1030 ± 25	994-1020 cal AD (68.2%)	975-1030 cal AD (95.4%)
PLD-40148 Pit3(Context No.70) SampleNo.1	-24.00 ± 0.29	1074 ± 19	1075 ± 20	906-916 cal AD (9.7%) 968-998 cal AD (51.6%) 1005-1012 cal AD (7.0%)	900-923 cal AD (17.6%) 947-1018 cal AD (77.8%)
PLD-40149 Pit1(Context No.81) SampleNo.7	-21.97 ± 0.45	956 ± 22	955 ± 20	1028-1048 cal AD (22.0%) 1088-1122 cal AD (36.4%) 1139-1149 cal AD (9.8%)	1022-1059 cal AD (29.1%) 1065-1155 cal AD (66.3%)
PLD-40150 Pit1(Context No.81) SampleNo.10	-25.33 ± 0.20	952 ± 21	950 ± 20	1029-1048 cal AD (19.3%) 1086-1123 cal AD (37.9%) 1138-1149 cal AD (11.0%)	1023-1059 cal AD (27.0%) 1065-1155 cal AD (68.4%)
PLD-40151 Pit7(Context No.130) SampleNo.1	-24.65 ± 0.46	1027 ± 20	1025 ± 20	995-1021 cal AD (68.2%)	985-1028 cal AD (95.4%)

3.3.2. Wood Species Identification

As the result of identification, the sample was confirmed to be *Rosa* sp. and *Salix* sp., both a broad-leaf tree (Table 1). The samples from layer 18 of Pit3 (Sample No.1: PLD-40148) and layer 1 of Pit1 (Sample No.10: PLD-40150) were both *Salix* sp. The sample from Pit7 (Sample No.1: PLD-40151) was *Rosa* sp..

The features of the identified material are described below. The photograph taken with a scanning electron microscope is pictorially presented.

(1) *Rosa* sp., Rosaceae Figure 1.1a-1c (PLD-40151)

It is a ring-porous wood in which slightly large trachea are arranged at the beginning of the annual ring, and the small trachea in the late part are scattered almost independently. There is a single perforation of the trachea, and there is spiral thickening in the small trachea. Radiant tissue is heterogeneous with a width of 1 to 10 rows, and some have a height of more than 1 mm.

Rosa sp. is a deciduous shrub widely distributed from subtropical to subarctic.

(2) *Salix* sp., Salicaceae Figure 1.2a-2c (PLD-40148), 3a-3c (PLD-40150)

It is a diffuse porous wood in which slightly small trachea are distributed individually or in combination of several. The perforation of the trachea is single. Radiant tissue is single row and heterogeneous.

Salix is a deciduous tree or shrub that grows widely from warm to cold.

3.4. Discussion

Now we organize the results focusing on the 2 σ calendar year range (probability 95.4%).

Charred residue collected from outside of pottery from layer 21 of Pit3 (Sample No.25: PLD-40147) was calibrated as in the range of 975-1030 cal AD (95.4%), and indicated a calendar date of the late 10th century to the early 11th century. Carbonated wood from layer 18 of Pit3 (Sample No.1: PLD-40148) was calibrated as in the range of 900 - 923 cal AD (17.6%) and 947 - 1018 cal AD (77.8%), and indicated a calendar date of the end of 9th century to the early 11th century.

Charred residue collected from inside of pottery from layer1 of Pit1 (Sample No.7: PLD-40149) was calibrated as in the range of 1022-1059 cal AD (29.1%) and 1065-1155 cal AD (66.3 %). Carbonated wood also from layer 1 of Pit1 (Sample No.10: PLD-40150) was calibrated as in the range of 1023 - 1059 cal AD (27.0%) and 1065 - 1155 cal AD (68.4%). Both samples indicated a calendar date of the early 11th century to the mid 12th century.

Carbonated wood from Pit7 (Sample No.1: PLD-40151) was calibrated as in the range of 985 - 1028 cal AD (95.4%) and indicated a calendar date of the late 10th century to the early 11th century.

The year of the apoptosis or the cutting of the wood can be determined by measuring the finally formed annual growth ring, but from inner annual rings, older years would be obtained (old wood effect). The final ring do not remain in carbonated wood from Pit3 (Sample No.1: PLD-40148) or Pit1 (Sample No.10: PLD-40150), so more rings must have existed beyond the outermost rings. Therefore, the actual timing when the wood was cut or died is estimated to be slightly later than the measured dates. Carbonized wood from Pit7 (PLD-40151) has the final ring remaining, so the estimated date of the final ring indicates the date of cutting or death of the wood.

References

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- Reimer, P.J., Bard, E., Bayliss, A., Beck, J.W., Blackwell, P.G., Bronk Ramsey, C., Buck, C.E., Cheng, H., Edwards, R.L., Friedrich, M., Grootes, P.M., Guilderson, T.P., Haffidason, H., Hajdas, I., Hatte, C., Heaton, T.J., Hoffmann, D.L., Hogg, A.G., Hughen, K.A., Kaiser, K.F., Kromer, B., Manning, S.W., Niu, M., Reimer, R.W., Richards, D.A., Scott, E.M., Southon, J.R., Staff, R.A., Turney, C.S.M., and van der Plicht, J.(2013) IntCal13 and Marine13 Radiocarbon Age Calibration Curves 0–50,000 Years cal BP. *Radiocarbon*, 55(4), 1869-1887.

(Paleo Labo AMS Age Measurement Group: Shigeru ITO, Masanori SATO, Masashi HIROTA, Hideki YAMAGATA, Zaur LOMTATIDZE, Yasuko KURONUMA)

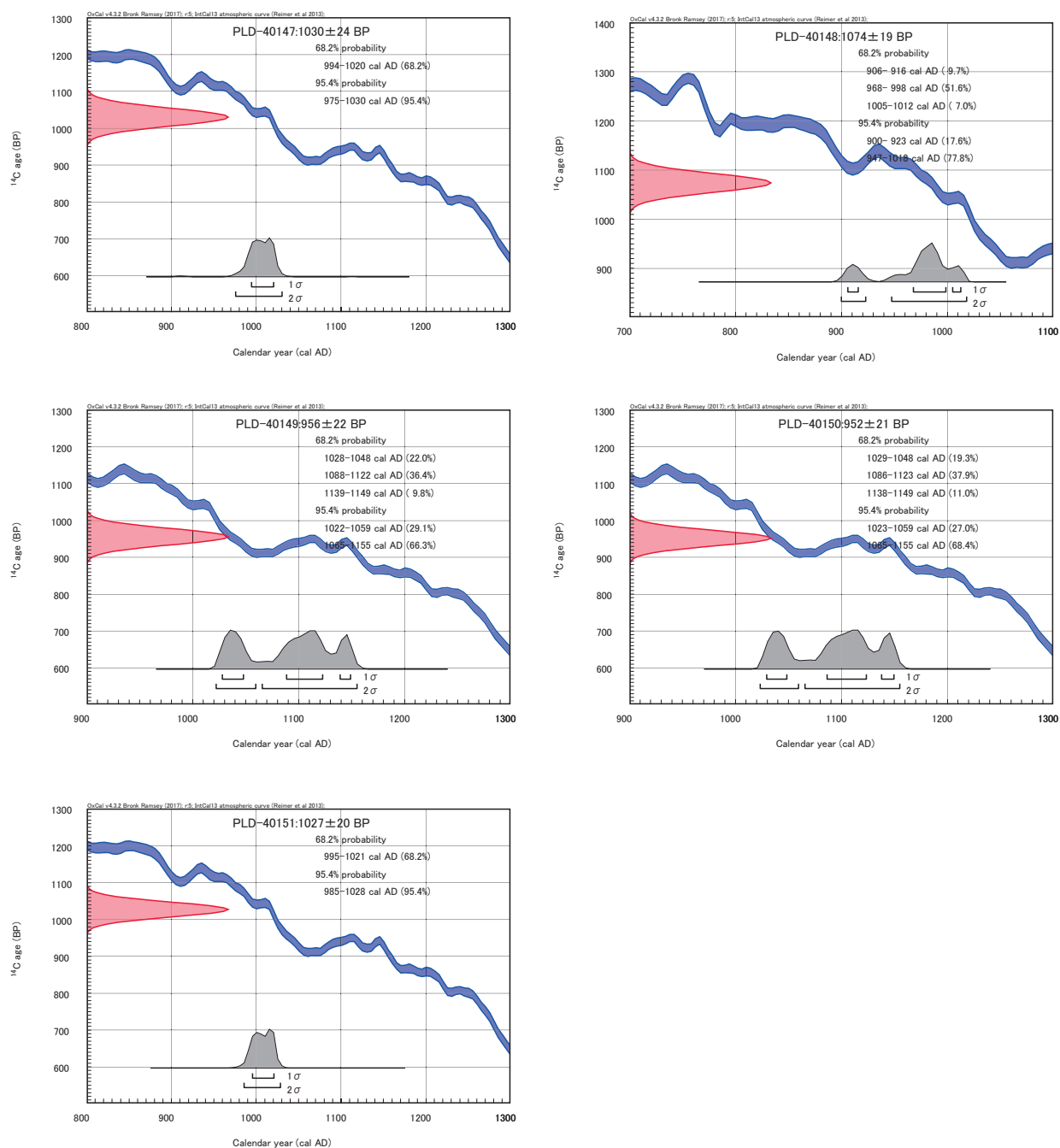


Fig.App.3.1 Result of the Calendar Year Calibration

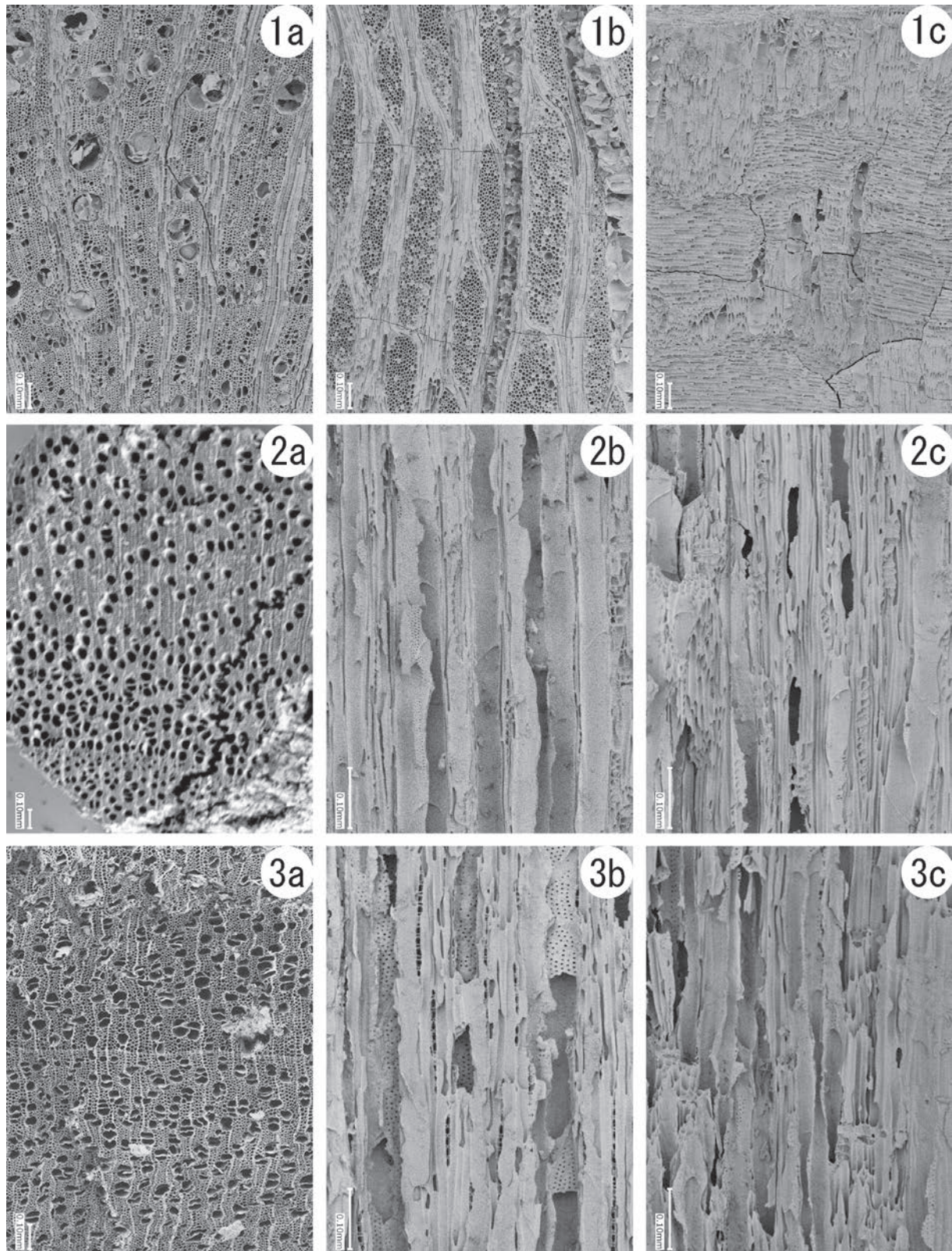


Fig.App.3.2 Scanning Electron Microscope Photographs of a Carbonized Wood

1a, 1c. *Rosa* (PLD 40151), 2a, 2c. *Salix* (PLD 40148) , 3a-3c. *Salix* (PLD 40150)

a: Cross-section, b:Tangent Cross-section, c: Radiation cross-section

4. Analysis of Braided Product from P3

4.1. Introduction

A charcoal with weave-like structure excavated from Ak-Besim site was identified.

4.2. Sample and methods

The sample is one charcoal with weave-like structure excavated from Pit3 of SH2.

The method was as follows: After observing and taking a picture of the whole with a stereomicroscope and a microscope, a part was sampled, and fixed to the sample table with double-sided tape. Next, gold coating was applied by ion sputtering, and observation and photography were performed using a scanning electron microscope (VHX-D510, KEYENCE).

4.3. Result

As a result of observation with a stereomicroscope and a microscope, it was found to be a carbonized herb mass. However, since the regular arrangement of fibers like weaving could not be confirmed, it is unclear whether it is a braided product. In addition, as a result of observing with a scanning electron microscope, the culm of a monocotyledonous plant was confirmed.

The characteristics of the plant and the basis for identification are as follows. Sample photographs and micrographs are shown in his Fig. App.4.1.

(1) Poaceae Fig.App.4.1 1-6

It is a monocotyledon composed of soft cells and vascular bundles. The vascular bundle is an asymmetric stele scattered in the soft cells, and the vascular bundle sheath surrounding the vascular bundle found at the edge of the culm is thin. From these characteristics, it was identified as a culm of the Poaceae.

4.4. Discussion

A culm of Poaceae was confirmed in the charcoal. Also, the poorly-conditioned brittle charred portion of the sample may be a leaf. Therefore, it is presumed that the entire grass of the Poaceae, including leaves, was carbonized and solidified. Since the regular fiber arrangement like weaving could not be confirmed, it is unclear whether it is a braided product.

(Paleo Labo: Yasuko KURONUMA)

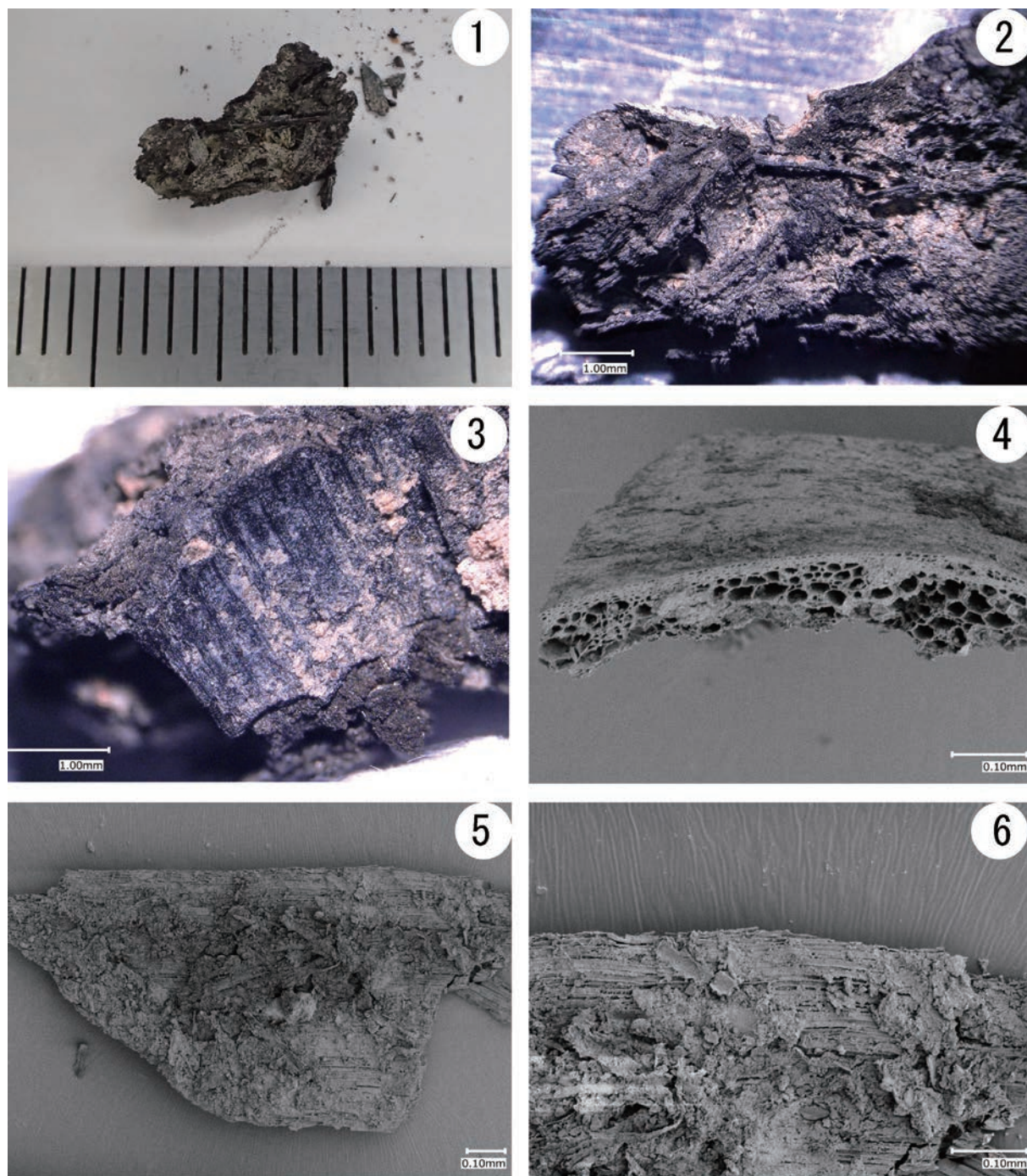


Fig.App.4.1 Photographs and Micrographs of a Sample

- | | |
|--|----------------------------------|
| 1. Overall photograph of the sample | 2, 3. Specimen microscope photo |
| 4. Electron micrograph (cross section) | 5, 6. Electron micrograph (side) |

5. Ground Penetrating Radar Survey (2019)

Denis Sorokin (Archaeological expertise, LLC)

Kazuya YAMAUCHI, Hidekazu MOCHIZUKI

(The Research Institute of Cultural Properties, Teikyo University)

5.1. Introduction

Underground exploration is a method to obtain various information of subsoil containing buried remains. This method is one of the important techniques to proceed preservation measures and investigation research, and the information given by this physical exploration makes the base of the investigation of buried cultural properties. We had implemented this radar survey at Ak-Beshim archaeological site, as a preliminary investigation of the excavation investigation, along with micro-topography analysis using aerial photos, to configure the range of excavation. Ground penetrating radar survey is a non-destructive method to explore subterranean structure by emitting electromagnetic ray from a ground surface to the underground and receiving the reflective wave. This time, we used this method for the purpose of comprehending the topographical and geological features of the site by collating the subsoil information by this physical exploration and the results of the excavation investigation up to this point and to grasp the detailed distribution of buried remains in the uninvestigated area. The following is the report of this exploration.

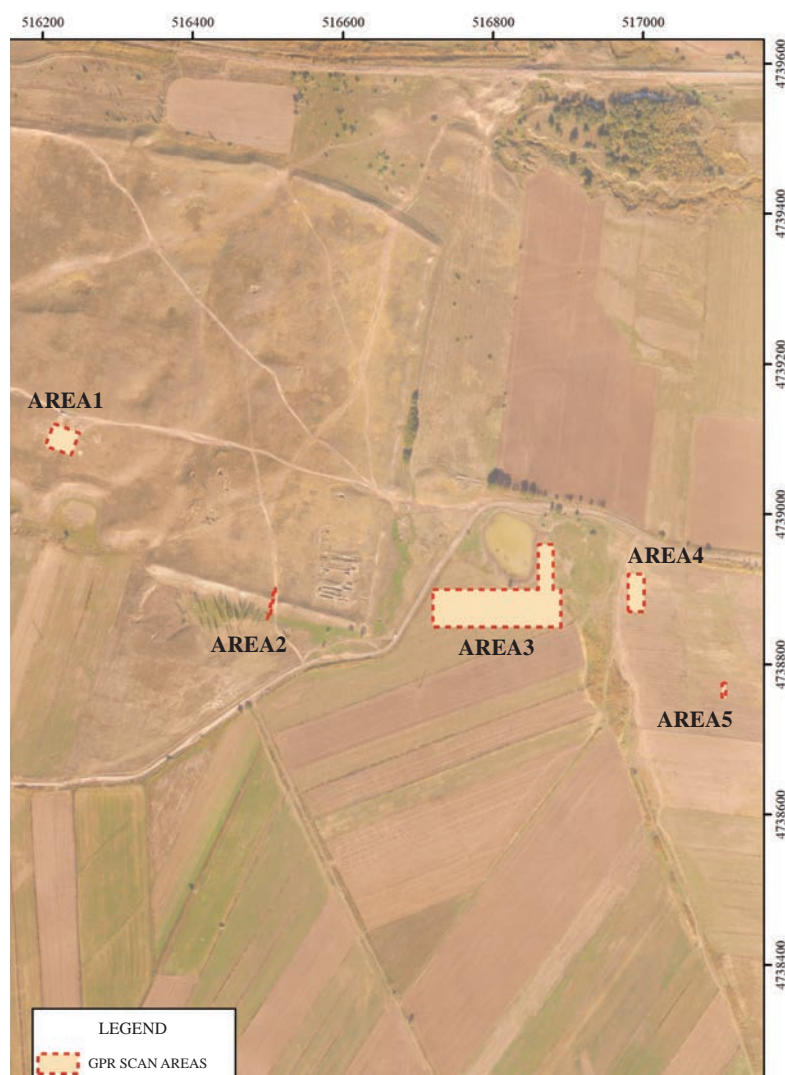


Fig.App.5.1 Investigation Points

5.2. Investigation Points

In order to specify subsurface structures and the potential points for archaeological investigation, we implemented ground penetrating radar survey at five points (GPR2019-1~GPR2019-5) at the First Shahrستان and the Second Shahrستان as shown in Fig.1

5.3. Equipment Used

For geomagnetic scanning we used GSSI's ground penetrating radar "SIR-3000" of antenna frequency of 270 MHz, which is capable of scanning to the depth of 5m.

5.4. Point GPR2019-1 (Fig.App.5.2)

The point GPR2019-1 is the extended area of AKB-13 of the First Shahrستان, including its north and south sides. The objective of the investigation of this point was to confirm the buried structures in the extended area of the excavation area of AKB-13 and the existence and structure of a street presumed to have extended towards the north and the south sides.

We named the sections investigated at the extended part of the excavation area of AKB-13 as: Section GPR2019-1a for the southeast end, Section GPR2019-1b for the northeast end, Section GPR2019-1c for the northwest end, and Section GPR2019-1d for the southwest end. Also, we named the south and the north of the AKB-13 as Section GPR2019-1e and Section GPR2019-1f, as shown in Fig.2

At the sections of GPR2019-1a~1d, 30cm of the surface soil had been removed. We conducted scanning in these sections for two directions with an interval of 50cm, and the exploration depth of 97cm.

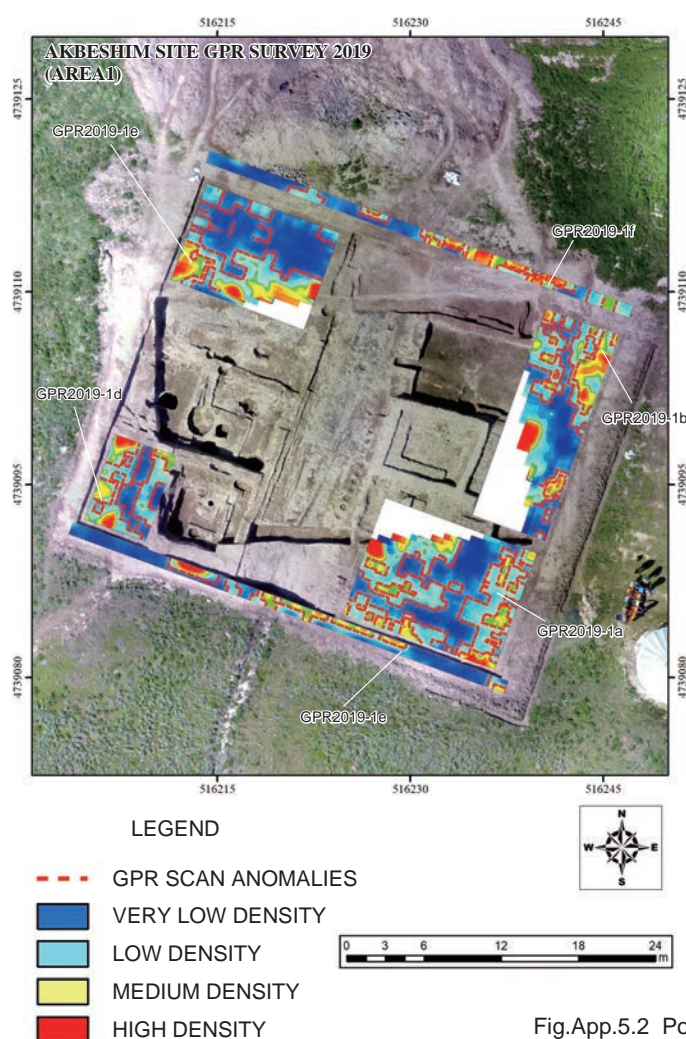


Fig.App.5.2 Point GPR2019-1

5.4.1. Section GPR2019-1a (Fig.App.5.3)

The dimensions of the Area 2019-1a are 23m×10m. By processing the GPR scanning data, many responses were detected, which suggested the existence of buried structures.

The dark blue part clearly recognized in the horizontal and vertical directions is the inner space of a passage and a building. Along the periphery of this blue part, there are more massed structures (indicated in yellow and red). These are the structures buried in the underground.

Basically, the plan is quite clear but to confirm the GPR scan data, it is necessary to implement archaeological excavation at this point.

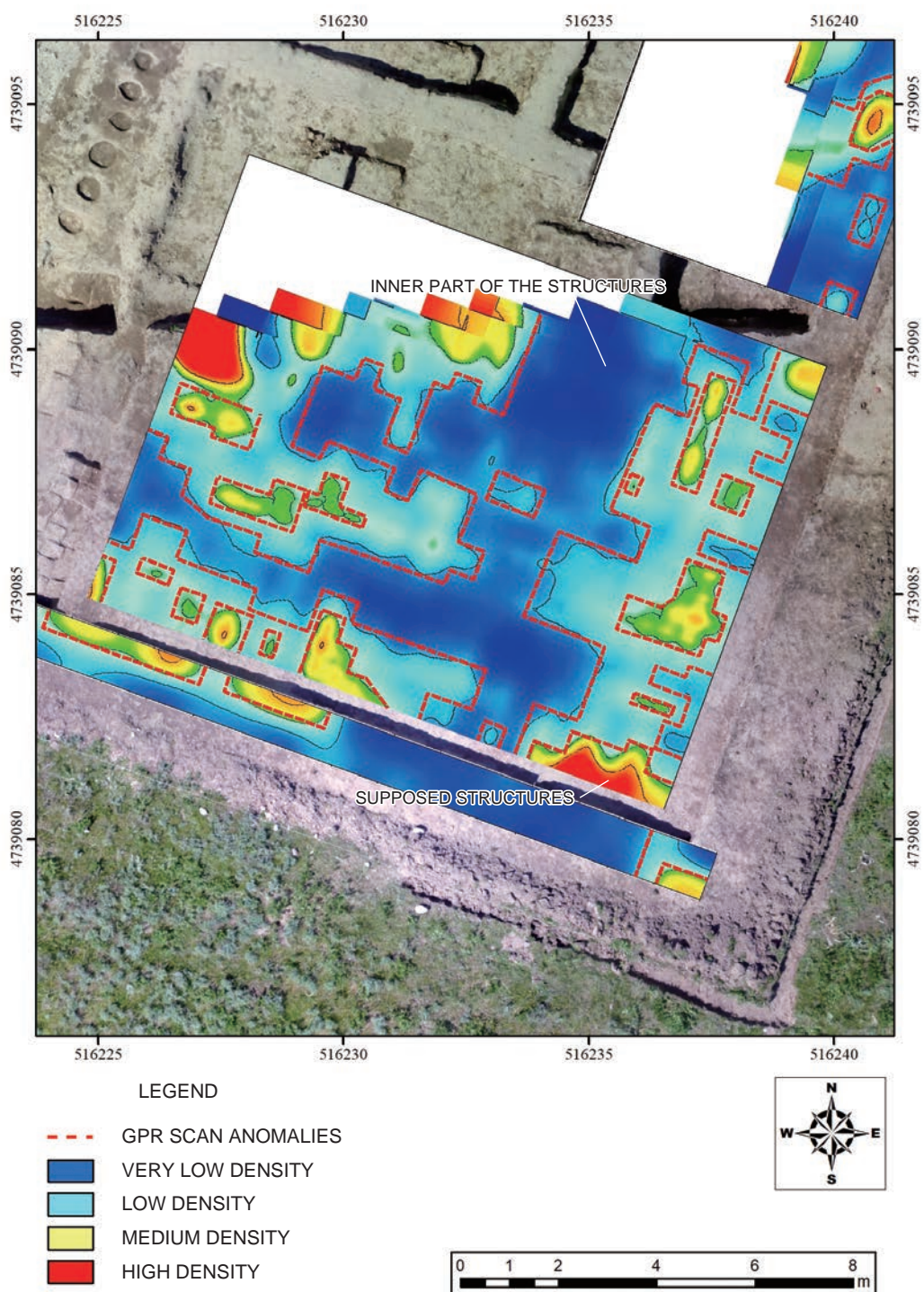


Fig.App.5.3 Section GPR2019-1a

5.4.2. Section GPR2019-1b (Fig.App.5.4)

The dimensions of this section are 17m×6m. As the result of the data analysis, many responses of high density were confirmed. These are the buried structures. The responses of lowdensity extending from north to south must be an inner space or a passage. On the south of the section, where the scope of the investigation was too small, it was difficult to discern the clear border of the underground structures.

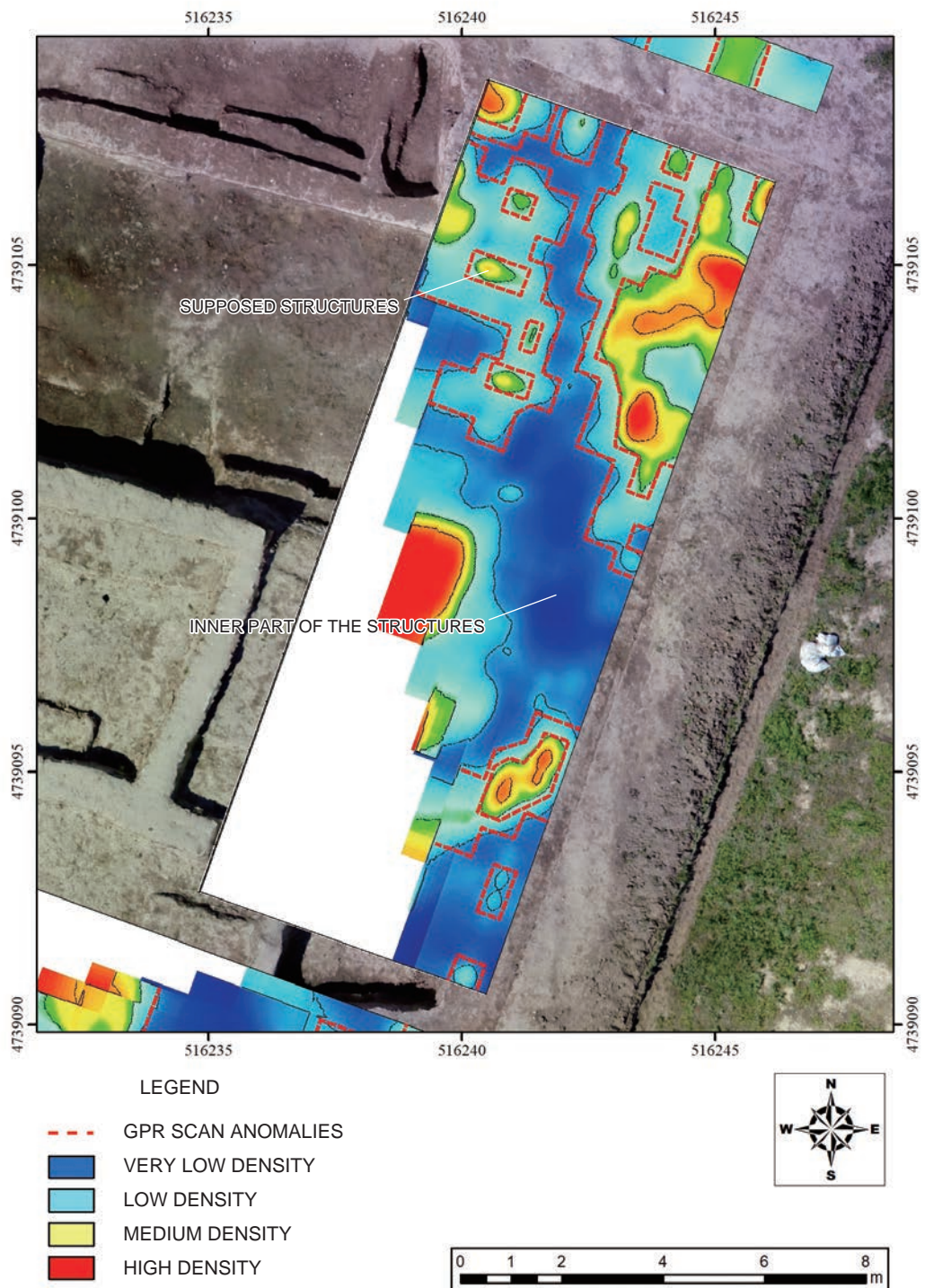


Fig.App.5.4 Section GPR2019-1b

5.4.3. Section GPR2019-1c (Fig.App.5.5)

The dimensions of this section are 11m×8m. There were high-density responses from the south side of this section, and a part of middle-density responses was confirmed at its center and the northern part. On the whole, the response density of the northern part of this section is low, and it is assumed that buried structures do not exist in this part.

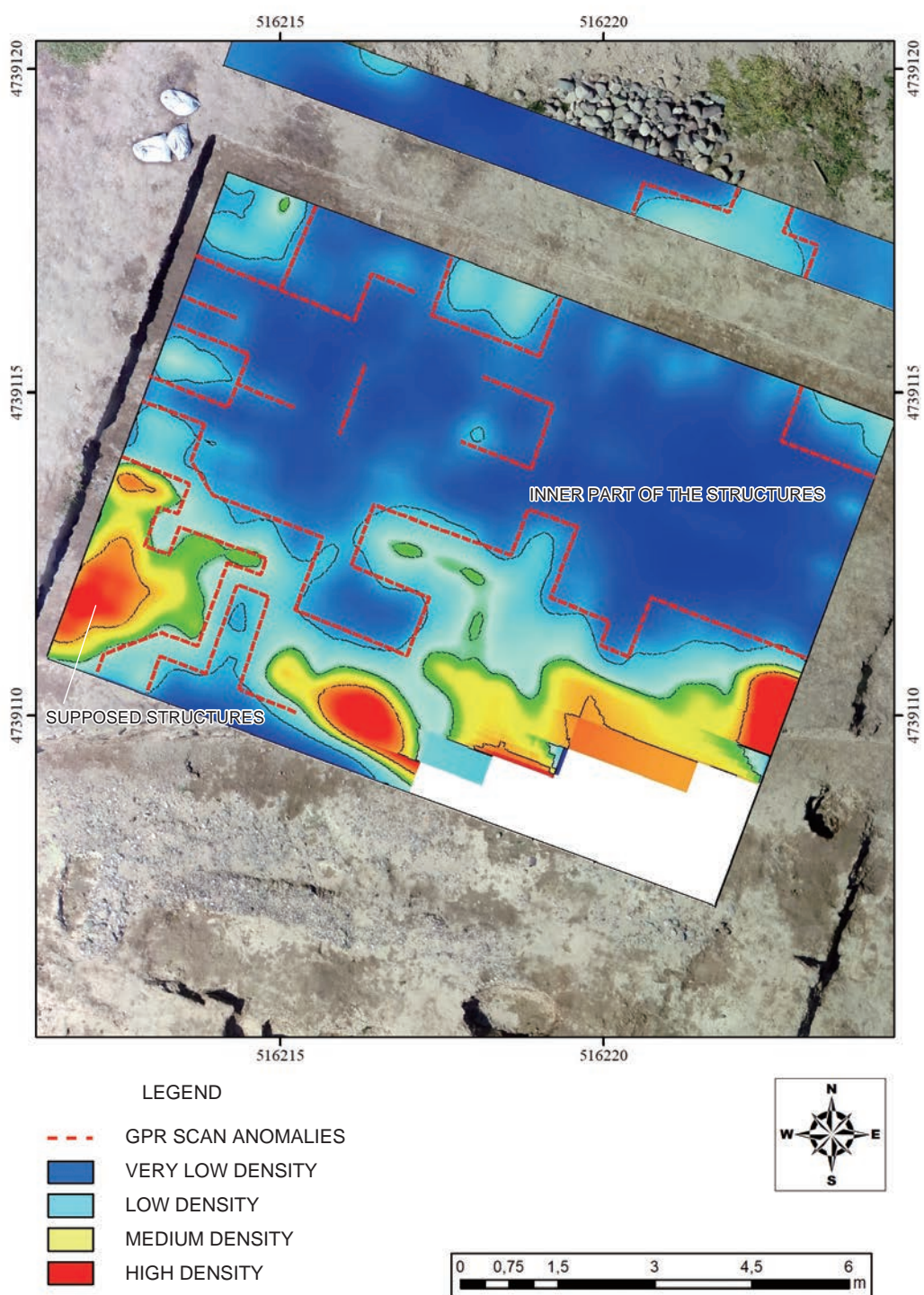


Fig.App.5.5 Section GPR2019-1c

5.4.4. Section GPR2019-1d (Fig.App.5.6)

The dimensions of this section are 5m×7m. At this section, the response of low density was clearly confirmed, and since it extended from north to south and to east, we assumed that this was a passage or a room. In the periphery of this point, responses of high density which indicates the existence of buried structures were obtained.

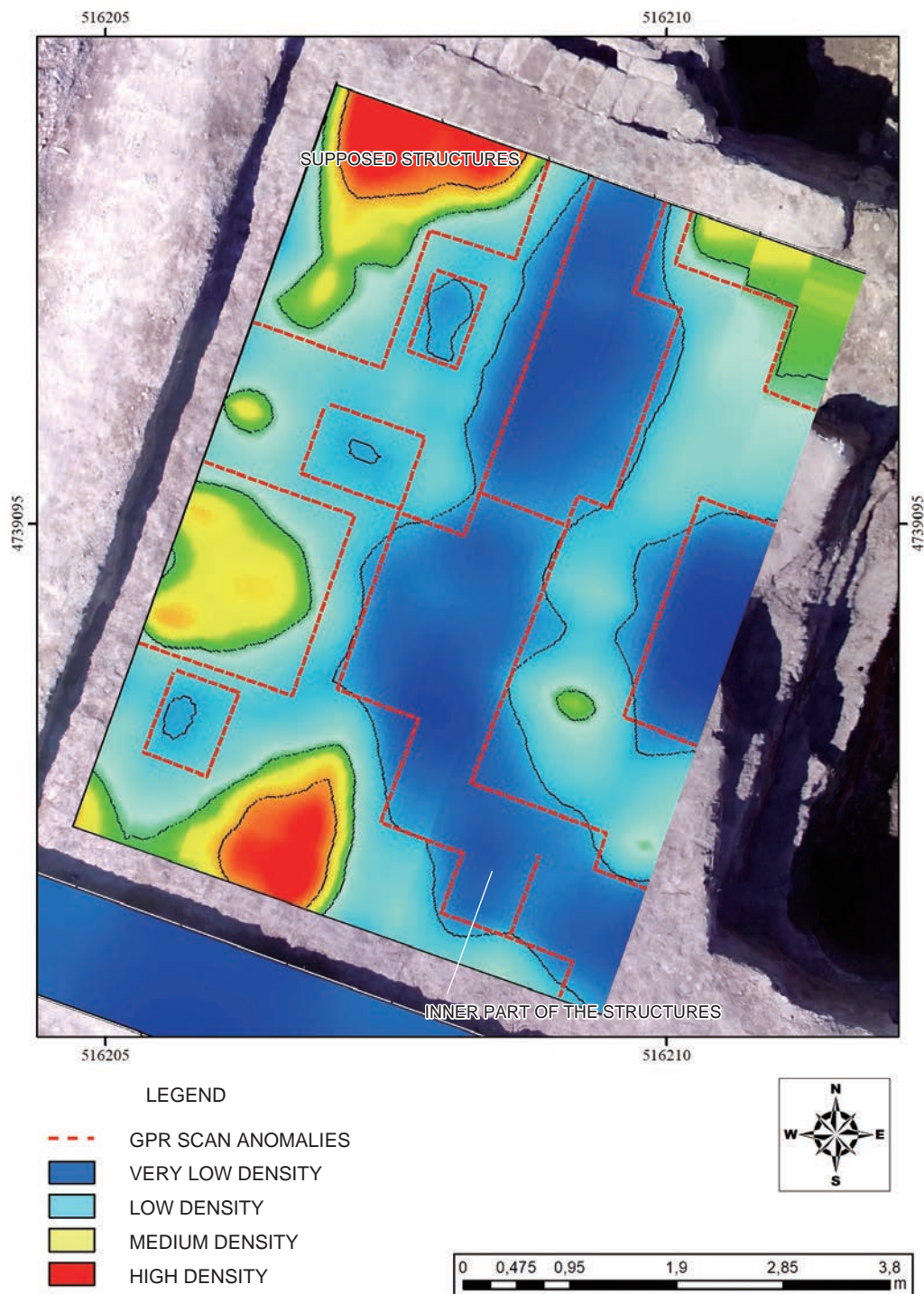


Fig.App.5.6 Section GPR2019-1d

5.4.5. Section GPR2019-e1 (Fig.App.5.7)

This section situates on the south of AKB-13, with the dimensions of 1m×35m. The objective of the investigation at this point is to clarify the existence of a street and its structure.

By the result of the data analysis, we confirmed the response related to a construction and a street. At the street part at the center of the section, high-density responses were confirmed, which indicated a border and a heap inside.

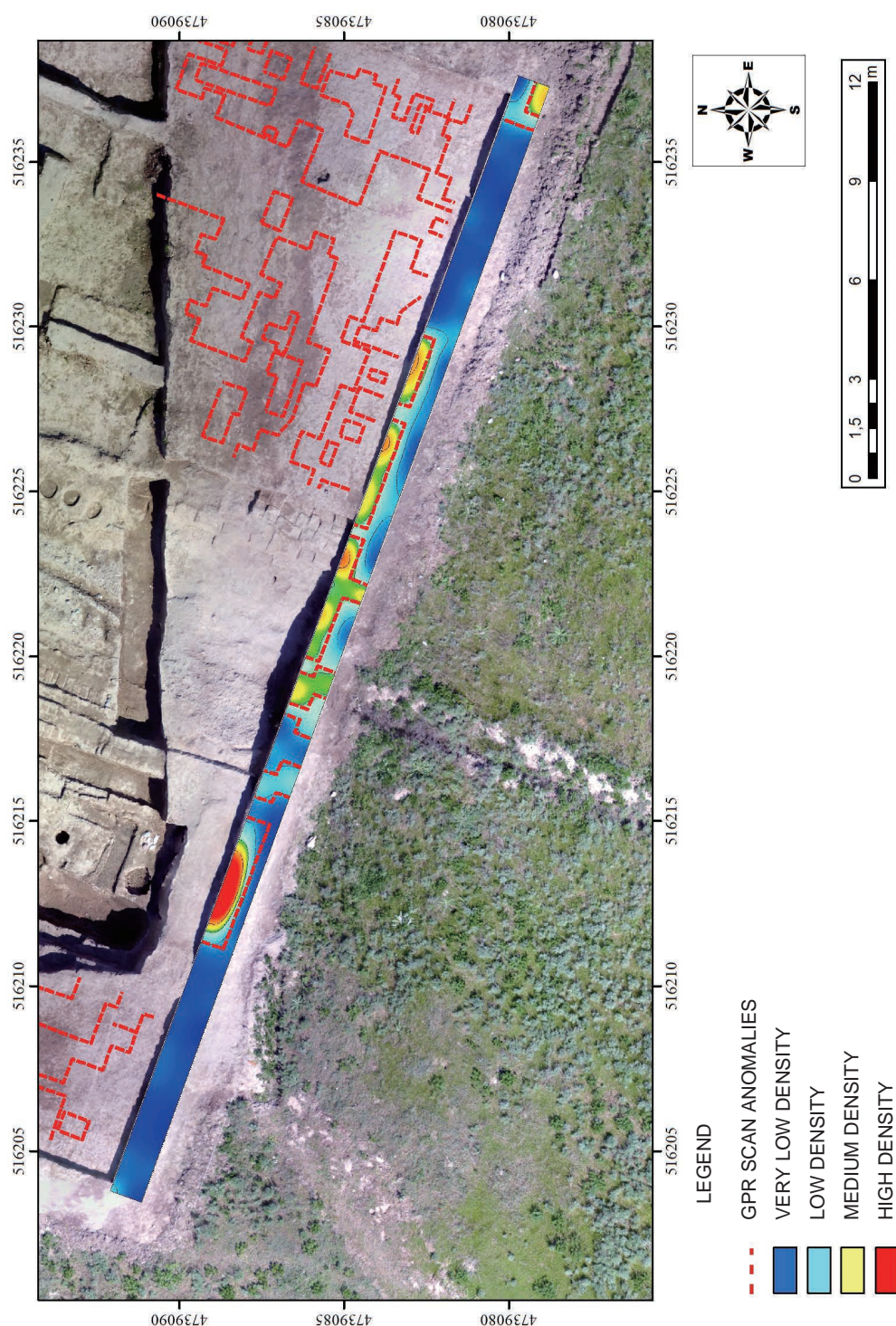


Fig.App.5.7 Section GPR2019-1e

5.4.6. Section GPR2019-1f (Fig.App.5.8)

This section situates on the north of AKB-13, and the dimensions are 37m×1m. By the result of the data analysis, we confirmed the response related to structures buried underground. Along the sides of the street part were high-density responses. At the center of the street, a response started at the depth of 97cm or deeper.

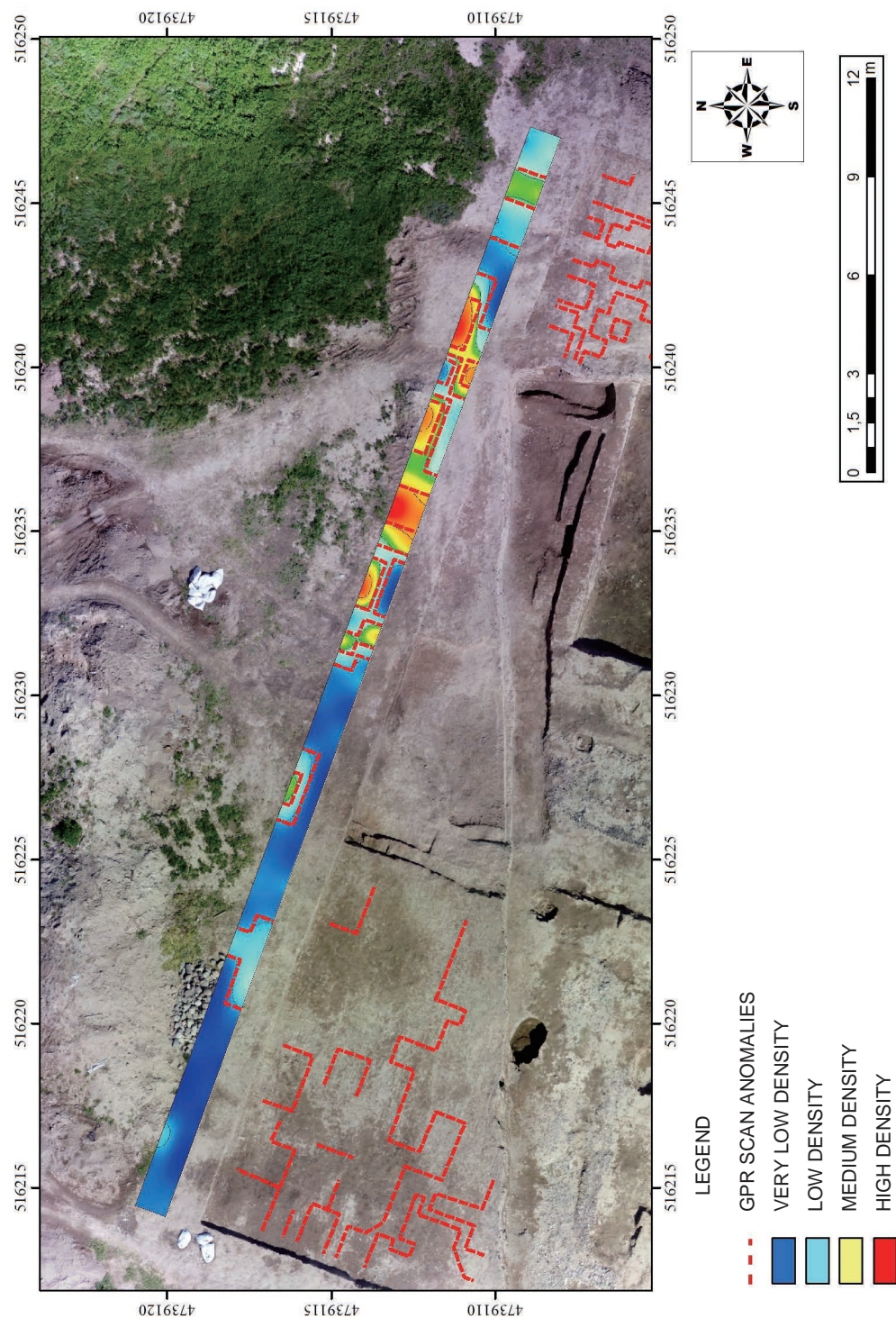


Fig.App.5.8 Section GPR2019-1f

5.5. Point GPR2019-2 (Fig.App.5.9)

This point is located about 350 m away westward from the southeast end of the southeast wall of the First Shahrstan. The aim of this investigation was to clarify the structure of the wall.

By analyzing the resulted data, the outline of a wall became observable at the depth of 78cm, though the response was weak. The building frame of high density was observed at the depth of 116cm, and at the center of the wall the structure became clear at the depth of 200cm. At the end part of the wall the response density was low, which suggested the possibility that the part had been a trace of a reconstruction or a collapse.

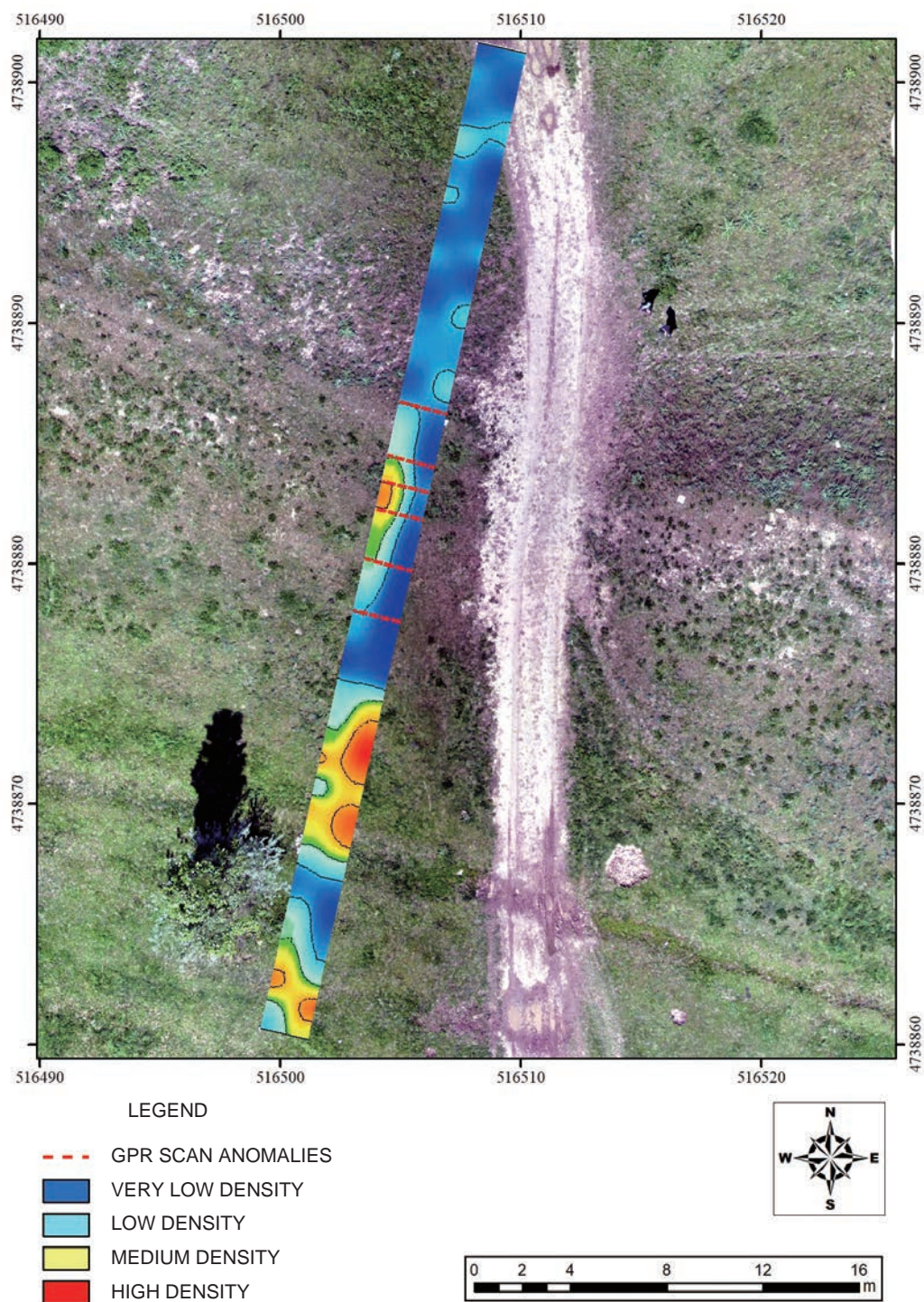


Fig.App.5.9 Point GPR2019-2

5.6. Point GPR2019-3 (Fig.App.5.10)

This point situates on the south and the east of a reservoir in the northeast part of the Second Shahristan. This reservoir situates between the east wall of the First Shahristan and the northwest corner of the Second Shahristan and is presumed to have been constructed in the Tang era.

5.6.1. Section GPR2019-3a

This section situates on the east of the reservoir, and the dimensions are 60m (north-south) \times 20m (east-west). The objective of the investigation of this point is to clarify the existence and the structure of a bank on the east of the reservoir.

As the result of the analysis of the data in horizontal and vertical directions, a structure recognizable as a bank was not confirmed. We presumed that the bank had similar component and density to those of the surrounding ground, and density differences were not discernable.

5.6.2. Section GPR2019-3b

This section is situated on the south of the reservoir where the grass grows thick. The dimensions are 170m (east-west) \times 50m (north-south). The objective of the investigation at this point is to confirm if there had been workshop or others related to the production of tiles and burnt bricks (fired bricks). The section was scanned in one direction in the interval of 1m to the depth of 129cm. As the result of the data analysis, two sections in high-density responses were identified.

On the north of the center of these sections there was a high-density response of irregular shape, extending south. The dimensions are 56 \times 28m. On the west of this point, a response was confirmed in the range of the diameter of 34m. In the rest of the points, clear response was not received.

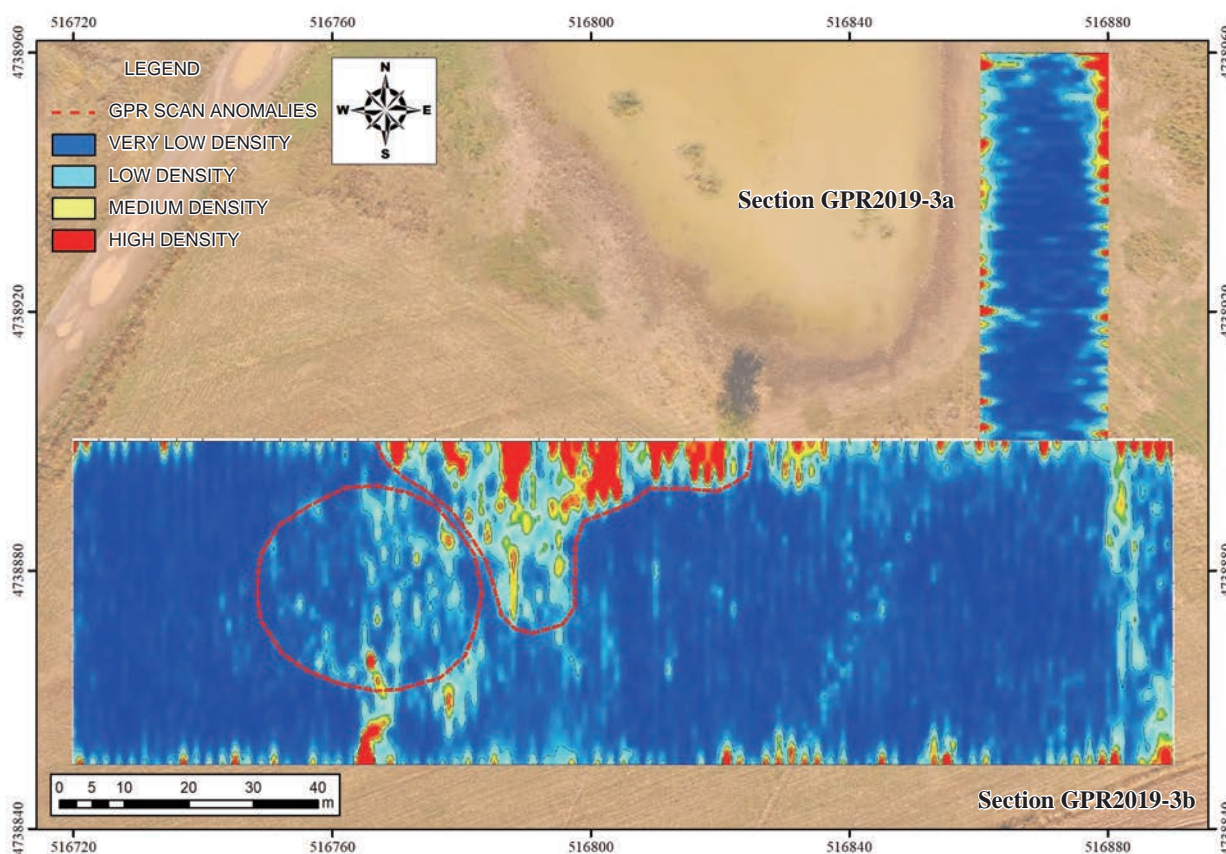


Fig.App.5.10 Point GPR2019-3

5.7. Point GPR2019-4 (Fig.App.5.11)

This point is located in the northwest corner of the Second Shahrستان.

According to the aerial photo shot in 1966, the Second Shahrستان was surrounded by walls in a rectangular shape, but as the consequence of a large-scale ground levelling, the walls have disappeared. The aim of investigation was to identify the trace of the walls and their position. The dimensions of the section are 50 (north-south) × 21m (east-west). The scanning was made in the interval of 1m in the direction of north-south.

By the data analysis, it was impossible to confirm the structure of the walls. In this section, various irregular-density responses without forming clear shapes and borders were confirmed. Maybe the walls must have been scraped and planed in this section.

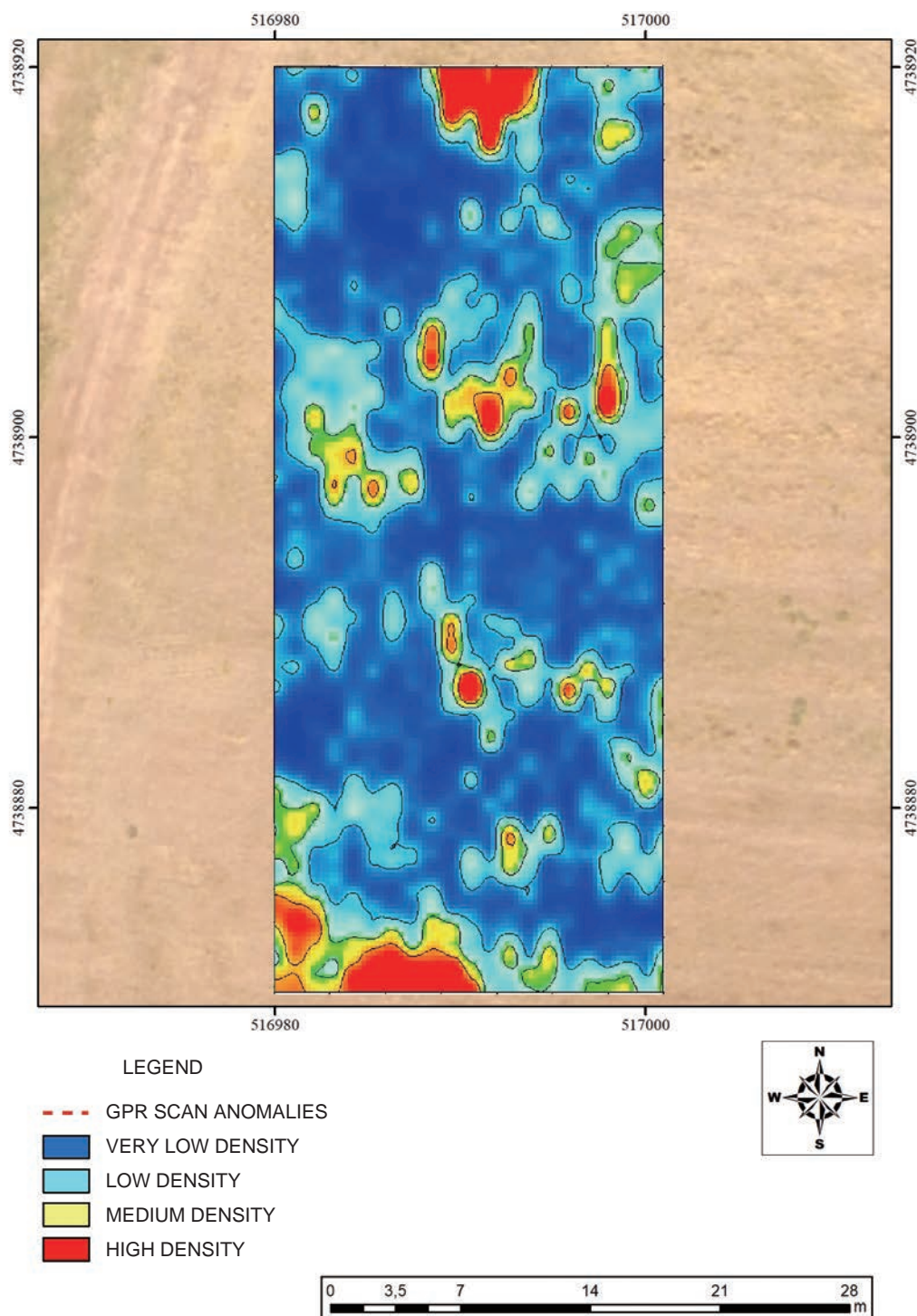


Fig.App.5.11 Point GPR2019-4

5.8. Point GPR2019-5 (Fig.App.5.12)

This point is on the east of AKB-15 of the Second Shahrstan. From AKB-15, the remains of stone mosaic and accumulated tile fragments were discovered in the 2018 spring investigation. The objectives of the investigation at this point are to specify the buried structures at the point adjacent to the east side of AKB-15 and to confirm if the east side also had a stone mosaic.

The dimensions of this section are 20m (north-south) \times 7m (east-west) (excluding some part on the northeast end and the southeast end). The scanning was performed in two directions, in the interval of 50cm.

As the result of data analysis, many responses of various density were confirmed. These responses structurally have geometric forms which correlate with those of the architectures detected in the past excavations. The dark blue color indicates the existence of a space (a passage or a room) and the green, yellow and red indicate the existence of architectures (walls, blocked area, pits).

In a horizontal view, or a planar view, the inner space of a courtyard continues, with connected pits on the north. On the south, we can clearly observe a response in high-density extending in the east-west direction. These responses are presumed to be piled-up stones or a wall.

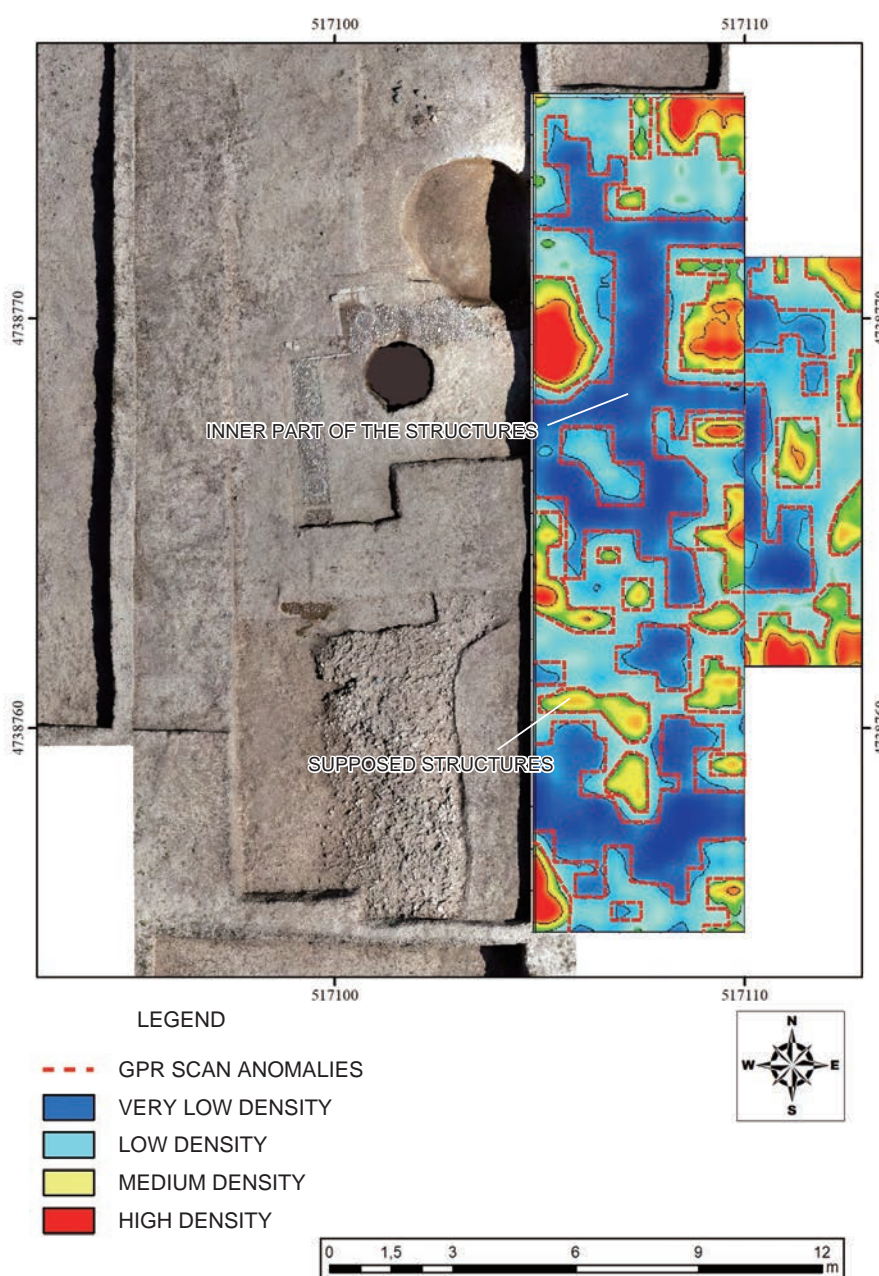


Fig.App.5.12 Point GPR2019-5

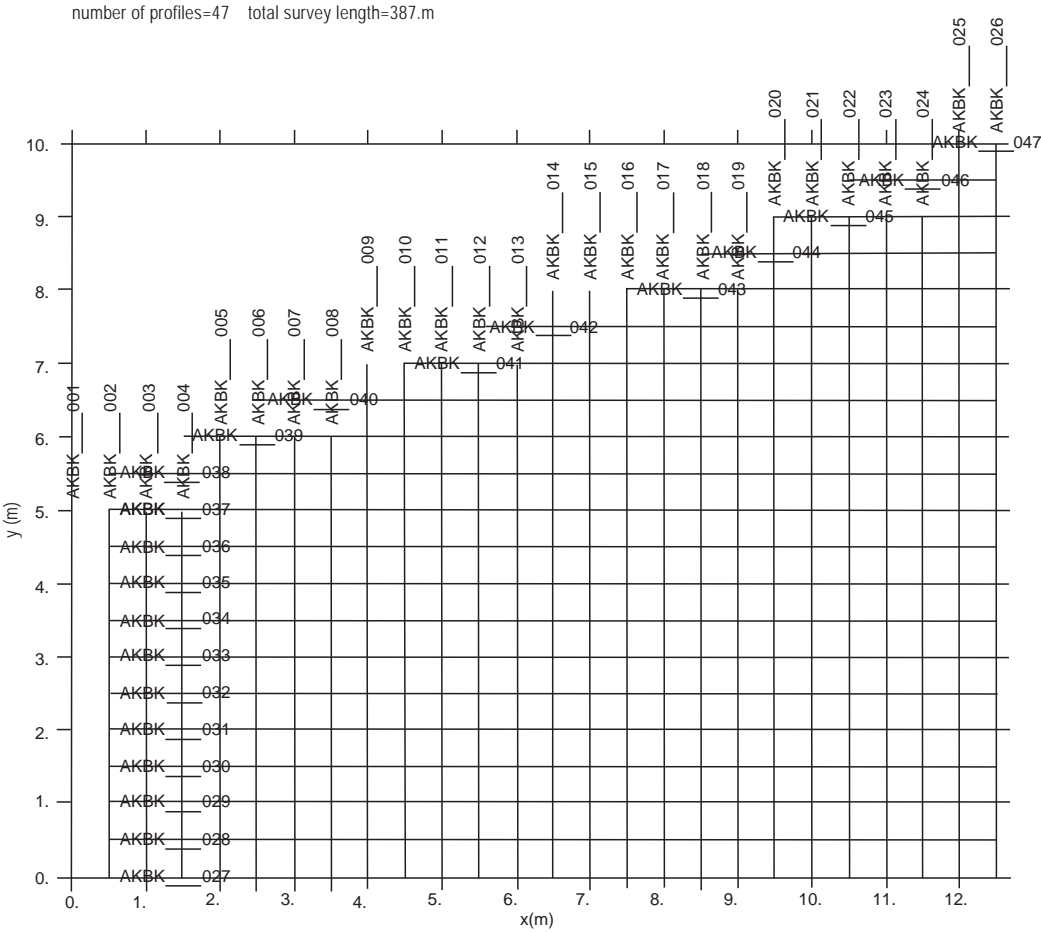


Fig.App.5.13 Measurement Lines of Section GPR2019-1a

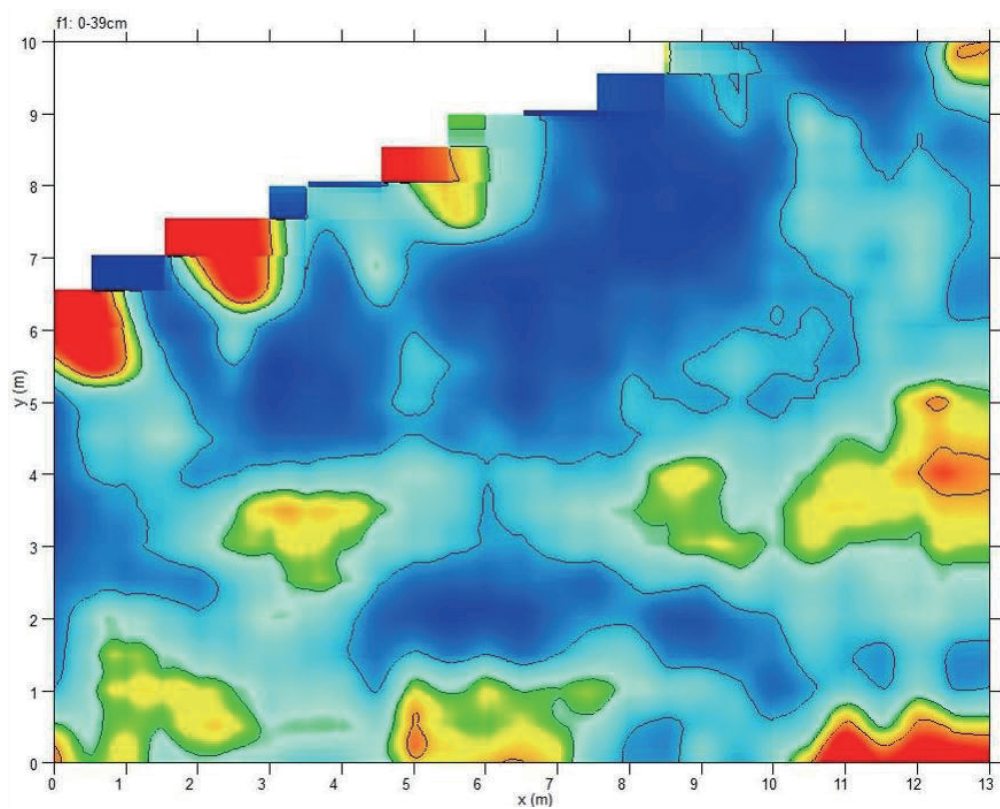


Fig.App.5.14 Time Slice of Section GPR2019-1a:0~39cm Deep

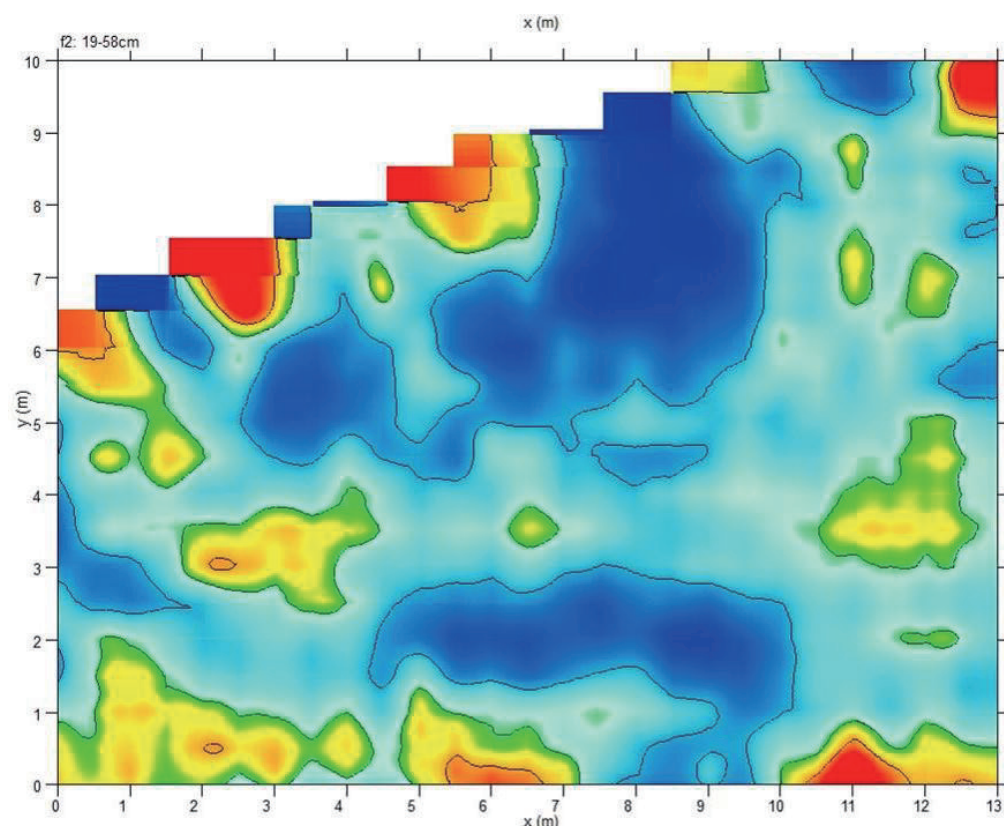


Fig.App.5.15 Time Slice of Section GPR2019-1a:19~58cm Deep

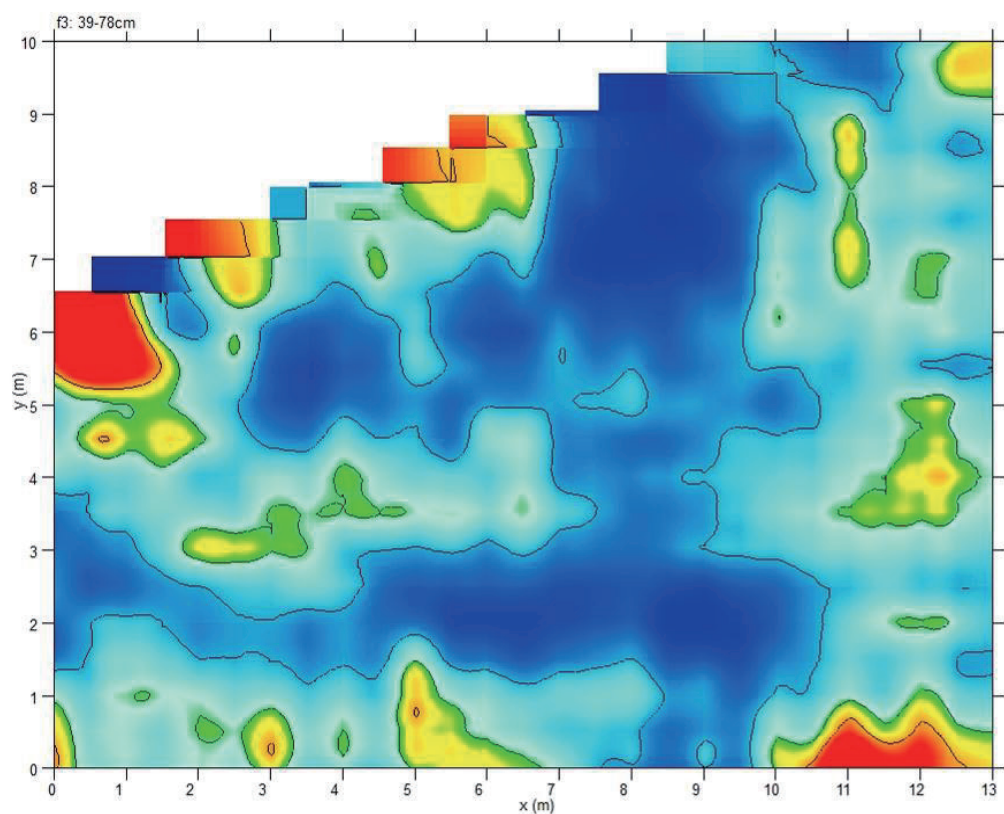


Fig.App.5.16 Time Slice of Section GPR2019-1a:39~78cm Deep

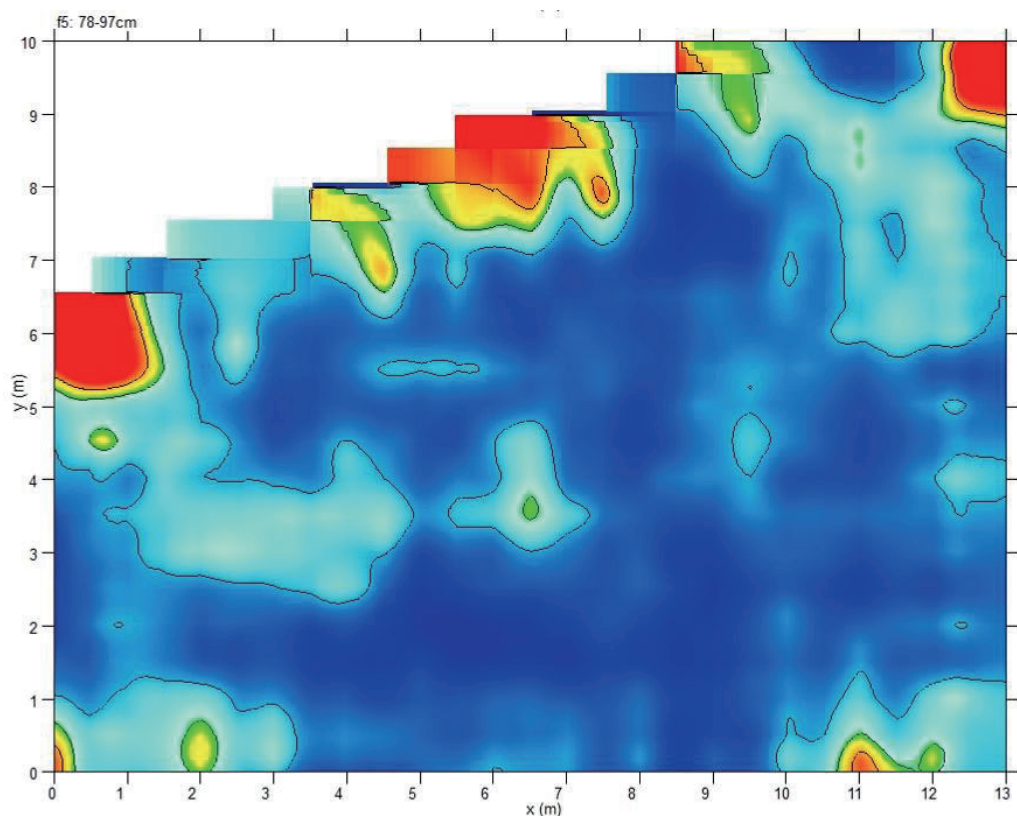


Fig.App.5.17 Time Slice of Section GPR2019-1a:78~97cm Deep

number of profiles=48 total survey length=235m

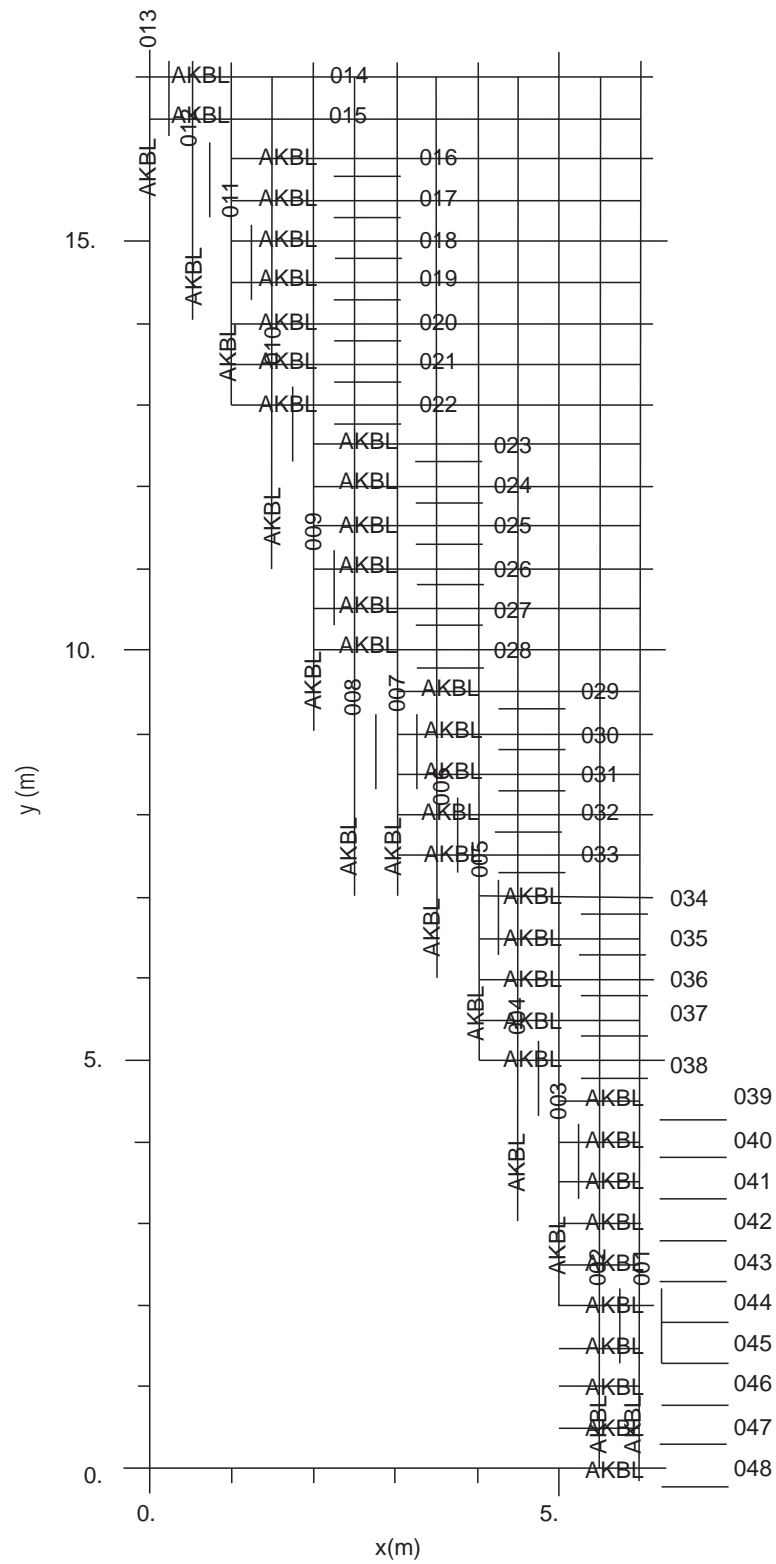


Fig.App.5.18 Measurement Lines of Section GPR2019-1b

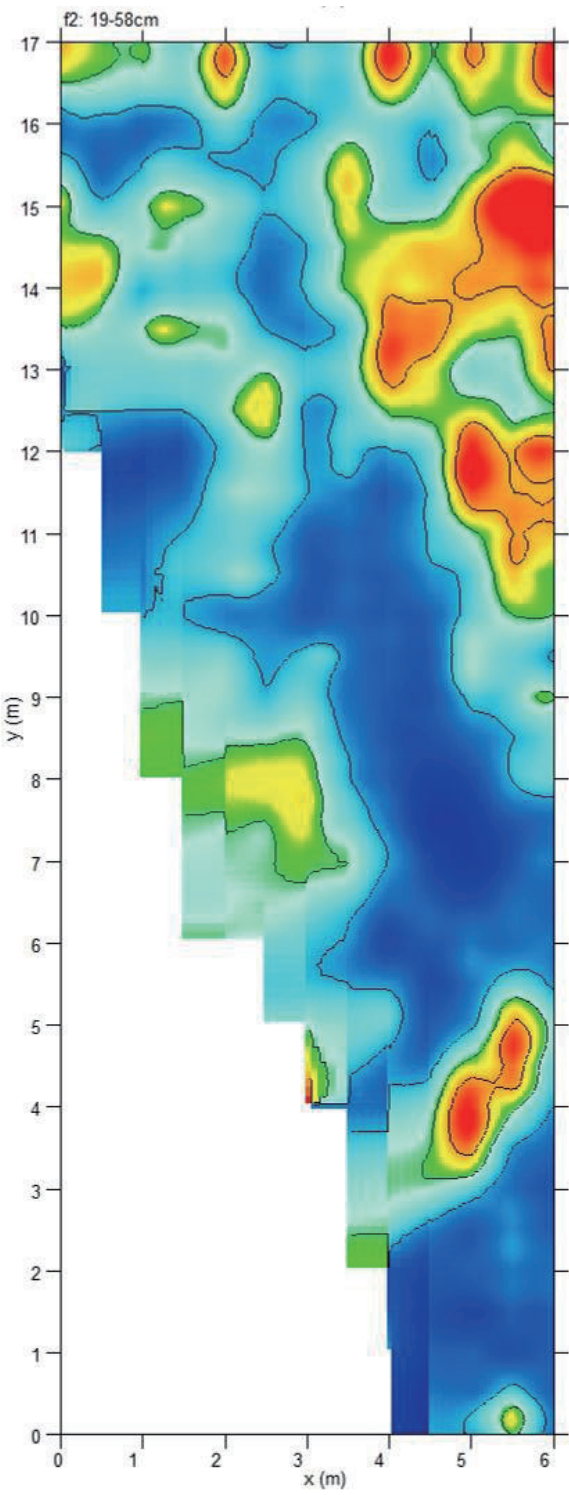
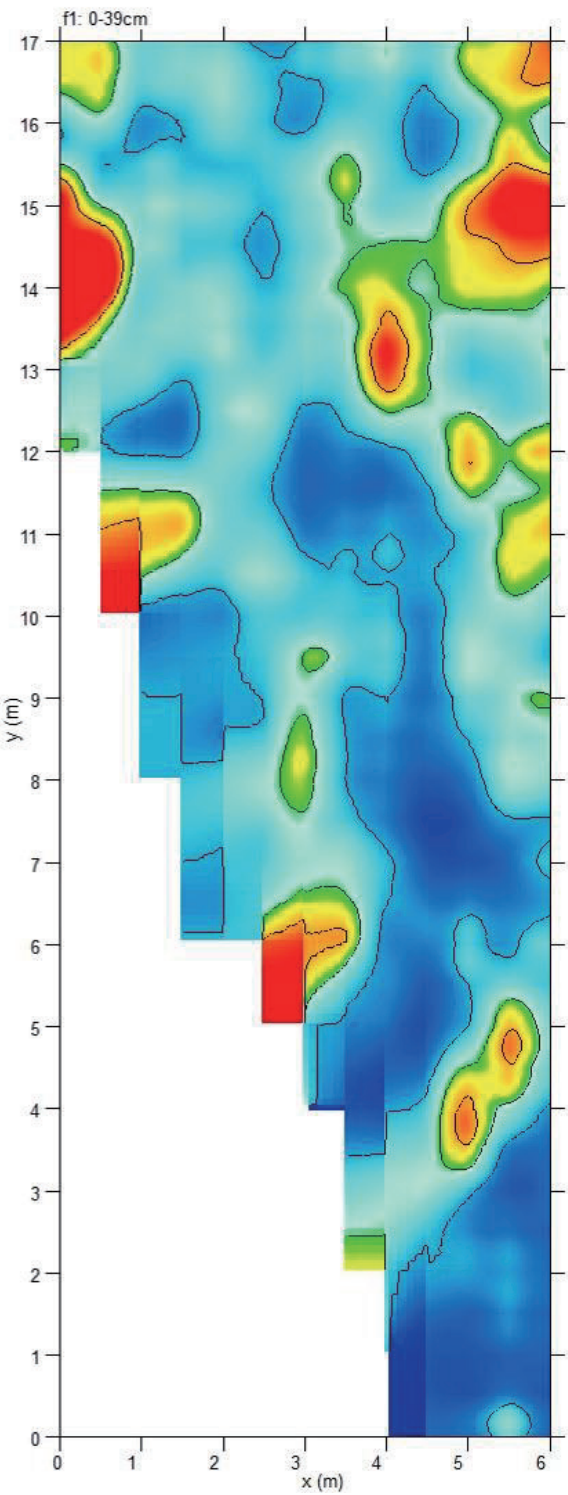


Fig.App.5.19 Time Slice of Section GPR2019-1b:0~39cm Deep Fig.App.5.20 Time Slice of Section GPR2019-1b:19~58cm Deep

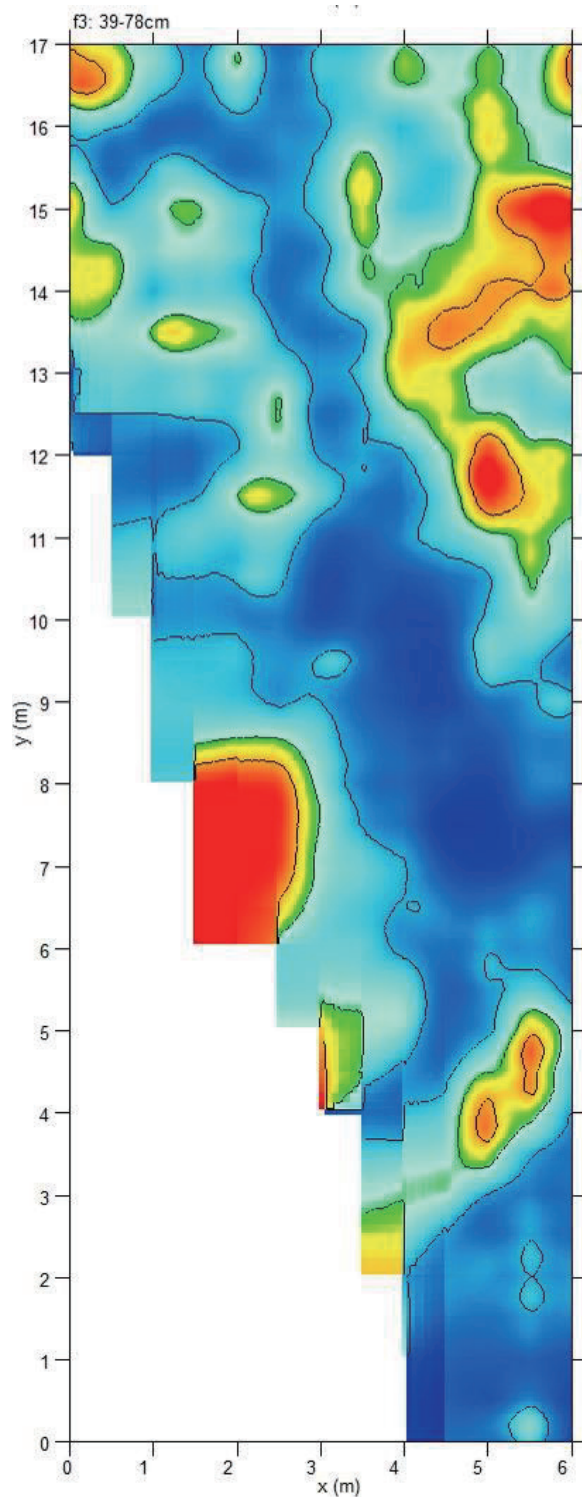


Fig.App.5.21 Time Slice of Section GPR2019-1b:39-78cm Deep

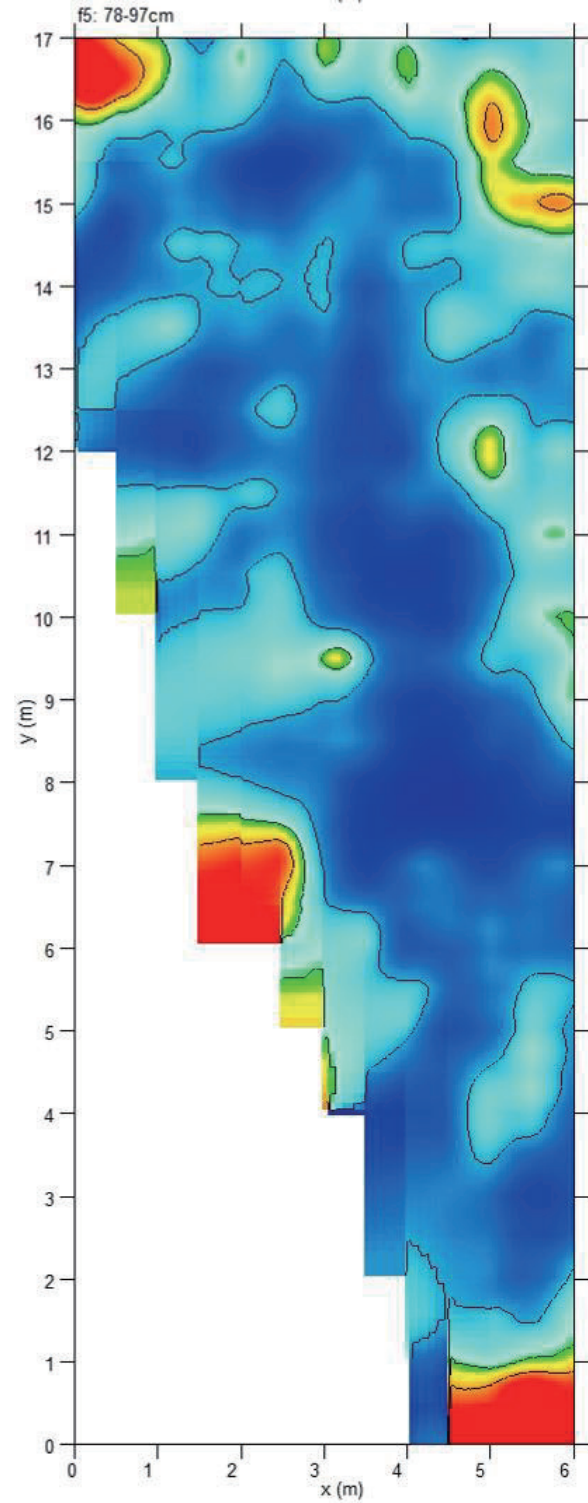


Fig.App.5.22 Time Slice of Section GPR2019-1b:78-97cm Deep

number of profiles=40 total survey length=299.m

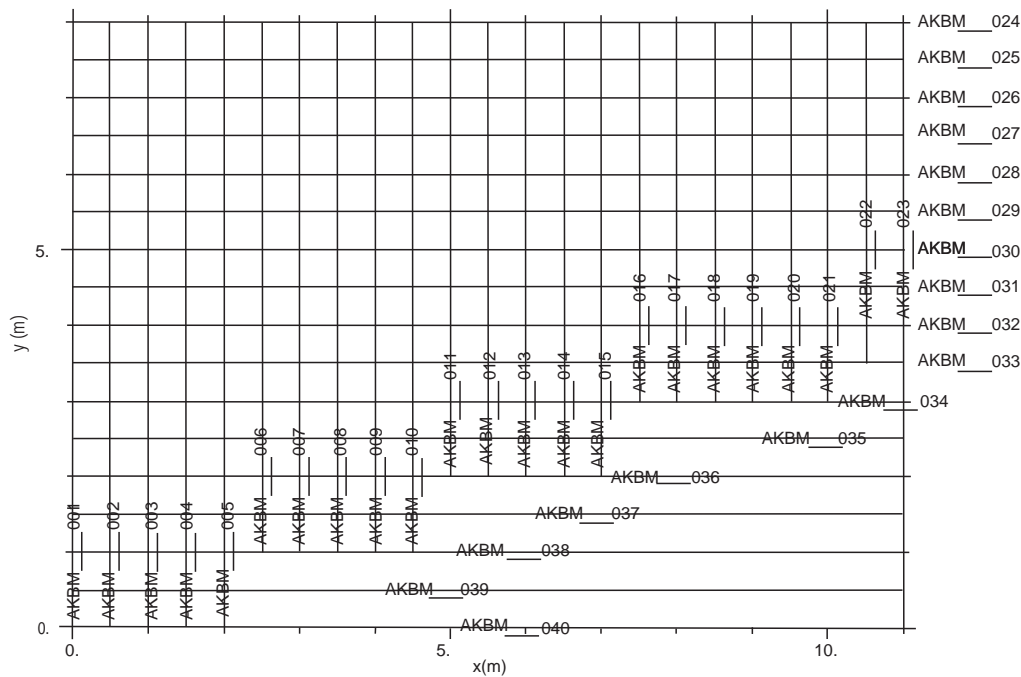


Fig.App.5.23 Measurement Lines of Section GPR2019-1c

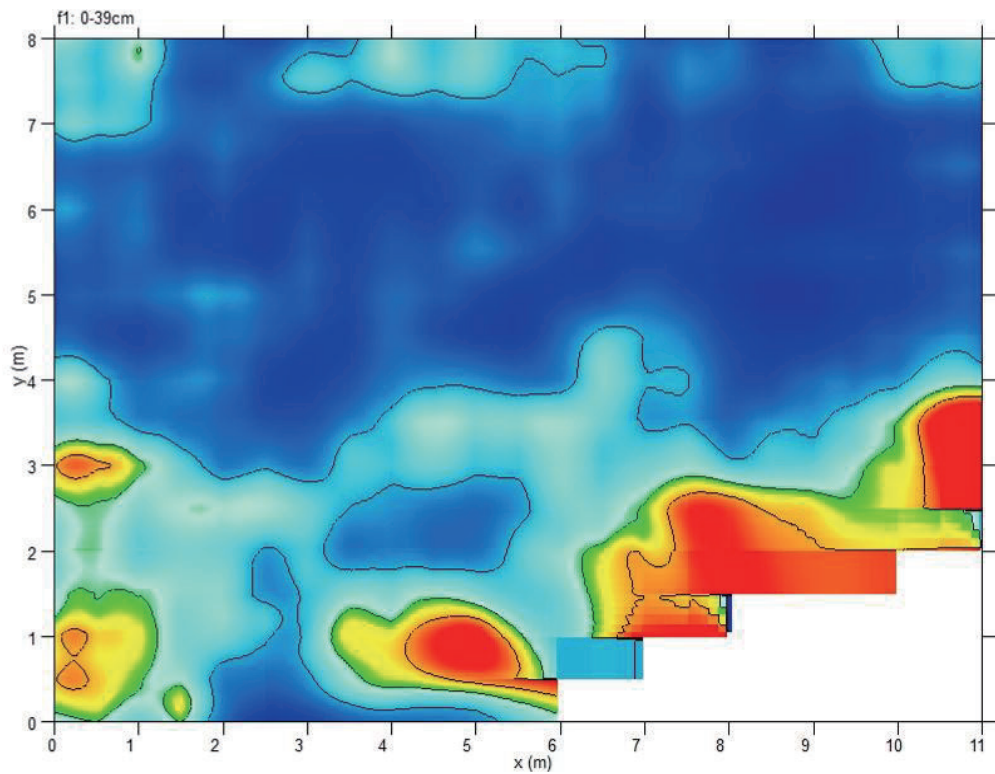


Fig.App.5.24 Time Slice of Section GPR2019-1c:0~39cm Deep

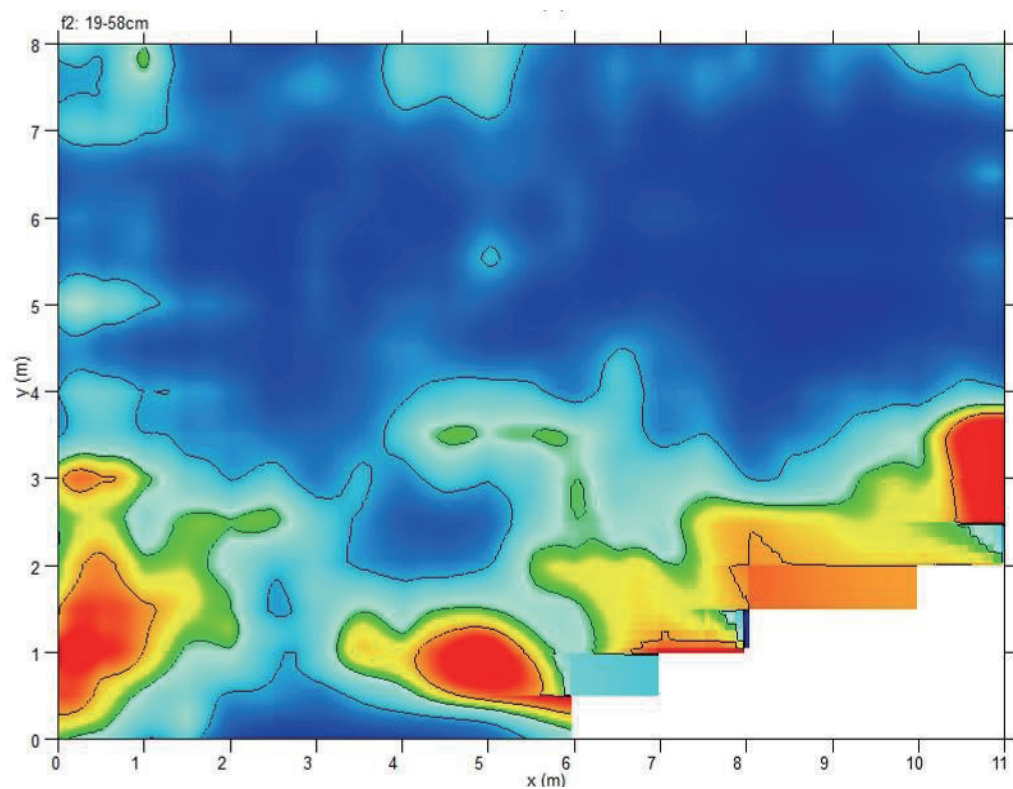


Fig.App.5.25 Time Slice of Section GPR2019-1c:19~58cm Deep

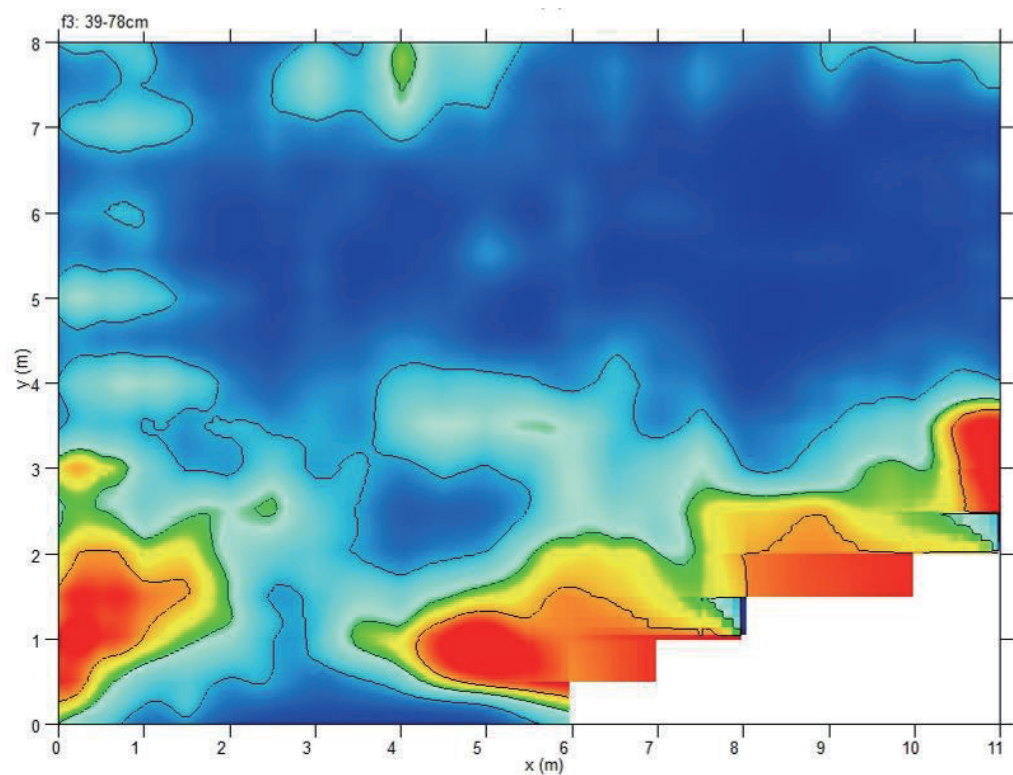


Fig.App.5.26 Time Slice of Section GPR2019-1c:39~78cm Deep

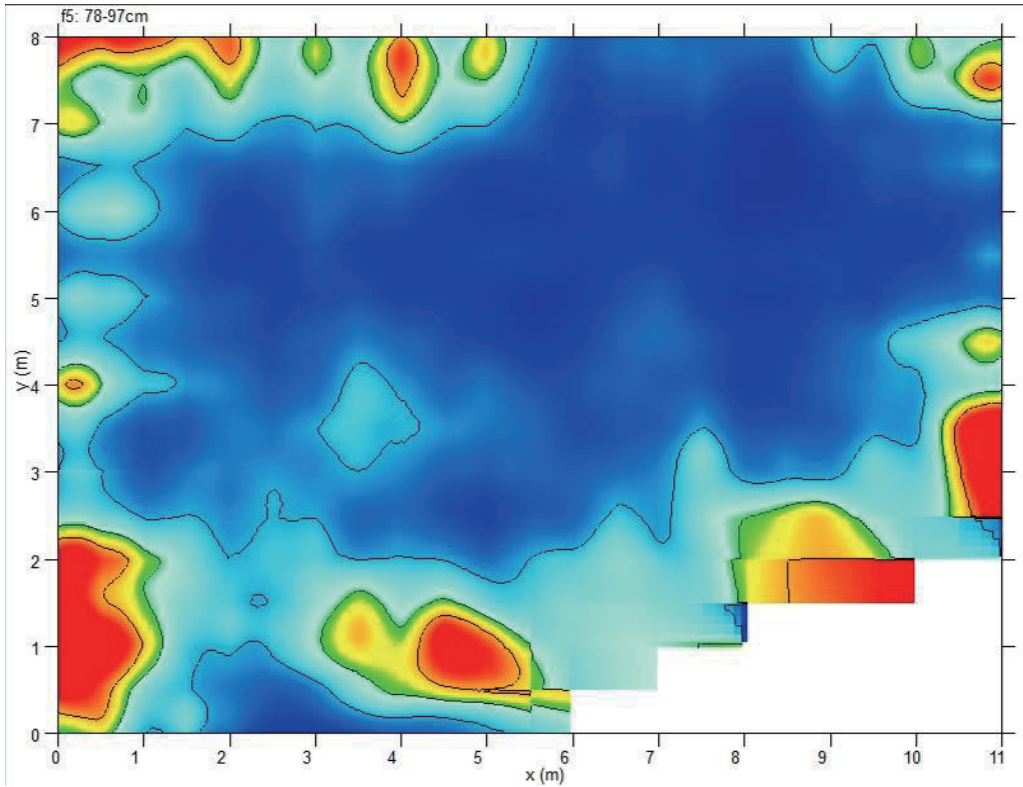


Fig.App.5.27 Time Slice of Section GPR2019-1c:78~97cm Deep

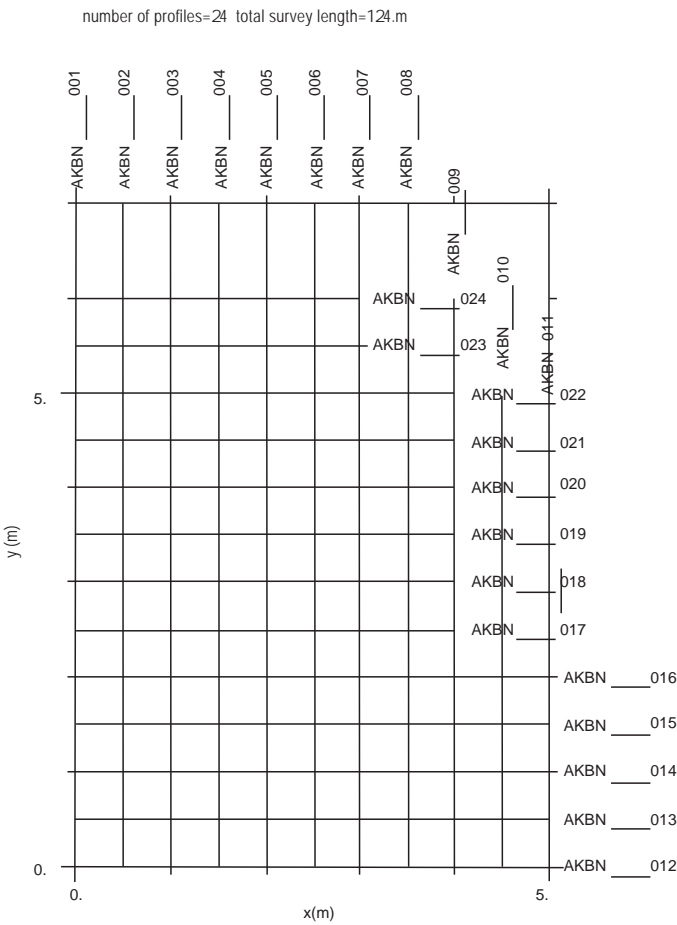


Fig.App.5.28 Measurement Lines of Section GPR2019-1d

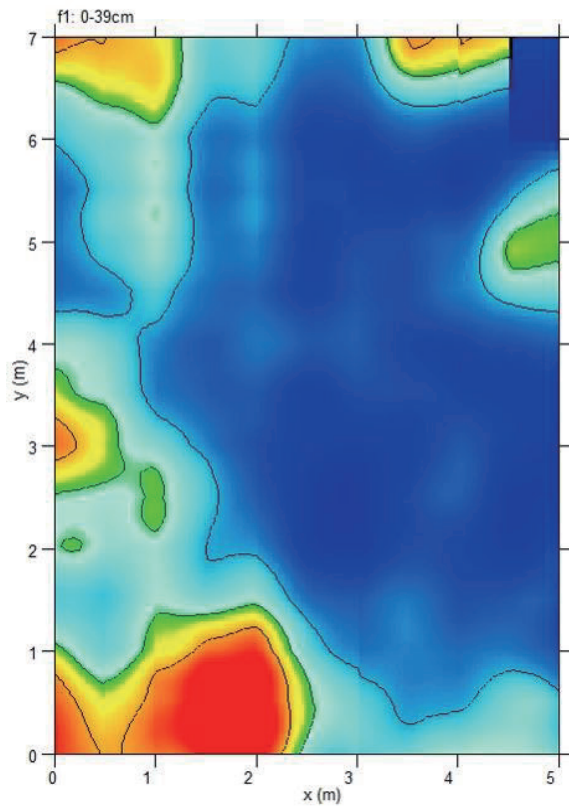


Fig.App.5.29 Time Slice of Section GPR2019-1d:0~39cm Deep

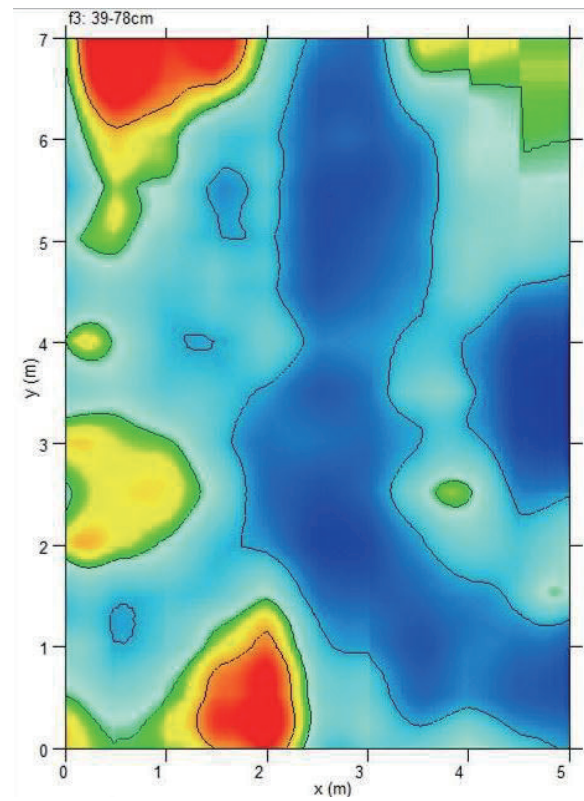


Fig.App.5.30 Time Slice of Section GPR2019-1d:39~78cm Deep

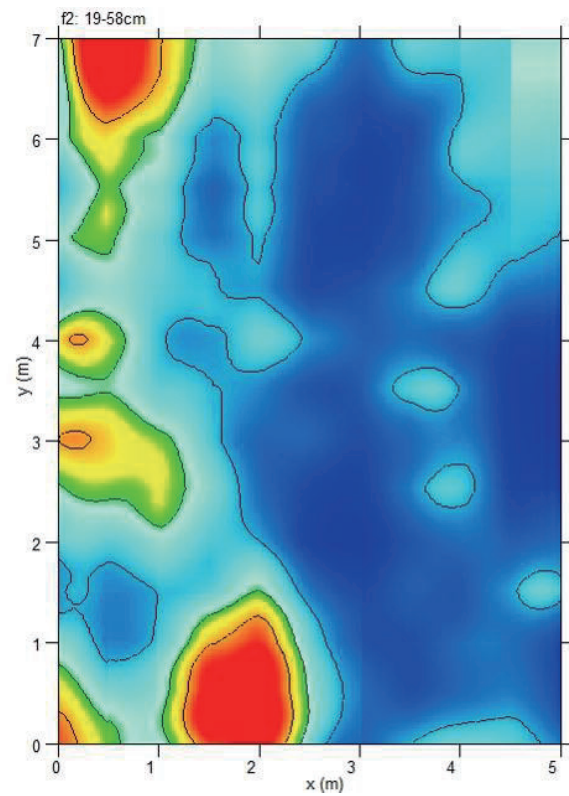


Fig.App.5.31 Time Slice of Section GPR2019-1d:19~58cm Deep

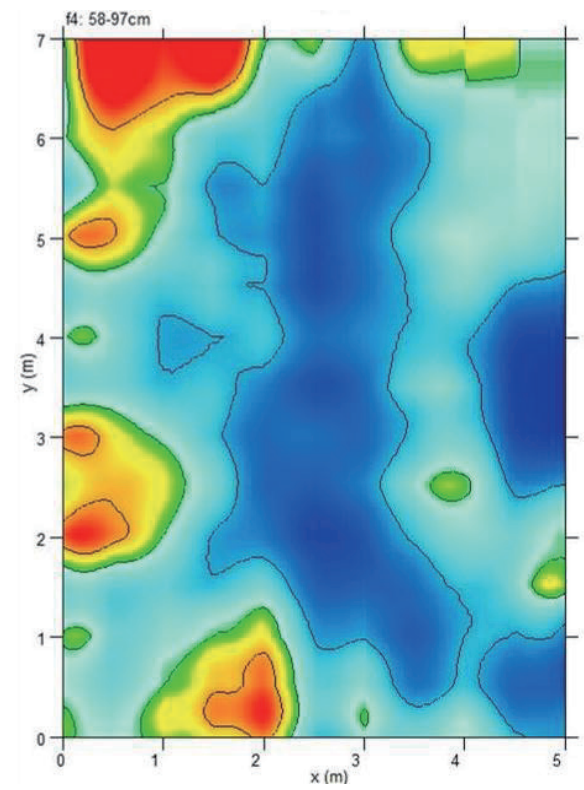


Fig.App.5.32 Time Slice of Section GPR2019-1d:58~97cm Deep

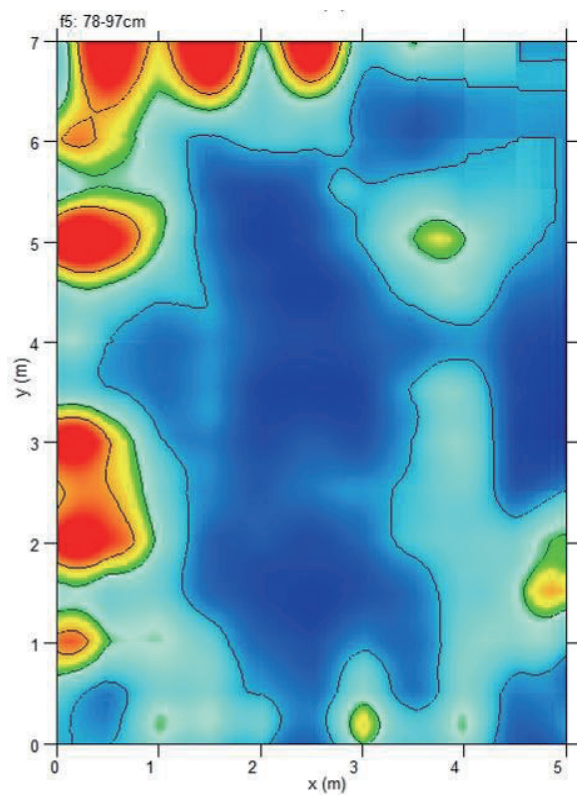


Fig.App.5.33 Time Slice of Section GPR2019-1d: 78-97cm Deep

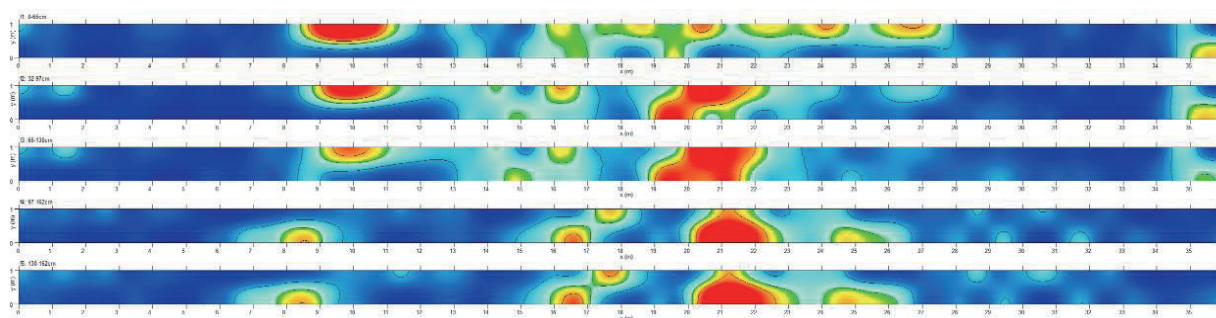


Fig.App.5.34 Time Slice of Section GPR2019-1e: 0-162cm Deep

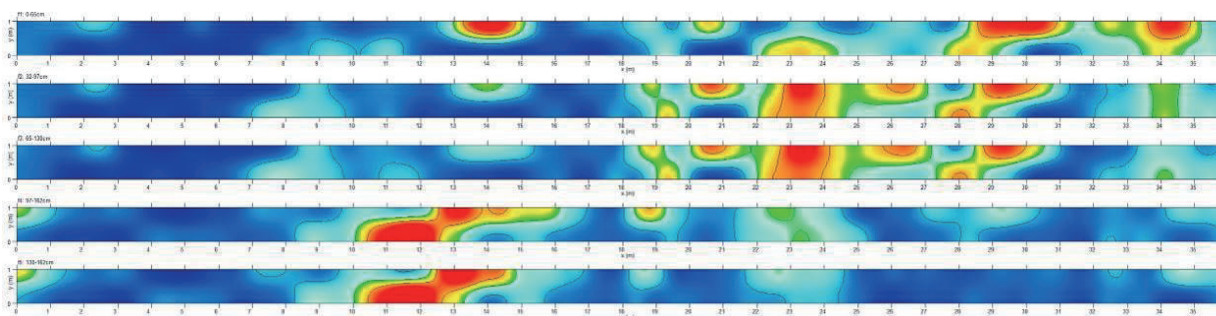


Fig.App.5.35 Time Slice of Section GPR2019-1f: 0-162cm Deep

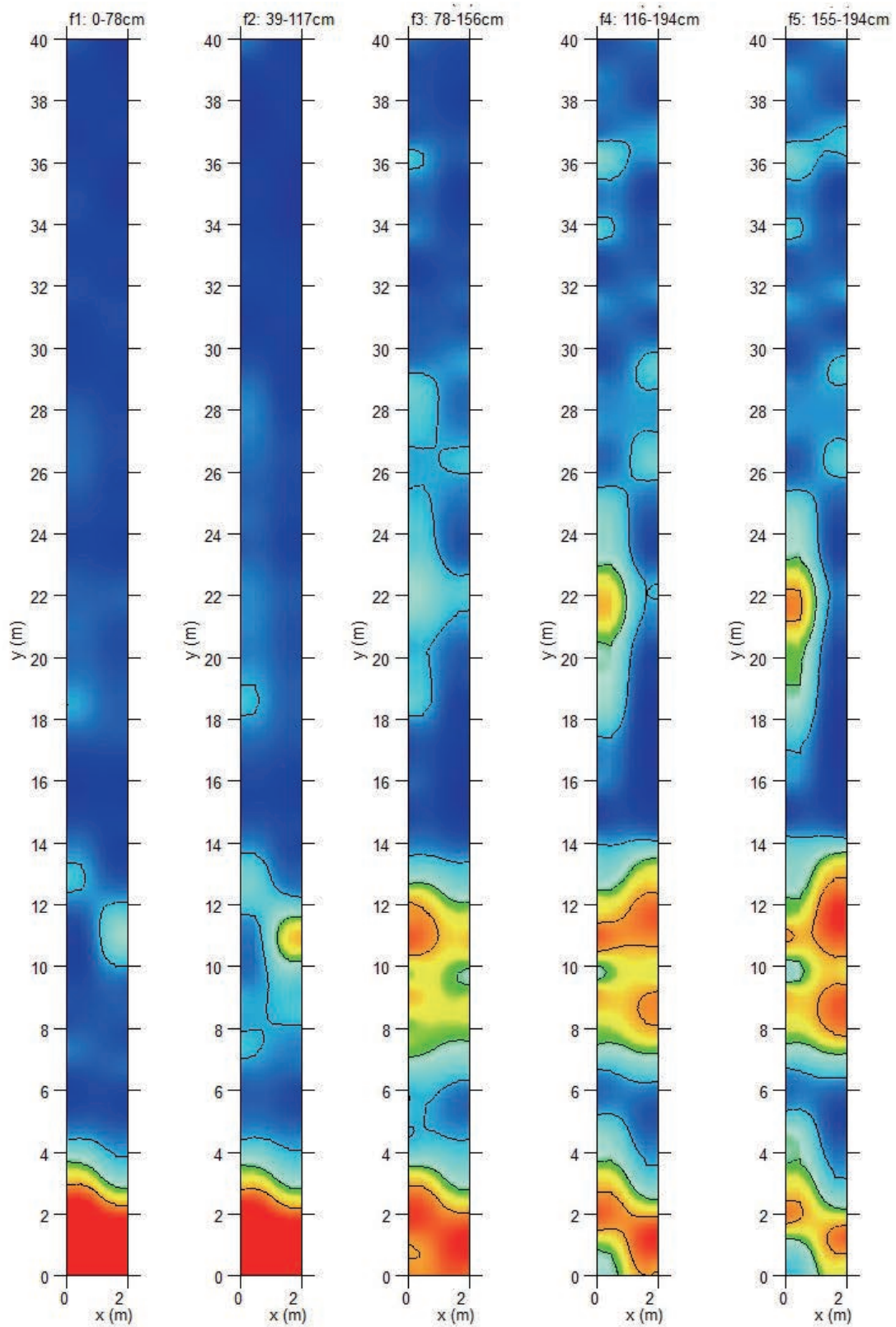


Fig.App.5.36 Time Slice of Section GPR2019-2: 0~194cm Deep

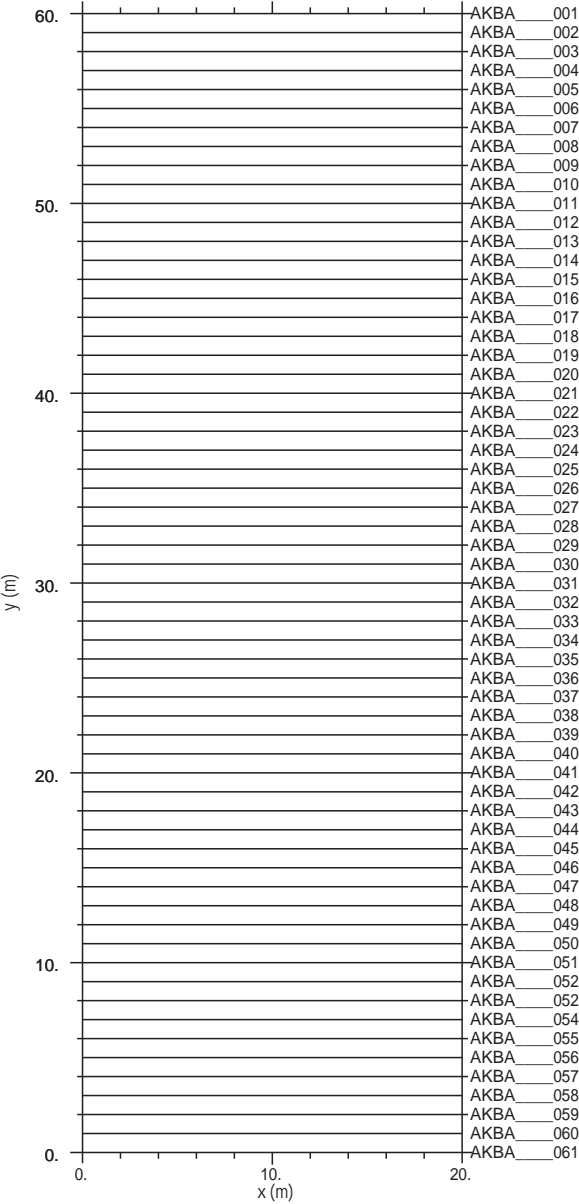


Fig.App.5.37 Measurement Lines of Section GPR2019-3a

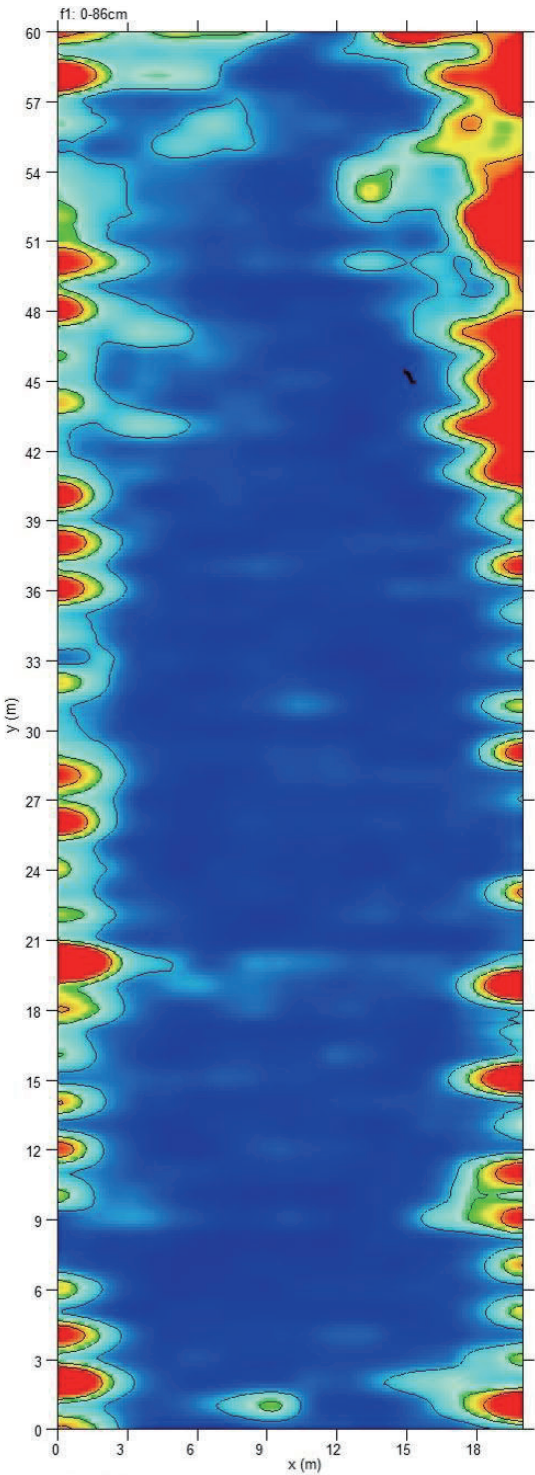


Fig.App.5.38 Time Slice of Section GPR2019-3a:0~86cm Deep

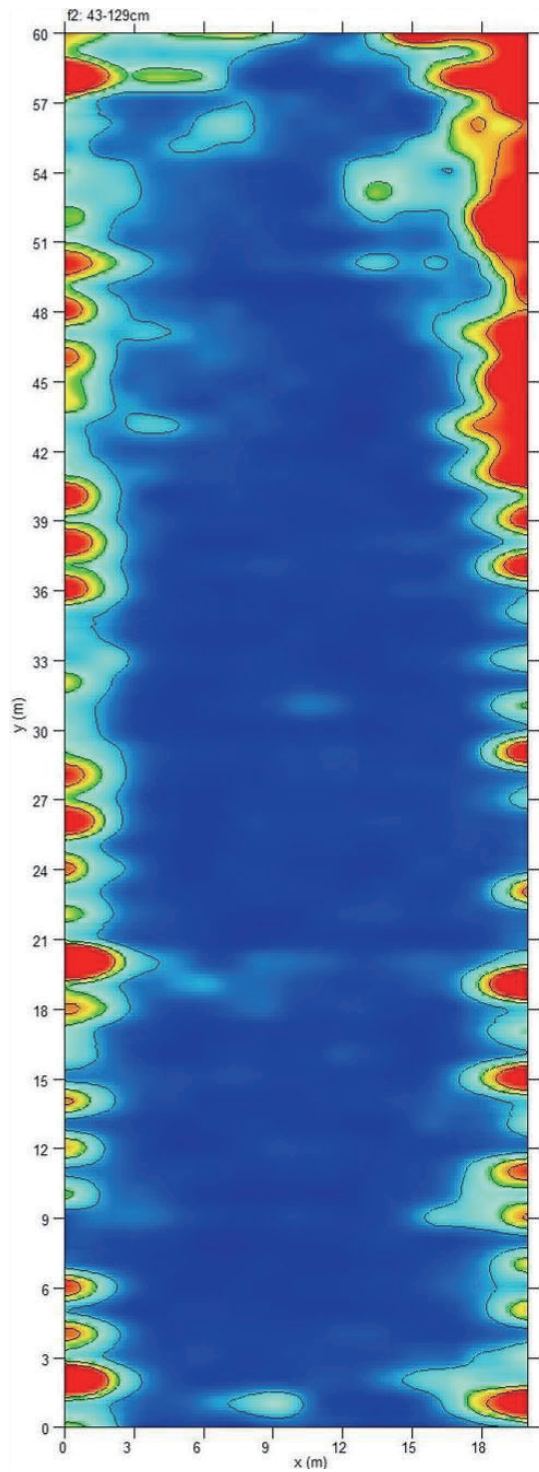


Fig.App.5.39 Time Slice of Section GPR2019-3a:43~129cm
Deep

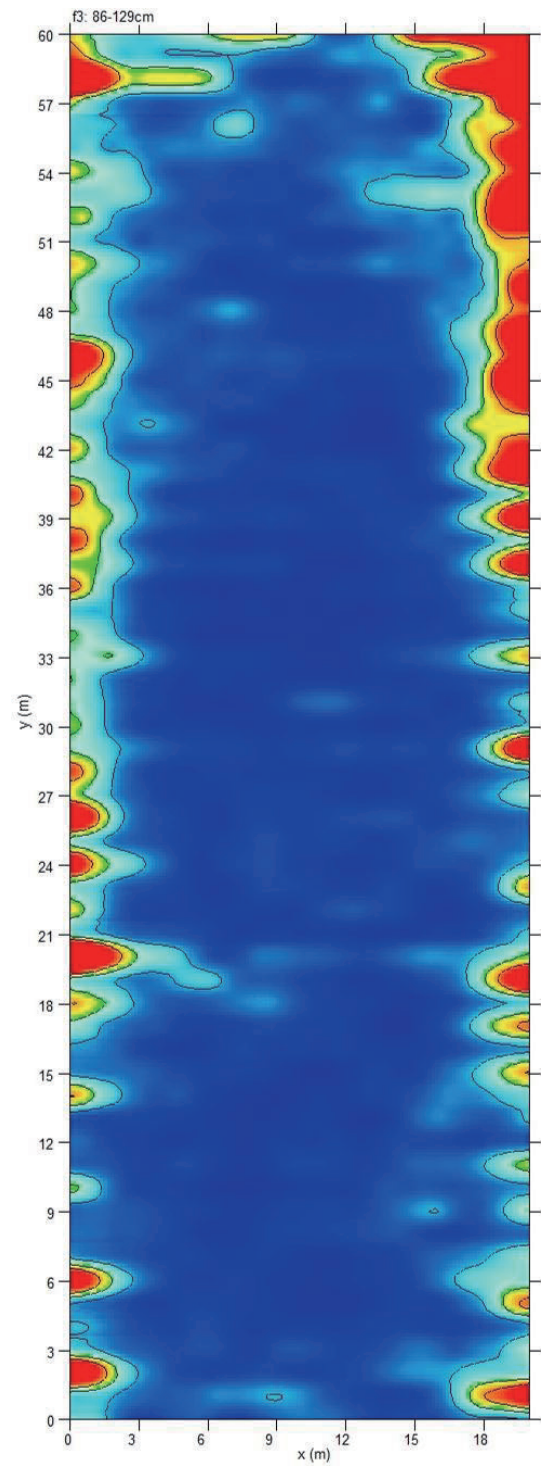


Fig.App.5.40 Time Slice of Section GPR2019-3a:0~129cm
Deep

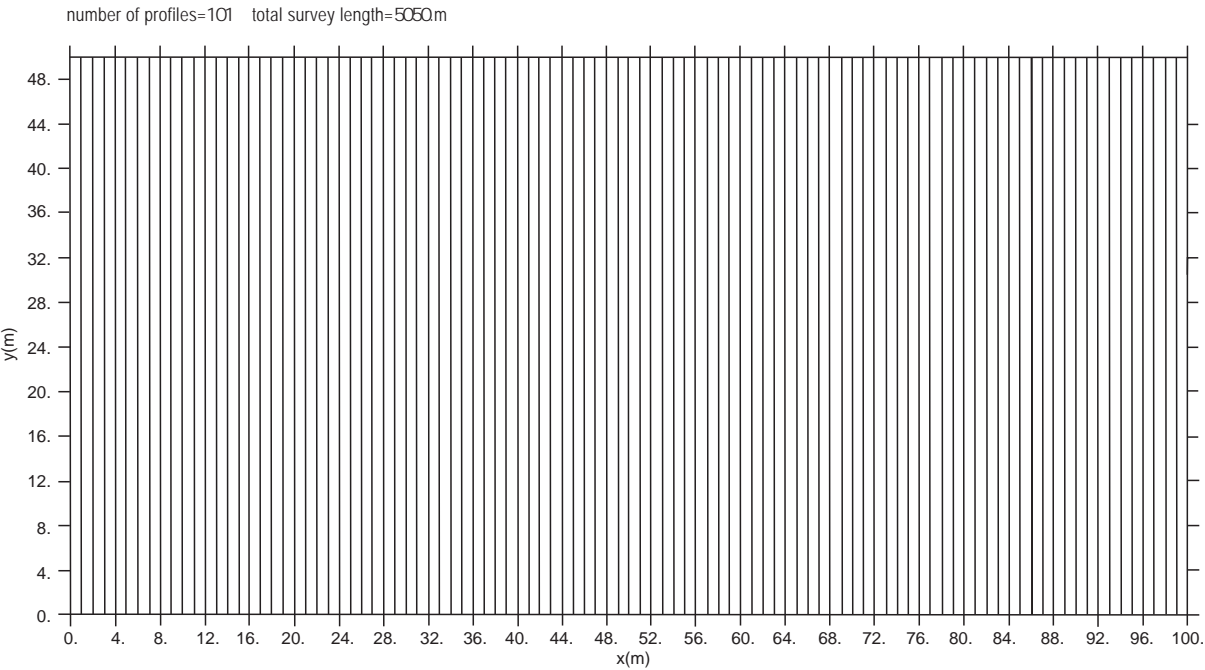


Fig.App.5.41 Measurement Lines of Section GPR2019-3b

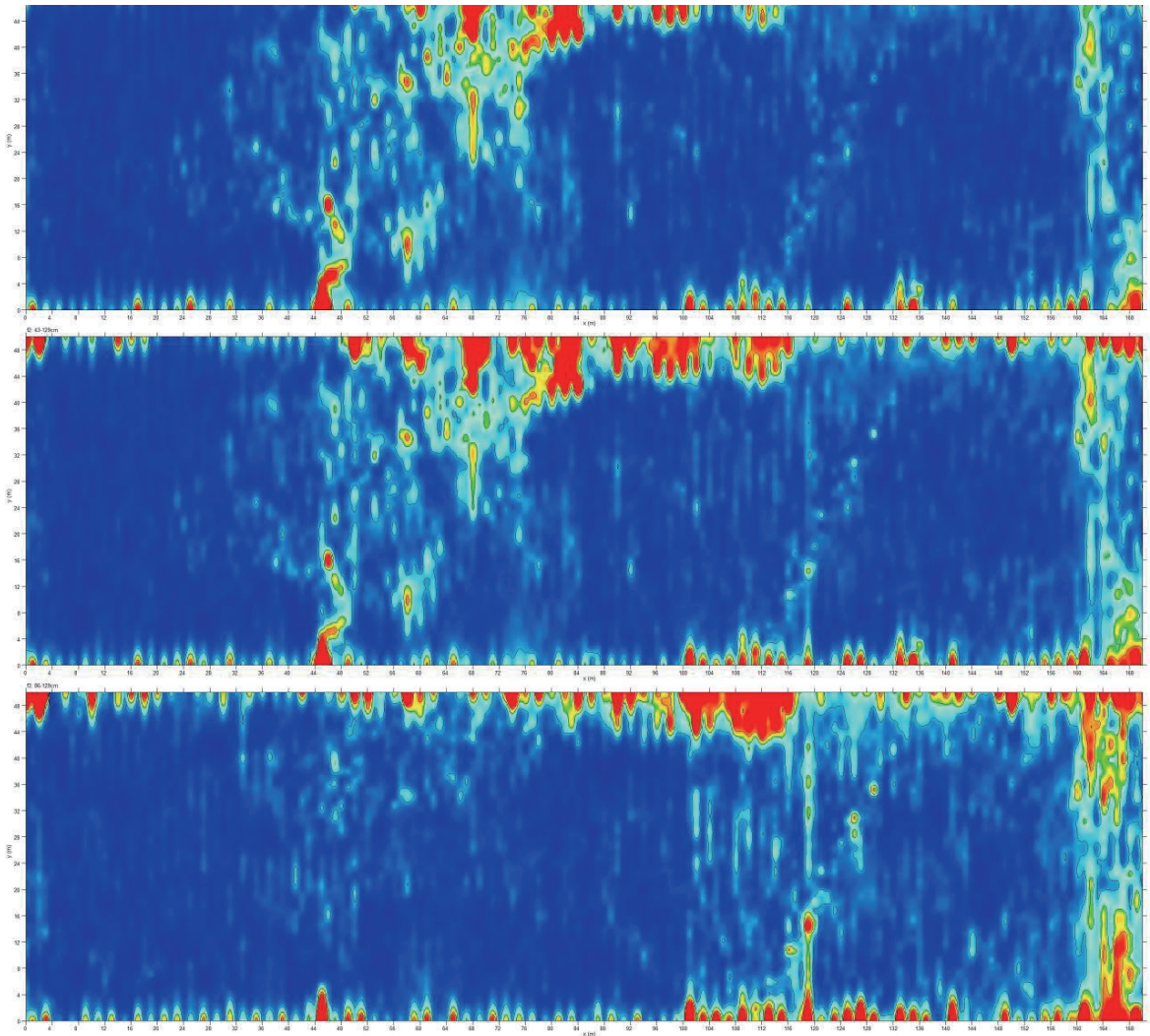


Fig.App.5.42 Time Slice of Section GPR2019-3b:0~129cm Deep

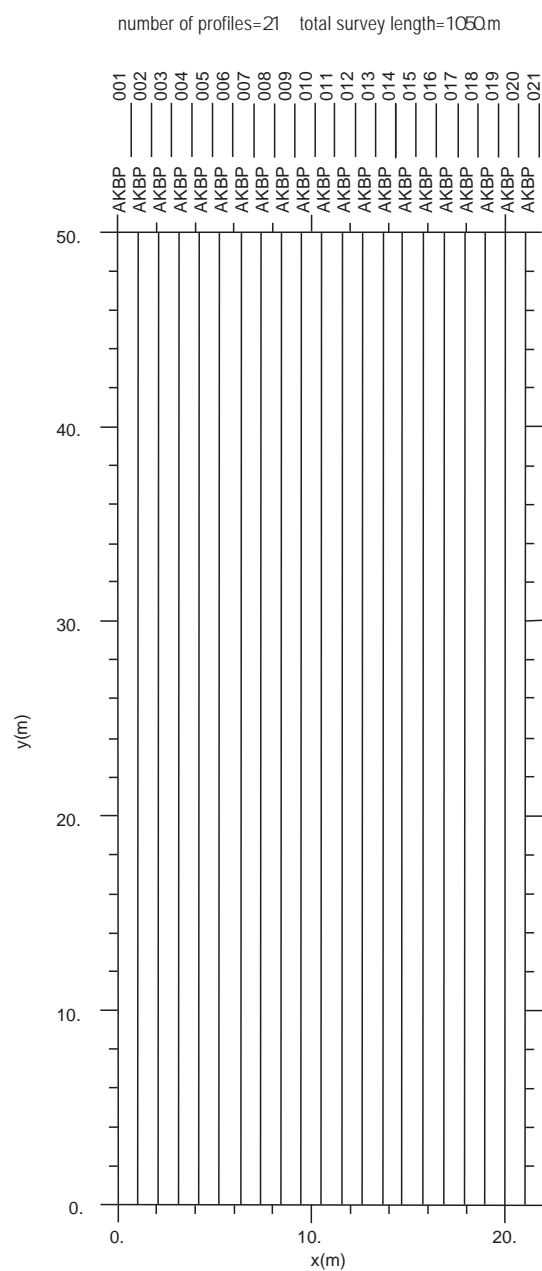


Fig.App.5.43 Measurement Lines of Section GPR2019-4

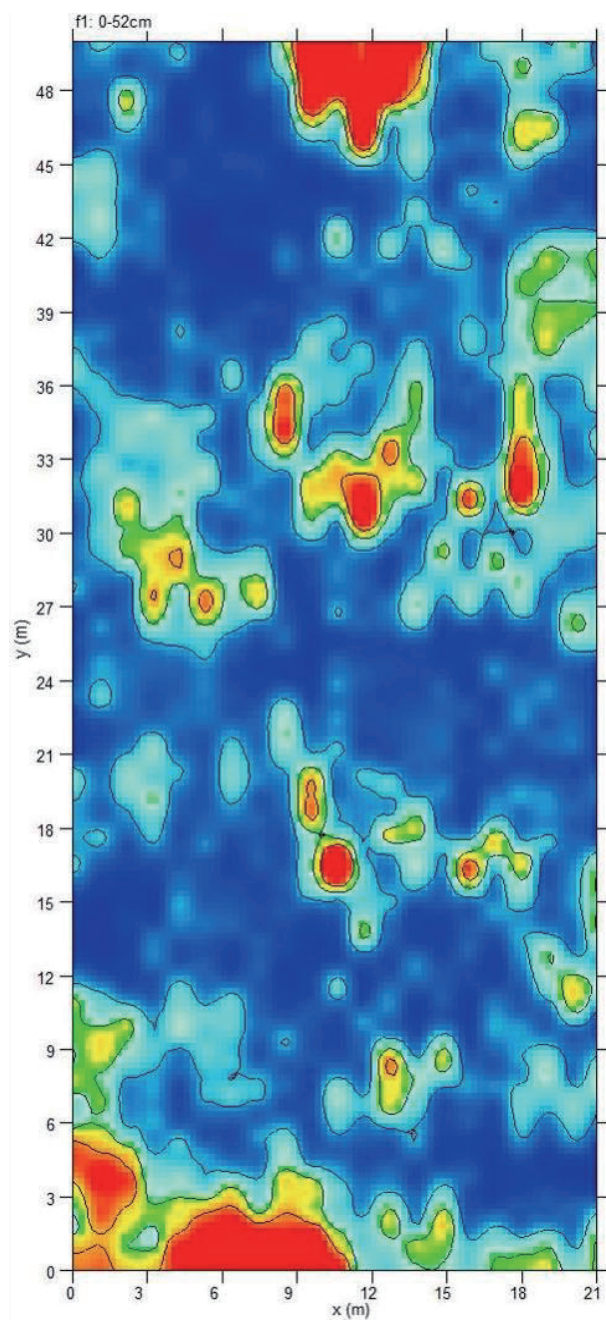


Fig.App.5.44 Time Slice of Section GPR2019-4:0-52cm Deep

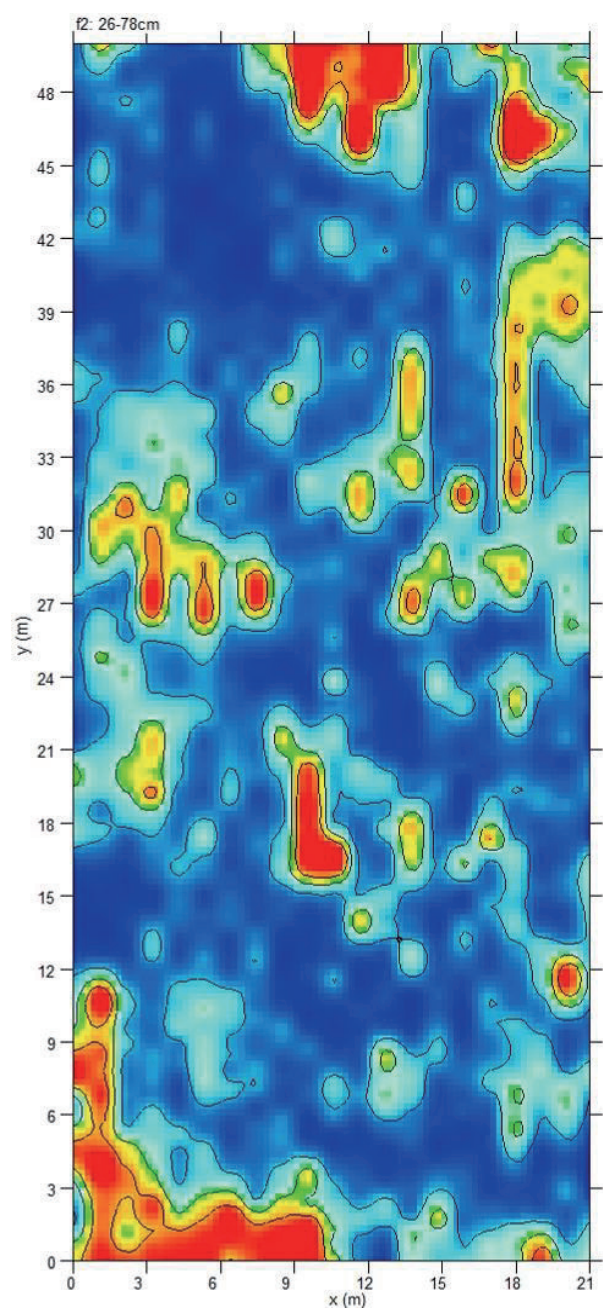


Fig.App.5.45 Time Slice of Section GPR2019-4:26~78cm Deep

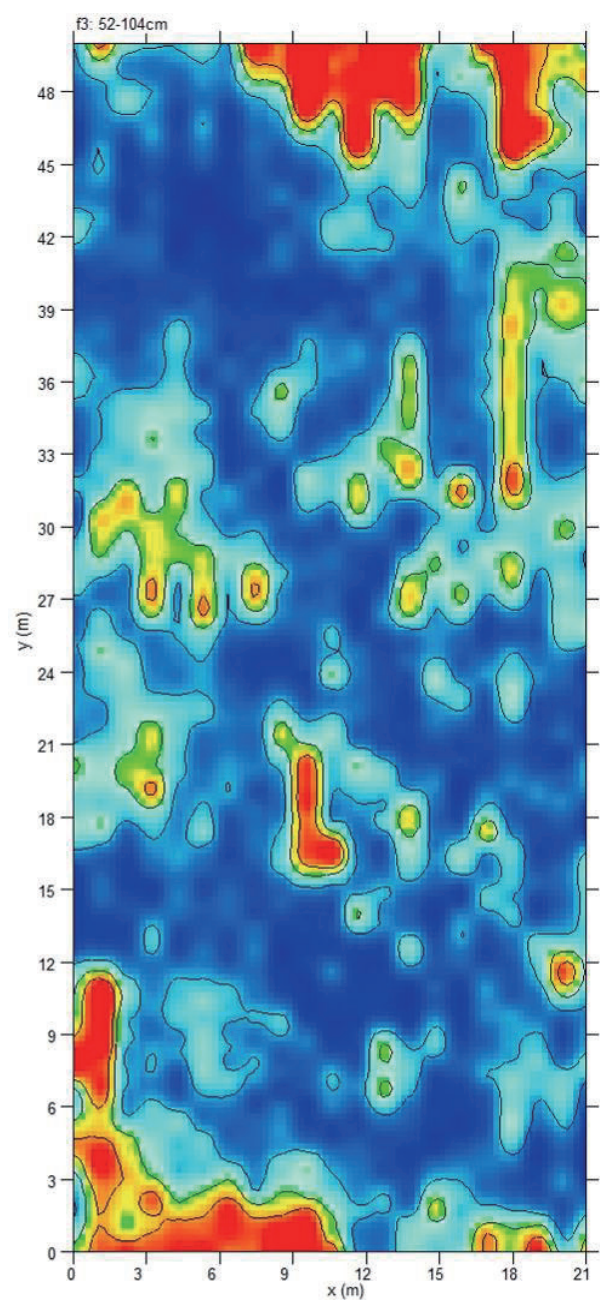


Fig.App.5.46 Time Slice of Section GPR2019-4:52~104cm Deep

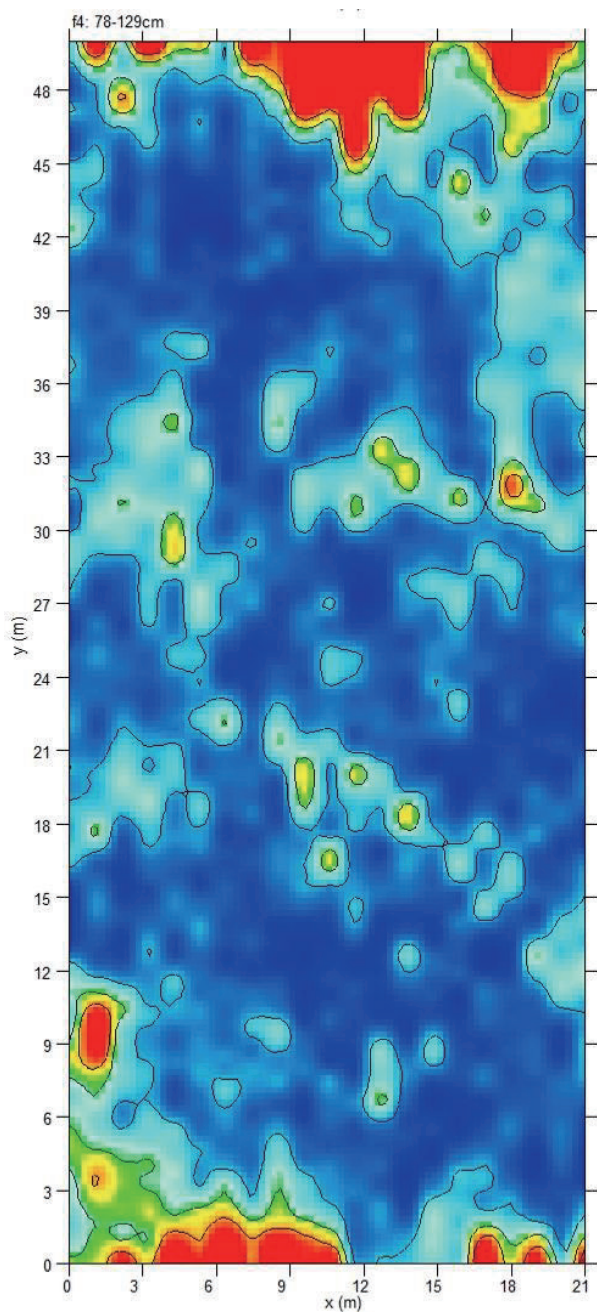


Fig.App.5.47 Time Slice of Section GPR2019-4:78~129cm
Deep

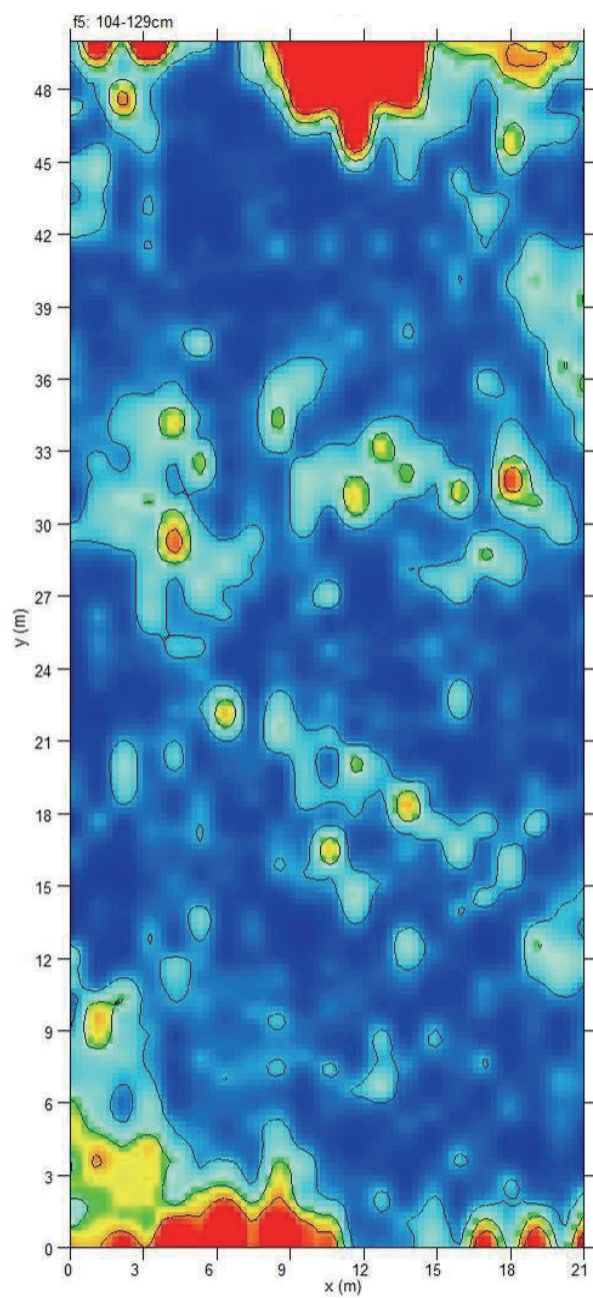


Fig.App.5.48 Time Slice of Section GPR2019-4:104~129cm
Deep

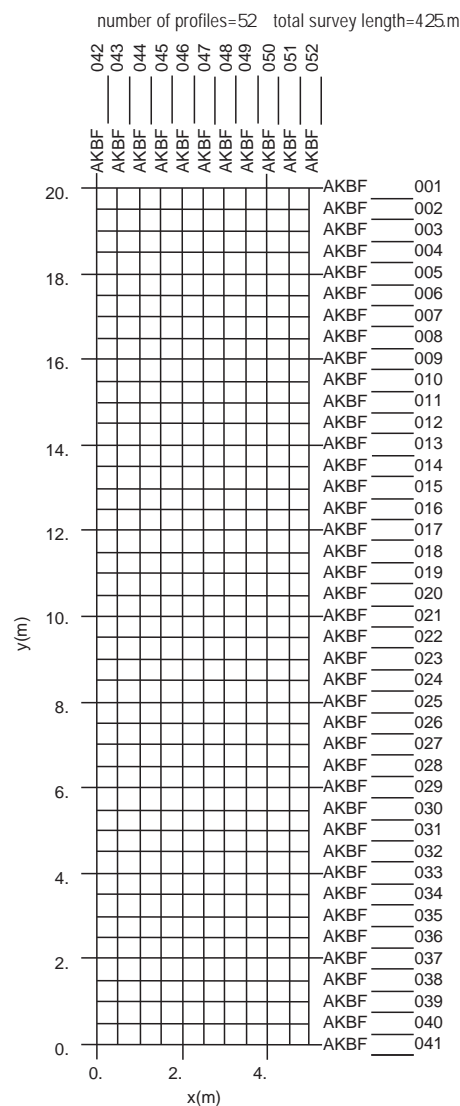


Fig.App.5.49 Measurement Lines of Section GPR2019-5

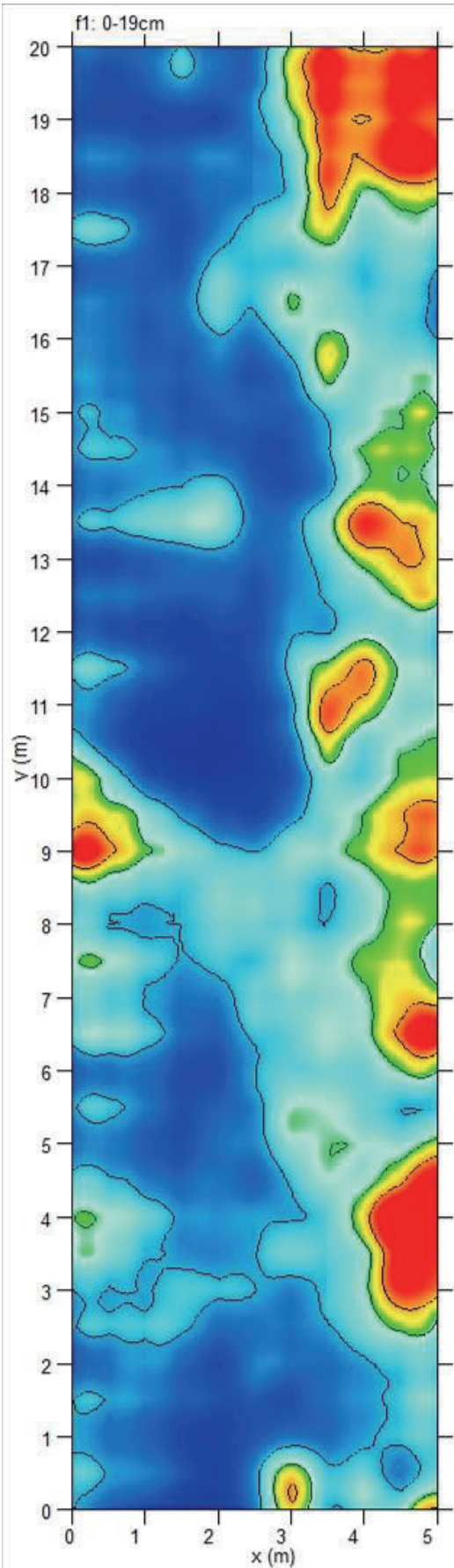


Fig.App.5.50 Time Slice of Section GPR2019-5:0~19cm Deep

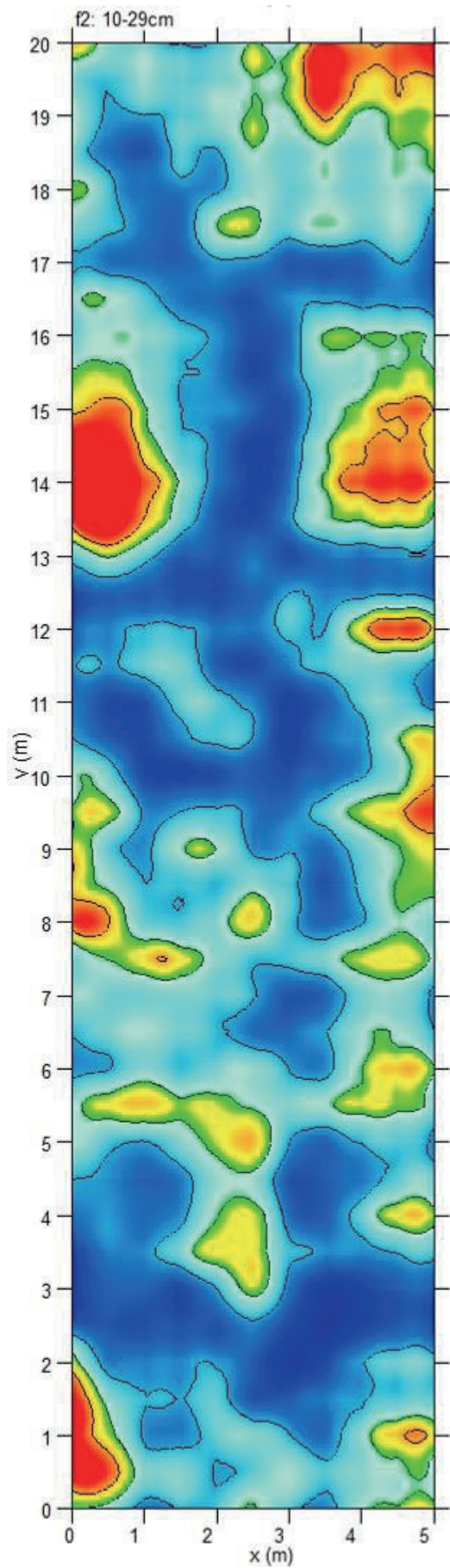


Fig.App.5.51 Time Slice of Section GPR2019-5:10~29cm Deep

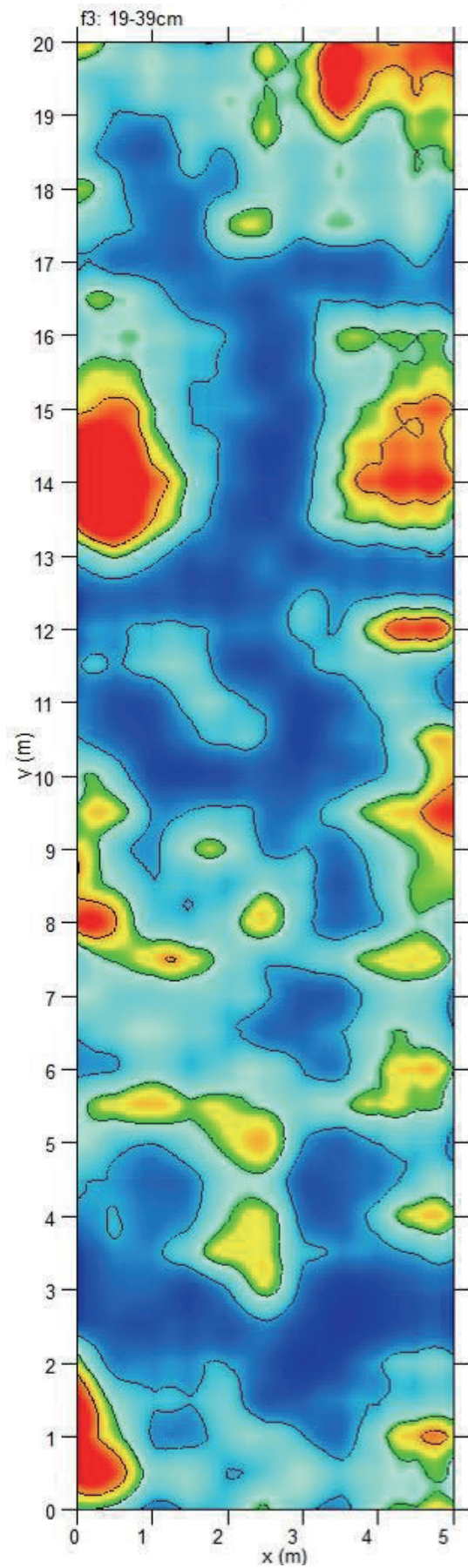


Fig.App.5.52 Time Slice of Section GPR2019-5:19~39cm Deep

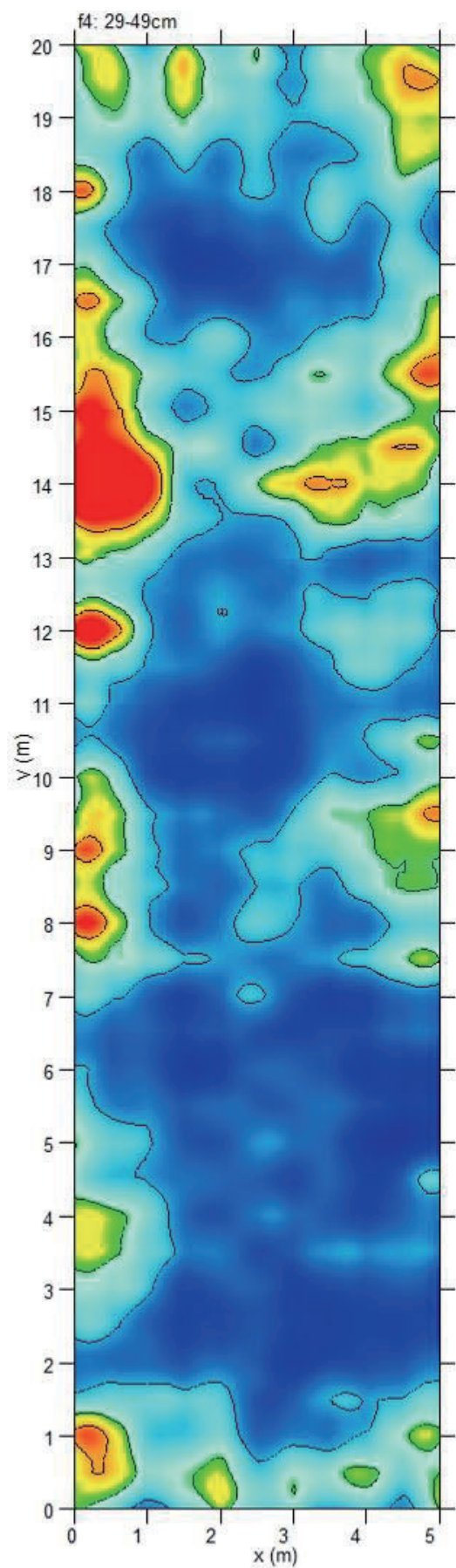


Fig.App.5.53 Time Slice of Section GPR2019-5:29~49cm Deep

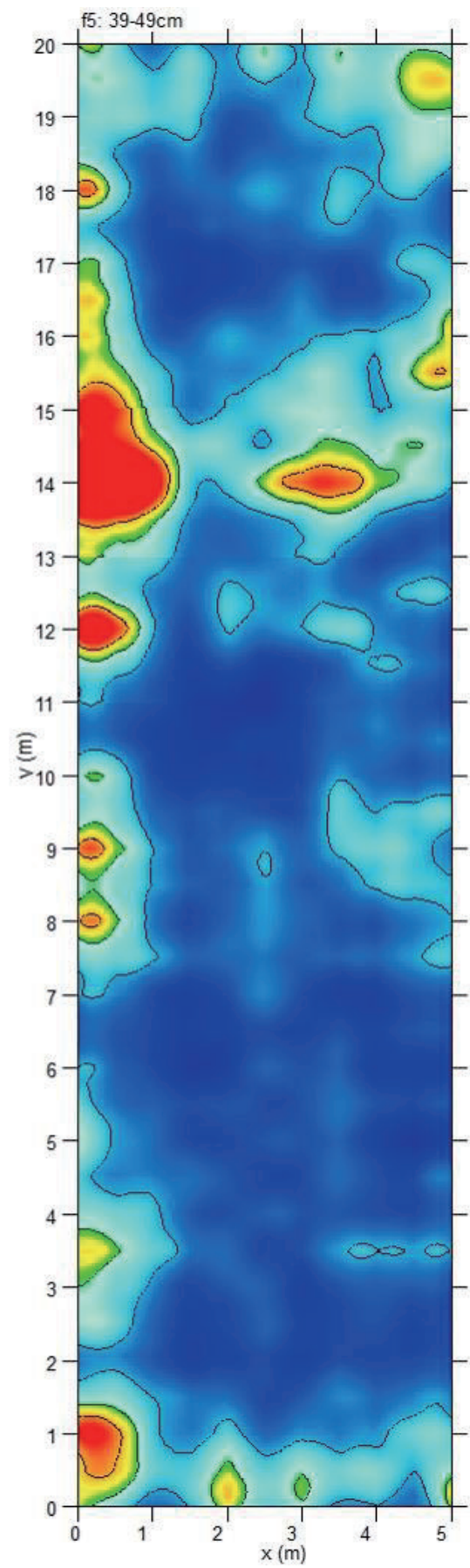


Fig.App.5.54 Time Slice of Section GPR2019-5:39~49cm Deep

