Report of the Okayama University of Science – Mongolian Institute of Paleontology and Geology Joint Expedition in 2017

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Accepted on November 30, 2017

Abstract. We briefly report the results of the Okayama University of Science (OUS) and Institute of Paleontology and Geology, Mongolian Academy of Sciences (IPG) Joint Expedition conducted in the Gobi Desert of Mongolia from July 29th to August 28 of 2017. We conducted geological surveys and fossil prospection in East Gobi Aimag and South Gobi Aimag, southern Mongolia. In this expedition, large sauropod trackways, a juvenile hadrosaur skeleton and a partial sauropod skeleton were discovered from Khavirgiin Zoo, Baynshire and Shar Tsav, respectively. Also, many isolated fossil bones (including 19 plaster jackets) footprints and rock samples were collected in all area where we surveyed for paleontological and geological researches.

Abbreviations: OUS, Okayama University of Science; **IPG,** Institute of Paleontology and Geology, Mongolian Academy of Sciences; **OUS-IPG JE,** Okayama University of Science and Mongolian Institute of Paleontology and Geology Joint Expedition (It is also abbreviated as **IPG-OUS JE**)

1. Members

The members of the joint expedition party from Japanese side were as follows.

Japanese side – total nineteen people:

1) Shinobu ISHIGAKI (Professor, OUS, Leader of the Japanese side)
2) Shin TOYODA (Professor, OUS)
3) Yosuke NOUMI (Professor, OUS)
4) Akio TAKAHASHI (Associate Professor, OUS)
5) Kazumasa AOKI (Lecturer, OUS)
6) Mototaka SANEYOSHI (Lecturer, OUS)
7) Shoji HAYASHI (Lecturer, OUS)
8) Hitomi ASAI (Graduate student, OUS)
9) Sayaka TSUTANAGA (Graduate student, OUS)
10) Daichi KATO (Undergraduate student, OUS)
11) Tomoya TERADA (Undergraduate student, OUS)
12) Yusuke NITTA (Undergraduate student, OUS)
13) Shohei KODAIRA (Undergraduate student, OUS)
14) Toshiki MIYAZAKI (Undergraduate student, OUS)
15) Yudai YAMAMOTO (Undergraduate student, OUS)
16) Kotaro YOSHIKOSHI (Undergraduate student, OUS)
17) Ryoichi KAWABATA (Undergraduate student, OUS)
18) Hidenao MURAKI (Undergraduate student, OUS)
19) Ayumu KAWABATA (Undergraduate student, OUS)

The members of the joint expedition party from Mongolian side were as follows.

Mongolian side – total fourteen people:

1) TSOGTBAATAR Khishigjav (Director of IPG, Leader of the Mongolian side)
2) CHINZORIG Tsogtbaatar (Researcher, IPG)
3) MAINBAYAR Buuvei (Researcher / Car (Land Cruiser) driver, IPG)
4) ZORIG Enkhtaivan (Researcher, IPG)
5) BUYANTEGSH Batsaikhan (Researcher, IPG)
6) PUREVSUREN Byambaa (Researcher, IPG)
7) ENEREL Gantulga (Researcher, IPG)
8) ULZIITSEREN Sanjaadash (Collection Manager, IPG)
9) BAYARDORJ Chagnaa (preparator / Car (Pajero) driver, IPG)

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[3] Faculty of Science, Okayama University of Science, 1-1 Ridai-cho, Kita-ku, Okayama, 700-0005, Japan

10) OCHIRJANTSAN Enkhbat (Preparator / Car (Rental) driver, IPG)
11) AMARZAYA Sodnomtsog (Cook)
12) GANTSETESEG Jamgan (Cook)
13) MUNKHNASAN Mungun (Track (Kamaz) driver)
14) JARGALSAIKHAN Damdinsuren (Driver)

2. Schedule

The expedition was performed from July 29th to August 28, 2017 (totally 31days).

This is the third expedition of OUS-IPG JE (Ishigaki *et al*. 2016; Saneyoshi *et al*. 2015).

Detailed schedule during this expedition is followings:

July 29 morning: Left Ulaanbaatar for Khongil Tsav.

July 30: Field work in Khongil Tsav (All team)

July 31: Field work in Khongil Tsav (All team)

August 1: Field work in Khongil Tsav (Geology team); Tsagaan Teg (Paleontology Team)

August 2: Field work in Khongil Tsav (All team)

August 3: Field work in Khongil Tsav (Geology team); Burkhant (Paleontology Team)

August 4: Field work in Khongil Tsav (Geology team); Bayn Shire and Burkhant (Paleontology Team)

August 5: Field work in Khongil Tsav and picking up plaster jacket specimens in Burkhant (All team)

August 6: Field work in Khongil Tsav (All team); Bayn Shire and Burkhant (Paleontology Team)

August 7: Rainy day. Picking up plaster jackets of vertebrates in Khongil Tsav (All team).

August 8: Rainy day. Stay at camp site in Khongil Tsav

August 9: Left from Khongil Tsav for Shar Tsav. Some of geology and paleontology members left Shar Tsav for Ulaanbaatar.

August 10: Making a base camp site in Shar Tsav (All team).

August 11: Field work in Shar Tsav (All team). New expedition members of paleontology, ichnology and press teams arrived in Shar Tsav.

August 12: Field work in Shar Tsav (Geology Team). Excavation of newly discovered sauropod skeleton (Paleontology Team). Khavirgiin Zoo (Ichnology team)

August 13: Field work and excavation of a sauropod in Shar Tsav (Geology and paleontology team, respectively). Ichnological survey in Khavirgiin Zoo (Ichnology team)

August 14: Field work and excavation of a sauropod in Shar Tsav (Geology and paleontology team, respectively). Ichnological survey in Khavirgiin Zoo (Ichnology team). The 2nd and 3rd large footprints were discovered. Excavation of a sauropod in Shar Tsav (Paleontology team).

August 15: Field work in Shar Tsav and Khavirgiin Zoo (Both in geology and ichnology team). The 4th large footprint was discovered. Excavation of a sauropod in Shar Tsav (Paleontology team).

August 16: Field work in Amtgai, Bayshin Tsav and Khoorai Tsav to search paleovertebrate materials (All team).

August 17: Field work in Khavirgiin Zoo and Bayshin Tsav (Paleontology team). Ichnology survey in Khavirgiin Zoo (Ichnology team)

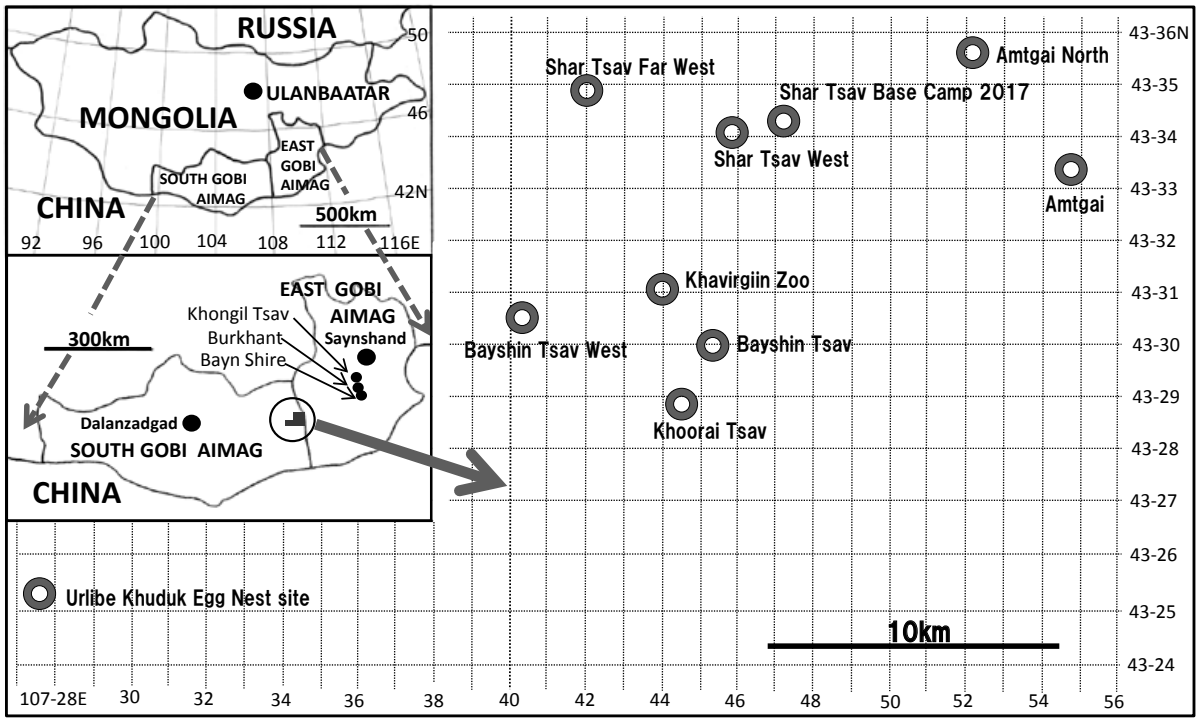

Figure 1. Locality map in this expedition.

August 18: Field work in the sauropod site of Shar Tsav (Geology team). Ichnological survey in Khavirgiin Zoo and Shar Tsav (Ichnology team). Excavation of a sauropod in Shar Tsav (Paleontology team).

August 19: Ichnological survey in Shar Tsav (Ichnology team). Picking up plaster jacket specimens in Amtgai and excavation of a sauropod in Shar Tsav (Paleontology team)

August 20: Geology team and press team left Shar Tsav for Ulaanbaatar. Ichnological survey and searching vertebrate fossils in Shar Tsav West (All team).

August 21: Ichnological survey in Khavirgiin Zoo (Ichnology team). Searching vertebrate fossils in Urlibe Khudag (Paleontology team).

August 22: Ichnological survey and protection of footprints in Shar Tsav West, Khavirgiin Zoo and Shar Tsav (All team). Protection of a sauropod excavation site (Paleontology team)

August 23: Ichnological survey in Shar Tsav (Ichnology team). Searching vertebrate fossils in Bayshin Tsav (Paleontology team).

August 24: Ichnological survey in Shar Tsav and Shar Tsav West (Ichnology team). Paleontology team left Shar Tsav for Ulaanbaatar.

August 24: Ichnological survey in Shar Tsav and Shar Tsav West (Ichnology team).

August 25: Ichnological survey in Shar Tsav, Bayshin Tsav and Khoorai Tsav (Ichnology team).

August 26: Ichnological survey in Shar Tsav, Bayshin Tsav and Shar Tsav West (Ichnology team).

August 27: Ichnological survey in Shar Tsav (Ichnology team). Left Shar Tsav for Tsagaan Suvraga. Geological survey of Tsagaan Suvraga (Ichnology team).

August 28: Left Tsagaan Suvraga for Ulaanbaatar.

3. Locality

The localities visited and surveyed by the joint expedition party are listed below. We follow the abbreviation of Watabe and Suzuki (2000) and Watabe *et al*. (2010) for each locality and geological ages except in those cases where we refer original literature. Locality map in Bayshin Tsav area are shown in Figure 1.

(1) Khongil Tsav (Baynshirenian, Late Cretaceous)
(2) Burkhant (Baynshirenian, Late Cretaceous)
(3) Baynshire (Baynshirenian, Late Cretaceous)
(4) Shar Tsav (Nemegtian?, Late Cretaceous)
(5) Shar Tsav West and Far West (Nemegtian?, Late Cretaceous)
(6) Amtgai (Baynshirenian, Late Cretaceous)
(7) Amtgai North (Baynshirenian, Late Cretaceous)
(8) Amtgai South (Baynshirenian, Late Cretaceous)
(9) Bayshin Tsav (Baynshirenian, Late Cretaceous)
(10) Bayshin Tsav West (Baynshirenian, Late Cretaceous)
(11) Khavirgiin Zoo (Baynshirenian?, Late Cretaceous)
(12) Urlibe Khuduk (Baynshirenian, Late Cretaceous)

4. Results

19 plaster jackets and isolated materials of vertebrates and rock samples for physical and chemical analysis were collected during this expedition. These samples are listed in table 1, 2 and 3. The GPS data in the tables and following text are WGS 84. The geological team performed fieldwork and sampling in the Bayshin Tsav area and the Eastern Gobi region. Paleoichnological mapping using 3D Laser Scanner in Khavirgiin Zoo and Shar Tsav area were conducted.

4-1. Khongil Tsav (Baynshirenian)

The Khongil Tsav is located about 15 km WSW of Dzun Bayan Somon (East Gobi (Dornogobi) Aimag). The following vertebrate fossils were discovered in the expedition of this year.

(1) Isolated bone of sauropod (tibia); PJ-2 (see attached file on "plaster jacket list")
(2) Isolated bone of theropod (fibula); PJ-3
(3) Partial articulated skeleton of theropod (cervical vertebra); PJ-4

These specimens are collected by three plaster jackets. Disarticulated fragmental bones of dinosaur and reptiles are also collected as surface collection.

The lithology of this locality consists of sand dominated alternation of sandstone and mudstone. Stratigraphy in the locality can be correlated with two sedimentary sequences. 17 cross sections have been described during the geological research. Paleoenvironment of this locality is fluvial (Watabe et al., 2010), and had been changed channel sized from 20 m to 100 m with accumulation. Geological samples of sand and caliche which will be analyzed mineral assemblages, mineralogical characteristics of quartz and geochronology are also collected.

4-2. Burkhant (Baynshirenian, Late Cretaceous)

The Burkhant is located about 20 km southwest of Dzun Bayan (East Gobi (Dornogobi) Aimag).

The following vertebrate fossils were discovered in the expedition of this year.

(1) Partial articulated skeleton of a sauropod (cervical vertebra); PJ-1 (1/2 and 2/2) is collected by 2 Plaster Jackets.

Disarticulated fragmental bones of dinosaur and other reptiles are also collected as surface collecting. The lithology of the locality consists of alternation of sandstone and mudstone. Sandstones are composed of mainly coarse to fine sand with rare granules of clasts, and exhibit trough cross-stratification. Mudstone overlies this facies. On the surface of the locality, sandstones show lateral accretion. Transitional pattern from sandstone to mudstone indicates upward-fining. The presence of sedimentary structure and accumulation pattern are interpreted that formed by meandering river systems (Watabe et al., 2010).

Table 1. List of fragmentary bones collected by OUS-IPG JE in 2017

Nr	Taxa	Latitude & Longtitude	Altitude (m)	Formation	Area	Date	Collector	Elements	Remarks
1	Hadrosaur	N43.30.32.22, E107.40.26.50	NA	Baynshire F.	Bayshin Tsav west	2017/8/15	Tsutanaga	Caudal verts and fragments	
2	Theropod	N43.33.26.05, E107.54.53.97	861	Baynshire F.	Amtgai	2017/8/16	Saneyoshi	Disit and fragments	
3	Theropod	N43.33.32.27, E107.54.46.52	857	Baynshire F.	Amtgai	2017/8/16	Tsogt	Caudal vert	
4	Hadrosaur	N43.33.32.97, E107.54.48.07	860	Baynshire F.	Amtgai	2017/8/16	Hayashi	Dorsal vert	
5	Hadrosaur	N43.33.28.11, E107.54.43.83	861	Baynshire F.	Amtgai	2017/8/16	Hayashi	Phalange	
6	Ornithomimosauria indet	NA	NA	Baynshire F.	Amtgai south	2017/8/16	OJN	Pedal pharanx and caudal vert	
7	Theropod	N43.28.53.27, E107.44.52.34	897	Baynshire F.	KhT	2017/8/16	Kawabata	Pedal pharanx	
8	Dinosauria indet.	N43.32.43.35, E107.55.06.25	870	Baynshire F.	Amtgai south	2017/8/16	Yamamoto	Long bone fragment	
9	Theropod	N43.30.03.28, E107.45.57.62	898	Baynshire F.	BST2	2017/8/16	Yamamoto	Phalange	
10	Dinosauria indet.	N43.32.46.20, E107.55.05.61	868	Baynshire F.	Amtgai south	2017/8/16	Nishimura	Long fragment	
11	Hadrosaur	N43.33.32.97, E107.54.48.07	860	Baynshire F.	Amtgai	2017/8/16	Hayashi	Caudal vert	
12	Dinosauria indet.	N43.30.02.1, E107.45.48.3	901.5	Baynshire F.	BST1	2017/8/16	Kodaira	Long bone fragment	
13	Theropod	N43.30.01.20, E107.45.41.85	903	Baynshire F.	BST2	2017/8/16	Yamamoto	Teeth	
14	Trionychidae	N43.32.43.27, E107.55.07.07	858	Baynshire F.	Amtgai south	2017/8/16	Yoshikoshi	Carapace	
15	Theropod	N43.28.48.95, E107.44.51.86	895	Baynshire F.	KhT	2017/8/16	Kawabata	Caudal vert and fragments	
16	Dinosauria indet.	N43.30.01.7, E107.43.40.0	899	Baynshire F.	BST2	2017/8/16	Miyazaki	Long bone fragment	
17	Theropod	N43.30.00.3, E107.45.42.71	2947Ft	Baynshire F.	BST2	2017/8/16	Nishimura	Caudal vert	
18	Dinosauria indet.	N43.28.44.35, E107.44.47.27	892	Baynshire F.	KhT	2017/8/16	Yoshikoshi	Bone fragment	
19	Hadrosaur	N43.30.06.16, E107.45.54.92	904	Baynshire F.	BST2	2017/8/16	Hayashi	Cadal vert, Ungual of pes	
20	Hadrosaur	N43.33.28.71, E107.54.44.07	860	Baynshire F.	Amtgai	2017/8/16	Hayashi	Vert	
21	Dinosauria indet.	N43.33.29.71, E107.54.44.54	863	Baynshire F.	Amtagi	2017/8/16	Kawabata	Bone fragments	
22	Trionychidae	N43.33.21.4, E107.54.32.6	854	Baynshire F.	Amtagi	2017/8/16	Puujee	Carapace	
23	Trionychidae	N43.33.33.52, E107.54.52.53	856	Baynshire F.	Amtgai	2017/8/16	Tsutanaga	Carapace	
24	Hadrosaur	N43.33.32.97, E107.54.48.07	860	Baynshire F.	Amtgai	2017/8/17	Hayashi	Caudal vert	
25	Hadrosaur	N43.30.01.6, E107.45.39.6	890	Baynshire F.	KhT	2017/8/16	Hayashi	Caudal vert and long bone fragments	
26	Theropod	N43.33.34.1, E107.54.48.8	859	Baynshire F.	Amt	2017/8/16	MB	Digits	
27	Trionychidae	N43.33.34.1, E107.54.48.8	859	Baynshire F.	Amtgai	2017/8/16	Puujee	Carapace	
28	Hadrosaur	N43.33.31.93, E107.54.48.69	NA	Baynshire F.	Amtgai	2017/8/16	Toyoda	Verts	
29	Hadrosaur	N43.33.30.5, E107.54.53.1	859	Baynshire F.	Amtgai	2017/8/16	Miyazaki	Phalange	
30	Crocodilia indet	N43.33.31.3, E107.54.48.2	NA	Baynshire F.	Amtgai	2017/8/16	Puujee	Skull fragments	
31	Crocodilia indet	N43.29.56.0, E107.46.03.8	899	Baynshire F.	Amtgai	2017/8/16	Puujee	Osteoderms	
32	Crocodilia indet	N43.33.27.15, E107.54.56.09	862	Baynshire F.	Amtgai	2017/8/16	Saneyoshi	Teeth, dentary and angular	
33	Trionychidae	N43.32.50.61, E107.55.06.23	869	Baynshire F.	Amtgai-south	2017/8/16	Yoshikoshi	Carapace	
34	Dinosauria indet.	N43.30.03.62, E107.45.55.91	898	Baynshire F.	BST1	2017/8/16	Yoshikoshi	Fragment	
35	Theropod	N43.30.01.6, E107.45.39.6	890	Baynshire F.	KhT	2017/8/16	Hayashi	Femur and bone fragments	
36	Hadrosaur?	N43.28.24.3, E107.44.55.4	888	Baynshire F.	KhT	2017/8/16	BD	Ungual	
37	Ornithomimosauria indet	N43.33.33.44, E107.54.41.64	858	Baynshire F.	Amtgai	2017/8/16	Tsogt	Teeth	
38	Hadrosaur	N43.33.32.97, E107.54.40.07	860	Baynshire F.	Amtgai	2017/8/16	Hayashi	Verts, long bone and phalange	
39	Dinosauria indet.	N43.32.47.1, E107.55.05.6	870	Baynshire F.	Amtgai-south	2017/8/16	Nishimura	Bone fragments	
40	Trionychidae	N43.33.28.58, E107.54.38.25	863	Baynshire F.	Amtgai-south	2017/8/16	Hayashi	Carapace	
41	Dinosauria indet.	N43.33.30.5, E107.54.50.4	860	Baynshire F.	Amtgai	2017/8/16	Miyazaki	Dorsal vert	
42	Trionychidae	N45.33.27.1, E107.54.46.5	867	Baynshire F.	Amtgai-south	2017/8/16	Miyazaki	Carapace	
43	Dinosauria indet.	N43.30.01.8, E107.45.39.8	2987FT	Baynshire F.	BST2	2017/8/16	Nishimura	Femur distal end	
44	Theropod	N43.33.27.0, E107.54.49.4	860.4	Baynshire F.	Amtgai	2017/8/16	Kodaira	Pes	
45	Dinosauria indet.	N43.29.58.77, E107.45.51.74	905	Baynshire F.	BST-1	2017/8/16	Yamamoto	Femur distal end	
46	Ornithomimosauria indet	N43.33.26.63, E107.54.48.98	863	Baynshire F.	Amt	2017/8/16	Kawabata	Ungual	

Nr	Taxa	Latitude & Longtitude	Altitude (m)	Formation	Area	Date	Collector	Elements	Remarks
47	Hadrosaur	N43.30.02.6, E107.45.39.6	890	Baynshire F.	KhT	2017/8/16	Hayashi	Proximal end of tibia and caudal verts	
48	Hadrosaur	N43.30.01.6, E107.45.39.6	890	Baynshire F.	KhT	2017/8/16	Hayashi	Dorsal and caudal verts, phlanges	
49	Trionychidae	N43.33.27.86, E107.54.47.70	864	Baynshire F.	Amtgai	2017/8/16	Asai	Carapace and fibula	
50	Dromaeosaurid and ornithomimid indet	N43.29.57.7, E107.46.07.9	900	Baynshire F.	BST1	2017/8/16	Tsogt	Ungual, pedal, phalanges	
51	Dinosauria indet.	N43.33.28.9, E107.54.48.1	862.3	Baynshire F.	Amt	2017/8/16	Kodaira	Femur distal end	
52	Theropod	N43.33.32.3, E107.54.46.8	852.3	Baynshire F.	Amt	2017/8/16	Kodaira	Teeth	
53	Hadrosauria and Ornithomimosauria indet	N43.33.27.53, E107.54.46.57	866	Baynshire F.	Amt	2017/8/16	Asai	Teeth and Ungual	
54	Dinosauria indet.	N43.33.27.91, E107.54.48.50	864	Baynshire F.	Amt	2017/8/16	Kawabata	Fragment	
55	Hadrosaur and Turtle	N43.33.29.31, E107.54.53.89	892	Baynshire F.	Amt	2017/8/16	Tsutanaga	Caudal vert and carapace	
56	Theropod and Turtle	N43.33.29.8, E107.54.53.1	848	Baynshire F.	Amt	2017/8/16	Chinzorig	Phalange and carapace	
57	Theropod	N43.29.59.03, E107.45.42.43	905	Baynshire F.	BST	2017/8/16	Terada	Teeth, digit and caudal vert	
58	Theropod and Crocodilia indet	N43.33.26.61, E107.54.55.69	863	Baynshire F.	Amt	2017/8/16	Saneyoshi	Osteoderm and teeth	
59	Dinosauria indet.	N43.33.27.53, E107.54.46.57	866	Baynshire F.	Amt	2017/8/16	Asai	Bone fragment	
60	Dinosauria indet.	N43.33.32.17, E107.54.46.11	865	Baynshire F.	Amt	2017/8/16	Tsogt	Skull fragment	
61	Ornithomimiosauria indet	N43.29.57.6, E107.45.07.6	899	Baynshire F.	BST1	2017/8/16	Tsogt	Pedal phalanges	
62	Theropod	N43.33.32.97, E107.54.48.07	860	Baynshire F.	Amt	2017/8/16	Hayashi	Ungual of pes	
63	Theropod	N43.33.32.27, E107.54.46.52	857	Baynshire F.	Amt	2017/8/16	Tsogt	Teeth	
64	Hadrosaur	N43.29.56.7, E107.46.07.9	896	Baynshire F.	BST1	2017/8/16	Chinzorig	Cervical vert	
65	Hadrosaur	N43.30.01.7, E107.45.40.0	907	Baynshire F.	Amtgai	2017/8/16	Muraki	Tibia	
66	Ornithomimiosauria indet	N43.29.57.6, E107.46.10.4	892.8	Baynshire F.	BST5	2017/8/16	Ishigaki	Humerus prox end and caudal vert	
67	Hadrosaur	NA	Central Hill top	Baynshire F.	Amt	2017/8/16	Ishigaki	Dorsal vert	
68	Dinosauria indet.	N43.33.30.17, E107.54.46.85	NA	Baynshire F.	Amt	2017/8/16	Toyoda	fragments	
69	Dinosauria indet.	N43.33.27.13, E107.54.47.49	864	Baynshire F.	Amt	2017/8/16	Asai	Rib fragments	
70	Theropod	NA	NA	Baynshire F.	Amt	2017/8/16	Yamamoto	Ungual	
71	Dinosauria indet.	N43.34.26.9, E107.54.46.4	NA	Baynshire F.	Amt	2017/8/16	Mb	Teeth	
72	Dinosauria indet.	N43.30.32.4, E107.54.52.4	NA	Baynshire F.	Amt	2017/8/16	Ishigaki	Ulna or Radius?	
73	Dinosauria indet.	N43.30.01.6 E107.45.39.6	890	Baynshire F.	KhT	2017/8/16	Hayashi	Long bone	
74	Hadrosaur	N43.30.00.1 E107.45.42.7	2963FT	Baynshire F.	BST2	2017/8/16	Nishimura	Humerus	
75	Trionychidae	N43.29.58.9 E107.45.36.7	NA	Baynshire F.	BST1	2017/8/23	Miyazaki	Carapace	
76	Trionychidae	N43.29.37.11 E107.45.54.48	890	Baynshire F.	BST4	2017/8/23	Yoshikoshi	Carapace	
77	Trionychidae	N43.29.53.89 E107.45.37.81	898	Baynshire F.	BST2	2017/8/23	Yoshikoshi	Carapace	
78	Hadrosaur	N43.30.04.57 E107.45.57.94	898	Baynshire F.	BST4	2017/8/23	Hayashi	Humerus	
79	Hadrosaur	N43.29.59.12 E107.46.08.89	NA	Baynshire F.	KhT	2017/8/16	Miyazaki	Caudal vert and fragments	
80	Ornithomimiosauria indet	N43.28.52.68, E107.44.53.28	895	Baynshire F.	KhT	2017/8/16	Kodaira	Metatarsals	
81	Theropod indet	N43.28.52.68, E107.44.53.28	895	Baynshire F.	KhT	2017/8/16	Kodaira	Metacarpals	
82	Dinosauria indet.	N43.28.52.68, E107.44.53.28	895	Baynshire F.	KhT	2017/8/16	Hayashi	Cervical vert	
83	Dinosauria indet.	N43.29.59.56.5 E107.46.07.7	913	Baynshire F.	BST2	2017/8/16	Miyazaki	Caudal vert	
84	Dinosauria indet.	N43.29.57.87 E107.46.03.50	897	Baynshire F.	BST2	2017/8/16	Miyazaki	Long bone	
85	Dinosauria indet.	N43.29.57.50 E107.46.07.55	898	Baynshire F.	BST2	2017/8/16	Miyazaki	Rib fragments	
86	Hadrosaur	N43.29.59.07 E107.46.06.49	897	Baynshire F.	BST	2017/8/16	Yamamoto	Caudal vert	
87	Hadrosaur and theropod	N43.29.57.39 E107.46.07.73	900	Baynshire F.	BST2	2017/8/16	Yoshikoshi	Ungual and caudal vert	
88	Dinosauria indet	N43.29.56.94 E107.46.00.34	903	Baynshire F.	BST2	2017/8/23	Yamamoto	Rib fragments	
89	Trionychidae	N43.29.59.16 E107.45.43.20	905	Baynshire F.	BST2	2017/8/23	Tsutanaga	Carapace	
90	Theropod	N43.29.57.08 E107.46.9.7	896.3	Baynshire F.	BST2	2017/8/16	Kodaira	Phalange	
91	Hadrosaur	N43.29.58.91 E107.46.3.71	900	Baynshire F.	BST2	2017/8/16	Nishimura	Caudal vert	
92	Theropod			Baynshire F.	BST3	2017/8/16	Tsogt	Phalanges	Baby hadro site
93	Theropod and hadrosaur	N43.29.56.0 E107.46.3.6	901	Baynshire F.	BST2	2017/8/16	Tsogt	Jaw, digit and vert	
94	Hadrosaur			Baynshire F.	BST3	2017/8/16	Tsogt	Fragmentary cranial elements	Baby hadro site

Nr	Taxa	Latitude & Longtitude	Altitude (m)	Formation	Area	Date	Collector	Elements	Remarks
95	Trionychidae	N43.29.58.14 E107.46.08.76	897	Baynshire F.	BST2	2017/8/16	Nishimura	Carapace	
96	Petrified wood	N43.30.07.5 E107.43.55.7		Nemegt F.	Kharirgiin Buuts	2017/8/17	Ishigaki	Petrified wood	
97	Sauropod and Theropod	N43.34.06.91 E107.47.34.16	903	Nemegt F.	Shar Tsav	2017/8/18	MB	Bone fragment and tooth	Sauropod site bone fragments
98	Dinosauria indet.	N43.30.07.5 E107.43.55.7	NA	Baynshire F.	BST-west	2017/8/16	Kawabata	Bone fragments	
99	Dinosauria indet.	N43.29.53.96 E107.46.05.74	897	Baynshire F.	BST2	2017/8/23	Yamamoto	Bone fragments	
100	Theropod indet.	N43.33.272 E107.54.44.1	876	Baynshire F.	Amtgai	2017/8/19	Tsogt	Bone fragments	
101	Theropoda indet.	N43.28.52.80 E107.44.53.11	894	Baynshire F.	KhT	2017/8/17	Yamamoto	Metatarsal 3	
102	Dinosauria indet	N43.28.53.31 E107.44.51.97	895	Baynshire F.	KhT	2017/8/17	Yoshikoshi	Long bone	
103	Theropoda indet. and Trionychidae	N43.27.32.12 E107.24.18.60	993	Baynshire F.	URB	2017/8/21	Hayashi	Teeth, caudal vert and carapace	
104	Egg shell	N43.25.24.21 E107.27.34.75	963	Baynshire F.	URB-S	2017/8/21	MB	Egg shells	
105	Dinosauria indet.	N43.34.12.80 E107.45.33.70	946	Baynshire F.	URB-S	2017/8/21	Hayashi	Bone fragments	
106	Egg shell	N43.33.3241 E107.54.46.49	970	Baynshire F.	Shar Tsav-west	2017/8/20	Hayashi	Egg shell	
107	Egg shell	N43.25.24.21 E107.27.34.75	963	Baynshire F.	URB-S	2017/8/21	MB	Egg shells	
108	Ankylosauria indet	N43.33.32.23 E107.54.46.44	856	Baynshire F.	Amtgai	2017/8/19	Kodaira	Caudal vert	
109	Ornithomimiosauria indet	N43.34.7.5 E107.45.36.4	905	Baynshire F.	Shar Tsav-west	2017/8/20	Kodaira	Tibia and fibula	
110	Segnosaurid? indet.	N43.33.28.2 E107.54.43.1	862	Baynshire F.	Amtgai	2017/8/19	ULZ	Cervical vert	Associate bones with Pj13
111	Hadrosauid and Theopoda indet	N43.25.29.82 E107.27.44.43	956	Baynshire F.	URB-S	2017/8/21	ULZ	Phalanges and verts	
112	Dinosaurid indet	N43.34.13.19 E107.40.34.12	909	Baynshire F.	Shar Tsav-west	2017/8/19	Tsutanaga	Fragment	
113	Hadrosauid and Theopoda indet	N43.34.12.80 E107.45.33.70	946	Baynshire F.	URB-S	2017/8/21	Hayashi	Verts, long bone and phalange	
114	Hadrosaurid, sauropoda, crocodilia indet and fish	N43.25.34.80 E107.27.21.41	957	Baynshire F.	URB-S	2017/8/21	MB et al	Teeth, dentary, long bone and vert	
115	Dinosauria indet	N43.25.34.5 E107.27.22.8	955	Baynshire F.	URB-S	2017/8/21	MB	Digits and verts	
116	Theropoda indet	N43.29.59.27 E107.45.59.19	900	Baynshire F.	BST2	2017/8/23	Yamamoto	Long bone fragment	
117	Hadrosaur	N43.27.31.95 E107.24.18.58	877	Baynshire F.	BST2	2017/8/23	Hayashi	Fibula	
118	Trionychidae	N43.25.34.32 E107.27.22.05	956	Baynshire F.	URB-S	2017/8/21	ULZ	Carapace	
119	Ornithomimiosauria indet	N43.25.34.80 E107.27.21.41	956	Baynshire F.	URB-S	2017/8/21	MB	Carpal and ungual	
120	Theropoda indet	N43.29.59.16 E107.45.43.20	905	Baynshire F.	BST2	2017/8/23	Tsutanaga	Furcula?	
121	Dinosauria indet	N44.26.11.01 E109.50.52.03	870	Baynshire F.	Khongil Tsav	2017/7/31	Saneyoshi	Bone fragments	
122	Trionychidae	N44.26.16.05 E109.51.32.7	NA	Baynshire F.	Khongil Tsav East	2017/7/31	Puujee	Carapace	
123	Trionychidae	N44.25.56.02 E109.50.44.9	832	Baynshire F.	Khongil Tsav West	2017/8/2	MB	Carapace	
124	Mollusca	N44.25.44.09 E109.50.49.7	832	Baynshire F.	Khongil Tsav West	2017/8/2	MB	Mollusca	
125	Egg shell	N44.26.43.03 E109.51.23.2	NA	Baynshire F.	Khongil Tsav	2017/7/31	Puujee	Egg shells	
126	Hadrosaur	N44.26.01.04 E109.50.31.1	841	Baynshire F.	Khongil Tsav-west	2017/8/2	MB	Fibula	
127	Mollusca	N44.26.17.02 E109.51.19.4	NA	Baynshire F.	Khongil Tsav	2017/7/30	Puujee	Mollusca	
128	Sauropoda indet	N44.20.18.0 E109.51.29.8	790	Baynshire F.	Khongil Tsav	2017/8/6	OCH	Cervical vert fragments	Associate bones with PJ1/1
129	Theropoda indet	N43.34.16.5 E107.47.21.7	897.8	Nemegt F.	Shar Tsav	2017/8/23	Ishigaki	Long bone	
130	Sauropoda indet	N44.26.08.0 E109.51.06.4	841	Baynshire F.	Khongil Tsav	2017/8/6	Tsogt	Tibia	Associate bones with PJ02
131	Sauropoda indet	N44.26.08.0 E109.51.06.4	841	Baynshire F.	Khongil Tsav	2017/8/6	Tsogt	Tibia	Associate bones with PJ02
132	Sauropoda indet	N44.26.08.0 E109.51.06.4	841	Baynshire F.	Khongil Tsav	2017/8/6	Tsogt	Tibia	Associate bones with PJ02
133	Sauropoda indet	N44.26.08.0 E109.51.06.4	841	Baynshire F.	Khongil Tsav	2017/8/6	Tsogt	Tibia	Associate bones with PJ02
134	Sauropoda, Theropoda and Crocodilia indet	N43.29.59.16 E107.43.43.20	905	Baynshire F.	BST2	2017/8/23	Tsutanaga	Teeth and ungual	
135	Theropoda indet	N43.29.59.16 E107.43.43.20	905	Baynshire F.	BST2	2017/8/23	Tsutanaga	Tibia?	
136	Petrified wood	NA	NA	Nemegt F.	Kharirgiin Buuts	2017/8/22	Ishigaki	Petrified wood	
137	Dinosauria indet	N43.33.30.4 E107.55.07.8	854	Baynshire F.	Amtgai	2017/8/16	Ishigaki	Long bone fragment	
138	Petrified wood	NA	NA	Baynshire F.	Shar Tsav-west	2017/8/24	Ishigaki	Petrified wood	South of Sphinx
139	Dinosauria indet	N43.29.35.94 E107.44.25.50	894	Baynshire F.	BST4	2017/8/26	Ishigaki	Bone fragments	
140	Dinosauria indet	N43.29.36.0 E107.44.25.6	913	Baynshire F.	BST4	2017/8/25	MB	Bone fragments	
141	Turtle (Adocidae?)	N44.26.17; E109.51.19	876	Baynshire F.	KgT	2017/7/30	Takahashi	shell fragments	in situ
142	Turtles	N44.26.17; E109.51.19	876	Baynshire F.	KgT	2017/7/30	Takahashi	shell fragments	surface

Nr	Taxa	Latitude & Longtitude	Altitude (m)	Formation	Area	Date	Collector	Elements	Remarks
143	Turtle (trionychid)	N44.26.55; E109.51.22	-	Baynshire F.	KgT, eastern part?	2017/8/4	Saneyoshi	shell fragments	surface
144	Turtle (Nanhsiungchelyid?)	N44.26.17; E109.51.16	849	Baynshire F.	KgT	2017/8/1	Takahashi	shell fragments	surface
145	Turtle (Adocid?)	N44.26.16; E109.51.18	845	Baynshire F.	KgT	2017/8/1	Takahashi	shell fragments	in situ
146	Crocodile	-	-	Baynshire F.	KgT, southwestern cliff	2017/8/2	Puujee	osteoderm	surface
147	Turtle (trionychid)	N44.26.11; E109.51.14	846	Baynshire F.	KgT	2017/8/2	Takahashi	costal fragments	surface
148	Turtle (non-trionychid)	N44.26.16; E109.51.17	845	Baynshire F.	KgT	2017/8/1	Takahashi	shell fragments	in situ
149	Crocodile	N44.26.18; E109.50.40	-	Baynshire F.	KgT	2017/8/2?	TRD	an isolated teeth	-
150	Turtles (1 individual of non-trionychid in good pres.)	N44.16.06; E109.55.9	738	Baynshire F.	BS (Bayn Shire)	2017/8/3	MB	shell fragments	BS01; in situ
151	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Takahashi	shell fragments	BS02; surface
152	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS03; in situ
153	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS04; in situ
154	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS05; in situ
155	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS07; in situ
156	Turtles (trionychid and non-trionychid)	N44.16.07; E109.55.09	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS08; in situ
157	Turtles (non-trionychid)	N44.16.07; E109.55.09	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS06; in situ
158	Turtles (non-trionychid)	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS09; in situ
159	Turtle (trionychid)	N44.16.16.8; E109.54.34.4		Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS10
160	Turtles (including 1 large trionychid cervical vertebra)	nearby:N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Takahashi	fragments	BS12; surface
161	Turtle (1 individual of Gobiapalone?, Trionychidae)	N44.16.17; E109.54.34	760	Baynshire F.	BS (Bayn Shire)	2017/8/4	Bylaa san	shell in good preservation	BS13; in situ
162	Turtles	nearby:N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS14; surface
163	Turtle	N44.16.07; E109.55.10	738	Baynshire F.	BS (Bayn Shire)	2017/8/4	Puujee	shell fragments	BS15; in situ
164	Turtles and fishes	nearby: N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/4	Takahashi	shell fragments and 25 fish scales	BS16; surface
165	Crocodile	nearby: N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/4	Takahashi	osteoderms	BS17; surface
166	Turtles (non-trionychid)	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	costal	BS18; in situ
167	Turtle (trionychid)	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	costal	BS19; in situ
168	Turtles (non-trionychid)	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Puujee	shell fragment?	BS20; in situ
169	Turtle (1 individual)	N44.16.06; E109.55.09	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	turtle vertebrae (big)	BS21; in situ
170	Crocodile and fishes	N44.16.19; E109.55.06	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Puujee	osteoderm and fish scales	BS22; surface
171	Turtle (Trionychidae indet.)	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Puujee	shell fragment?	BS23; in situ
172	Turtle	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	plastron: epiplastra?	BS24; in situ
173	Turtle	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	shell fragments	BS25; in situ
174	Turtle (Lindholmemydidae?)	N44.16.19; E109.55.06	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Puujee	shell: isolated costal bones	BS26; surface
175	Turtles	N44.16.19; E109.55.06	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	shell fragments	BS28; surface
176	Dinosauria	N44.16.19; E109.55.07	737	Baynshire F.	BS (Bayn Shire)	2017/8/6	Takahashi	Sacral vertebrae	BS27; in situ
177	Turtles	N44.26.17; E109.51.19	876	Baynshire F.	KgT	2017/8/1	Takahashi	shell fragments	surface
178	Turtles and a crocodile	N44.24.44; E109.50.18	827	Baynshire F.	Sagan Teg	2017/8/1	Takahashi	20 turtle shell frags, 1 croc osteoderm	surface

Table 2. Vertebrate list of plaster jackets collected by OUS-IPG JE in 2017

	20170811 IPG-OUS Joint Expedition Surface Collection List (Isolated Bones and Fragmental Bones)								
Bag No. and PJ No	Field No.	Locality	Age	Material, specimen	Collector	Altitude N	Longitude E	Elevation	Remarks
PJ-1/1	170804 BK Och	Burkhant BK	Bayan Shiree	cervical vertabrae of saurupod	Ochirjantsan. E	44-20-18.0	109-51-29.8	790 m	
PJ-1/2	170805 BK Och	Burkhant BK	Bayan Shiree	cervical vertabrae of saurupod	Ochirjantsan. E	44-20-18.0	109-51-29.8	790 m	
PJ-2	170806 KgT BD	Khongil Tsav	Bayan Shiree	Proximal tibia of saurupod	Bayardorj. Ch	44-26-08.0	109-51-06.4	841 m	Fragile jacket
PJ-3	170806 KgT BD	Khongil Tsav	Bayan Shiree	Tibia and fibula of ornithomimid	Bayardorj. Ch	44-26-08.0	109-51-06.4	841 m	
PJ-4	170806 KgT BD	Khongil Tsav	Bayan Shiree	?broken cervical vert., of sauropod	Bayardorj. Ch	44-26-11.8	109-51-06.4	841 m	Small jacket
PJ-05	170817 BTs-II TSGT	Baishin tsav	Bayan Shiree	Juvenile Hadro. Skeleton	Tsogtbaatar. Kh	43-29-59.1	107-46-08.9	897 m	
PJ-06	170817 BTs-II TSGT	Baishin tsav	Bayan Shiree	Part of Maxilla	Tsogtbaatar. Kh				PJ-1/3. 2/3. 3/3
PJ-07	170817 BTs-II TSGT	Baishin tsav	Bayan Shiree	Scapula of Hadro	Tsogtbaatar. Kh				
PJ-08	170817 BTs-II MB	Baishin tsav	Bayan Shiree	Jaw of Hadro	Mainbayar. B	43-29-56.0	107-46-03.7	900 m	
PJ-09	170817 KhT Hayashi	Baishin tsav	Bayan Shiree	Tibia of ornitho.	Hayashi Shoji	43-28-52.68	107-44-53.28	895 m	
PJ-10	170818 ShT MB	Shar Tsav	? Nemegt	cervical vertabrae of saurupod and juvenile theropod	Mainbayar. B	43-34-06.83	107-47-34.21		
PJ-11	170819 AMT MB	Amtgai	Bayan Shiree	Femur of Hadro	Mainbayar. B	43-33-26.9	107-54-46.4	863 m	
PJ-12	170819 AMT Hayashi	Amtgai	Bayan Shiree	Femur of Ankylo.	Hayashi Shoji	43-33-32.2	107-54-46.5	859 m	
PJ-13	170819 AMT ULZ	Amtgai	Bayan Shiree	Femur of ?Segno	Ulziitseren.S	43-33-28.2	107-54-43.1	862 m	Same specimen take off
PJ-14	170819 ShT MB	Shar Tsav	? Nemegt	Ischium of Theropod	Mainbayar. B	43-34-06.83	107-47-34.21		
PJ-15	170821 URB-S MB	Urlibe Khudag	Bayan Shiree	Theropod of metatarsal	Mainbayar. B	43-25-35.91	107-27-22.51	957 m	
PJ-16	170821 URB-S BD	Urlibe Khudag	Bayan Shiree	Theropod of metatarsal	Bayardorj. Ch	43-25-34.64	107-27-22.27	957 m	
PJ-17	170826 BTs-4 MB	Baishin tsav	Bayan Shiree	Illium of hadrosaur	Mainbayar. B	43-29-36.0	107-44-25.6	913 m	
PJ-18	170826 BTs-4MB	Baishin tsav	Bayan Shiree	Mandibula of hadrosaur	Mainbayar. B	43-29-35.94	107-44-25.59	895 m	
PJ-19	170826 BTs-4 MB	Baishin tsav	Bayan Shiree	Theropod ungual	Mainbayar. B	43-29-35.94	107-44-25.59	895 m	

Table 3. List of geological samples collected by OUS-IPG JE in 2017

Sample No.	Date	Rock type	Formation	Area	WGS84(° ‘ ”)	memo
ESR20170801-01	8/1/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 20.5 E109 51 13.8	843m
ESR20170801-02	8/1/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 21.5 E109 51 13.6	858m
ESR20170801-03	8/1/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 21.0 E109 51 08.8	886m
ESR20170802-01	8/2/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 13.9 E109 51 59.3	838m
ESR20170802-02	8/2/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 14.3 E109 51 01.9	864m
ESR20170802-03	8/2/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 15.2 E109 51 55.4	844m
ESR20170802-04	8/2/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 15.9 E109 51 53.6	857m
ESR20170803-01	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 22.6 E109 51 23.8	844m
ESR20170803-02	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 24.3 E109 51 23.1	848m
ESR20170803-03	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 30.5 E109 51 27.2	847m
ESR20170803-04	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 32.6 E109 51 19.6	856m
ESR20170803-05	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 34.9 E109 51 16.1	866m
ESR20170803-06	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 36.8 E109 51 10.3	871m
ESR20170803-07	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 42.7 E109 51 19.1	865m
ESR20170803-08	8/3/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 48.1 E109 51 18.8	879m
ESR20170804-01	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 50.2 E109 51 20.7	861m
ESR20170804-02	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 52.4 E109 51 22.2	868m
ESR20170804-03	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 55.2 E109 51 16.0	879m
ESR20170804-04	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 07.1 E109 51 24.5	873m
ESR20170804-05	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 12.0 E109 51 19.1	883m
ESR20170804-06	8/4/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 18.5 E109 51 35.9	868m
ESR20170805-01	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 13.7 E109 51 50.5	863m
ESR20170805-02	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 16.5 E109 51 50.3	870m
ESR20170805-03	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 16.7 E109 51 50.8	872m

Sample No.	Date	Rock type	Formation	Area	WGS84(° ‘ ”)	memo	
ESR20170805-04	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 21.5 E109 51 52.4	879m	
ESR20170805-05	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 2712.5 E109 52 04.6	861m	
ESR20170805-06	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 12.7 E109 52.05.1	866m	
ESR20170805-07	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 14.3 E109 52 04.2	867m	
ESR20170805-08	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 06.7 E109 52 13.0	858m	
ESR20170805-09	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 27 59.9 E109 52 24.2	852m	
ESR20170805-10	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 59.8 E109 52 23.7	856m	
ESR20170805-11	8/5/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 59.8 E109 52 23.6	859m	
ESR20170806-01	8/6/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 16.5 E109 50 45.9	852m	
ESR20170806-02	8/6/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 17.5 E109 50 45.7	871m	
ESR20170806-03	8/6/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 14.9 E109 50 34.6	847m	
ESR20170806-04	8/6/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 15.0 E109 50 32.6	861m	
ESR20170806-05	8/6/2017	SandStone	Baynshire F.	Khogil Tsav	N44 26 17.4 E109 50 31.0	876m	
20170813-01	8/13/2017	Calcite	Baynshire F.	Shar Tsav West	N43 31 54.30 E107 43 14.90	Calcite attached to a footprint, Bigfoot No2 Site	
20170813-02	8/13/2017	Caliche	Baynshire F.	Shar Tsav West	N43 31 55.03 E107 43 13.52	Top of a hill, 4m from the bottom, 20m away from the foot prints	
20170813-03	8/13/2017	Calcite	Baynshire F.	Shar Tsav Main	N43 34 21.08 E107 47 11.55	Calcite attached to a footprint, first foot print layer	
20170814-01	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	the 2nd hard layer, chariched?
20170814-02	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	40 cm above the 2nd hard layer
20170814-03	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	the 3rd hard layer
20170814-04	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	70 cm above the 3rd hard layer
20170814-05	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	the 3rd hard layer from the top, top of the three successive hard layers
20170814-06	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	the 2nd hard layer from the top, caliched
20170814-07	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 05.20 E107 45 24.24	Kingyobachi Hill	the top hard layer, caliched
20170814-08	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	the 1st hard layer
20170814-09	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	plane bed, lower part, redish soft fine sand
20170814-10	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	plane bed, middle part, coarse, hard
20170814-11	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	plane bed, top
20170814-12	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	the 3rd hard layer
20170814-13	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	40 cm above the 3rd har layer
20170814-14	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	upper convolution hard layer
20170814-15	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	top convolution hard layer, lower part
20170814-16	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 12.63 E107 45 35.51	Sphinx	top convolution hard layer, upper part
20170814-17	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	lowest hard layer, corresponding to the 1st in sphinx?
20170814-18	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	plane bed, lower part
20170814-19	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	plane bed, middle, hard layer
20170814-20	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	plane bed, upper
20170814-21	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	a hard layer above the plane bed
20170814-22	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	fine sand
20170814-23	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	one of the chaliches in the find sand
20170814-24	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	sand layer just bellow the top hard layer
20170814-25	8/14/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 19.45 E107 45 49.00	Kobu Hill	top hard layer
20170815-01	8/15/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 33 55.90 E107 46 02.21	Setouchi Hill	foot print sand
20170815-02	8/15/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 33 50.86 E107 45 58.78	Setouchi Hill	foot print sand
20170815-03	8/15/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 33 50.86 E107 45 58.78	Setouchi Hill	foot print sand? With gypsum
20170815-04	8/15/2017	Mudstone	Baynshire F.	Shar Tsav West	N43 33 50.86 E107 45 58.78	Setouchi Hill	
20170815-05	8/15/2017	Sandstone	Baynshire F.	Baishin Tsav	N43 30 09.42 E107 45 11.32		Chaliche
20170815-06	8/15/2017	Sandstone	Baynshire F.	Baishin Tsav	N43 30 10.37 E107 45 12.07		Chaliche
20170815-07	8/15/2017	Sandstone	Baynshire F.	Baishin Tsav	N43 30 10.56 E107 45 09.89		Chaliche
20170815-08	8/15/2017	Sandstone	Baynshire F.	Baishin Tsav	N43 30 07.75 E107 44 59.11		Chaliche
20170815-09	8/15/2017	Sandstone	Baynshire F.	Baishin Tsav	N43 30 09.58 E107 44 58.78		Chaliche, black
20170815-10	8/15/2017	Sandstone	Baynshire F.	Shar Tsav West	Saneyoshi 17081502		south outcrop
20170817-01	8/17/2017	Mudstone	Baynshire F.	Shar Tsav Main	N43 34 11.79 E107 47 05.00		lowest layer
20170817-02	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 11.79 E107 47 05.00		lowest hard layer

Sample No.	Date	Rock type	Formation	Area	WGS84(° ' ")	memo	
20170817-03	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 12.52 E107 47 05.75		hard layer
20170817-04	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 12.74 E107 47 06.10		hard layer
20170817-05	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 13.11 E107 47 06.60		convolution hard layer
20170817-06	8/17/2017	Mudstone	Baynshire F.	Shar Tsav Main	N43 34 13.11 E107 47 06.60		just below the convolution
20170817-07	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 14.57 E107 47 07.31		convolution hard layer, same as above
20170817-08	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 16.12 E107 47 08.13		hard layer
20170817-09	8/17/2017	Mudstone	Baynshire F.	Shar Tsav Main	N43 34 16.12 E107 47 08.14		corresponding to 20170815-04?
20170817-10	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 16.12 E107 47 08.15		sandy mud between the above two
20170817-11	8/17/2017	Mudstone	Baynshire F.	Shar Tsav Main	N43 34 20.95 E107 47 11.26		above 20170817-08
20170817-12	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 20.95 E107 47 11.27		foot print sand stone on the above
20170817-13	8/17/2017	Mudstone	Baynshire F.	Shar Tsav Main	N43 34 23.01 E107 47 11.26		upper most mudstone
20170817-14	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 23.22 E107 47 11.45		upper most sandstone
20170817-15	8/17/2017	Sandstone	Baynshire F.	Shar Tsav Main	N43 34 23.05 E107 47 12.43		foot print sand stone
20170817-16	8/17/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 21.29 E107 45 44.97	Kobu Hill side	brought by ice bed?
20170817-17	8/17/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 20.62 E107 45 44.58	Kobu Hill side	just below the hard layer
20170817-18	8/17/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 20.94 E107 45 44.78	Kobu Hill side 925m	surface, upper
20170817-19	8/17/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 20.85 E107 45 44.34	Kobu Hill side 922m	surface, middle
20170817-20	8/17/2017	Sandstone	Baynshire F.	Shar Tsav West	N43 34 20.21 E107 45 44.14	Kobu Hill side 920m	surface, lower
20170817-21	8/17/2017	Mudstone	Baynshire F.	Khavirgiin buuts	N43 31 07.35 E107 43 55.71	Big foot print site	corresponding to big foot prints?
20170817-22	8/17/2017	Sandstone	Baynshire F.	Khavirgiin buuts	N43 31 07.35 E107 43 55.71	Big foot print site	convolution
20170817-23	8/17/2017	Mudstone	Baynshire F.	Khavirgiin buuts	N43 31 07.35 E107 43 55.71	Big foot print site	above convolution
20170817-24	8/17/2017	Sandstone	Baynshire F.	Khavirgiin buuts	N43 31 07.35 E107 43 55.71	Big foot print site	hard layer
20170817-25	8/17/2017	Mudstone	Baynshire F.	Khavirgiin buuts	N43 31 07.35 E107 43 55.71	Big foot print site	upper most mudstone
20170817-26	8/17/2017	Sandstone	Baynshire F.	Khavirgiin buuts	N43 31 07.45 E107 43 59.39	Big foot print site	hard layer corresponding to the other foot prints

4-3. Bayn Shire (Baynshirenian, Late Cretaceous)

The Bayn Shire is located about 30 km SSW of Dzun Bayan Somon (East Gobi (Dornogobi) Aimag). Disarticulated fragmental bones of dinosaur and other reptiles are collected from the surface. Turtle specimens with good preservation are collected. The lithology of this locality composed of reddish to grayish mudstone, sandstone with reworked caliche and conglomerates. Lateral accretion of sandstone and up-ward fining sequences from sandstone to mudstone shows that these sedimentary sequences had deposits in meandering fluvial systems (Watabe et al., 2010).

4-4. Shar Tsav (Nemegtian?, or Baynshirenian?, Late Cretaceous; Figure 2)

The Shar Tsav locality is located about 9km north of Bayshin Tsav, about 108km ESE of Manlai Somon and about 70 km northeast of Han Bogd Somon (South Gobi (Umnugobi) Aimag). Many footprints of dinosaur have been preserved in the locality.

The following vertebrate fossils were discovered in the expedition of this year.

(1) Partial skeleton of sauropod.
(2) Partial skeleton of a possible juvenile theropod; PJ-10
(3) Isolated theropod teeth.
(4) Footprints

Concerning on the sauropod skeleton, the specimen is covered and protected in situ by an iron roof for future expeditions. Also, we conducted a taphonomical study on footprint and then, protected them using a hardner "Paraloid".

Lithology of the main outcrop (protection sites) in Shar Tsav consists predominantly of fine sandstone and mudstone with caliche horizon. Sandstone beds consist of medium to fine sand with rare granule to very coarse sand. These sandstone beds are 0.1-1.0m in thick, and exhibit trough cross-stratification and current ripple lamination. The bases of these sandstone beds are flat with partly erosional surfaces. These sandstone beds show a sheet-like geometry with no lateral continuity. The top of the sandstone is covered by mudstone with sharp contact.

Mudstone beds of the locality, typically brown to reddish, are characterized by massive and well sorted lithofaces with sheet-like geometry. These beds partly contain millimeter-scale laminations and caliche horizons which are 0.05-0.2m in thick. These caliches beds also exhibit a sheet-like geometry with good lateral continuity.

The presence of sedimentary structure of sandstone beds formed by unidirectional currents, sandy faces and mainly flat surfaces indicate that this sedimentary facies is of flood flow origin with minor channel fill. Mudstone beds are interpreted as being deposits in a fluvial flood plain with lacustrine environments based on the sheet-like geometry, well sorted fine-grained laminated mudstone, and cover the sandstone beds with flat contact.

4-5. Shar Tsav West and Far West (Nemegtian?, Late Cretaceous)

Shar Tsav West is located 2 km west, and Shar Tsav Far West is located 8 km west of Shar Tsav main footprint site. The lithology of western locality consists of the alternation of white course sandstone and red muddy fine sandstone. Sedimentary environment changes from fluvial to lacustrine. The age of Shar Tsav West and Shar Tsav Far West locality is not clear, but may be Nemegtian. In Shar Tsav Far West, thick mudstone bed develops. The bed is covered with conglomerate at the top.

In these two localities, geological survey, rock sampling and bone collections are conducted.

The following vertebrate fossils were discovered in the expedition of this year.

(1) A tibia and fibula of ornithomimosaurids

(2) Egg shell

Lithology of the beds in the locality is composed of sandstone and mudstone. Sandstone beds consist of course to fine sand with granule. These sandstone beds are 0.5-5.0m in thick, and exhibit trough cross-stratification with ripple lamination. Each trough-cross stratification bed shows a concave-up erosional base. The large-scale convolution distributed through the sandstone beds. This sandstone beds are overlain by mudstone beds. The Mudstone beds are characterized by massive or mm-scale lamination with well sorted. These facies beds are up to 3.0m in thick. The main outcrops in the locality indicate the tectonic reverse fault through the laminated mudstone beds.

The sandstone beds are revealed fluvial channel fill deposits which are interpreted from cross-stratification and concave-up erosional base. Overlying massive mudstone beds are interpreted floodplain deposits. The laminated mudstone beds are interpreted as representing lacustrine deposits supported by very well sorted fine grained laminated facies. These facies changes show that fluvial environments in the locality were submerged during periods of floodplain inundation.

4-6. Amtgai (Baynshirenian, Late Cretaceous)

The Amtgai locality is located about 14 km east of Bayshin Tsav locality (South Gobi Aimag).

The following vertebrate fossils were discovered in the expedition of this year.

(1) Femur of a hadrosauroid

(2) Femur of an ankylosaurid (figure 3A)

(3) Femur of a possible *Segnosaurus*

These specimens are collected as three plaster jackets (respectively PJ-11, 12 and 13). Disarticulated fragmental bones are also collected as surface collection.

4-7. Amtgai North (Baynshirenian, Late Cretaceous)

The Amtgai North locality is located about 7 km NNW of Amtgai locality and about 7 km NE of Shar Tsav footprint site. Only geological survey and rock sampling were conducted.

4-8. Amtgai South (Baynshirenian, Late Cretaceous)

The Amtgai South locality is located at south of Amtgai locality.

Disarticulated fragmental bones of dinosaur and other reptiles are collected from the surface.

The lithology of Amtgai, Amtgai North and South is comprised of reddish to grayish mudstone, sandstone with reworked caliche and conglomerates. Lateral accretion of sandstone and up-ward fining sequences from sandstone to mudstone shows that these sedimentary sequences had deposits in fluvial systems (Watabe et al., 2010).

4-9. Bayshin Tsav (Baynshirenian, Late Cretaceous)

The Bayshin Tsav locality is located about 60 km north of Han Bogd Somon (South Gobi Aimag). A nearly complete skeleton of a small juvenile hadrosauroid is discovered. Also, some fragmentary skull of hadrosauroid are collected in this expedition.

The following vertebrate fossils were discovered in the expedition of this year.

(1) Nearly complete skeleton of a small juvenile hadrosauroid (PJ-5; figure 3B).

(2) Fragmentary skulls and postcranial materials of hadrosauroids (PJ-6, 7, 8, 17 and 18)

(3) Fragmentary postcranial materials of theropods (PJ-9 and 19)

Eight plaster jackets are made from the locality including these specimens. Disarticulated fragmental bones are also collected as surface collection. The age is regarded as Baynshirenian. The lithology of this locality consists of sand dominated alternation of sandstone and mudstone. Bone beds including disarticulated bones are often observed in this area. Paleoenvironment of this locality is fluvial. Geological survey and rock sampling are also executed.

4-10. Bayshin-Tsav West (Baynshirenian, Late Cretaceous)

The Bayshin Tsav West locality is located about 6-7 km west of Bayshin Tsav Locality (South Gobi Aimag). This site was discovered in 2015 IPG-OUS expedition.

Only fragmental bones were collected from the area. The lithology of this locality consists of sand dominated alternation of sandstone and mudstone. Paleoenvironment of this locality is fluvial. Geological survey is also executed.

4-11. Khavirgiin Zoo (Baynshirenian?, Late Cretaceous)

The Khavirgiin Zoo locality is a large sauropod footprint site discovered in IPG-OUS expedition 2016 (Ishigaki et al. 2016). The locality is located about 2.5 km WNW of Bayshin Tsav I. The detailed documentation and taphonomical study on footprints using a 3D Laser Scanner apparatus and geological survey were conducted during this expedition. In this expedition, we revealed a trackway of one of the largest sauropod footprint, consisting of four consecutive footprints in this site (figure 4). The geological survey of this

expedition indicates that age of this site may be Baynshirenian. Trackway and footprint data on consecutive 6 natural casts of large theropod were also collected. These trackway sites were covered by earth for future prospection.

4-12. Urlibe Khuduk (Baynshirenian, Late Cretaceous)

The Urlibe Khuduk locality is located about 50km north of Han Bogd Somon (South Gobi Aimag) and 25 km W –WSW of Bayshin Tsav. The following vertebrate fossils were discovered in the expedition of this year.

(1) Two metatarsal of theropods (PJ-15 and 16)

(2) Egg shell fragments

Disarticulated fragmental bones are also collected as surface collection.

The lithology of the Bayshin Tsav, Bayshin Tsav West and Khavigiin Zoo is composed of sandstone with rare conglomerate and mudstone. In the Bayshin Tsav, trough cross-stratification and ripple lamination are recognized on sandstone top set. Detailed descriptions of those stratigraphy and sedimentary facies are now in preparation. Rough descriptions of the lithology in Bayshin Tsav are reported by Watabe et al. (2010).

5. Future perspectives

Unfortunately, a partial sauropod skeleton in Shar Tsav, which is a first sauropod skeleton at this area, was not able to be picked up in this excavation. Therefore, the specimen should be excavated in the future expedition. Also, many dinosaur remains (including footprints) which we didn't collect and survey, need to be excavated and studied.

Acknowledgements

We are grateful to all staff of IPG and OUS for their support. This study and expedition were supported by Private University Research Project (MEXT: Japanese Ministry of Education, Culture, Sports, Science and Technology), and University Students Research Support Program of Okayama University of Science. Financial support was provided by the Private University Research Branding Project entitled on OUS International Research Project on Mongolian Dinosaurs.

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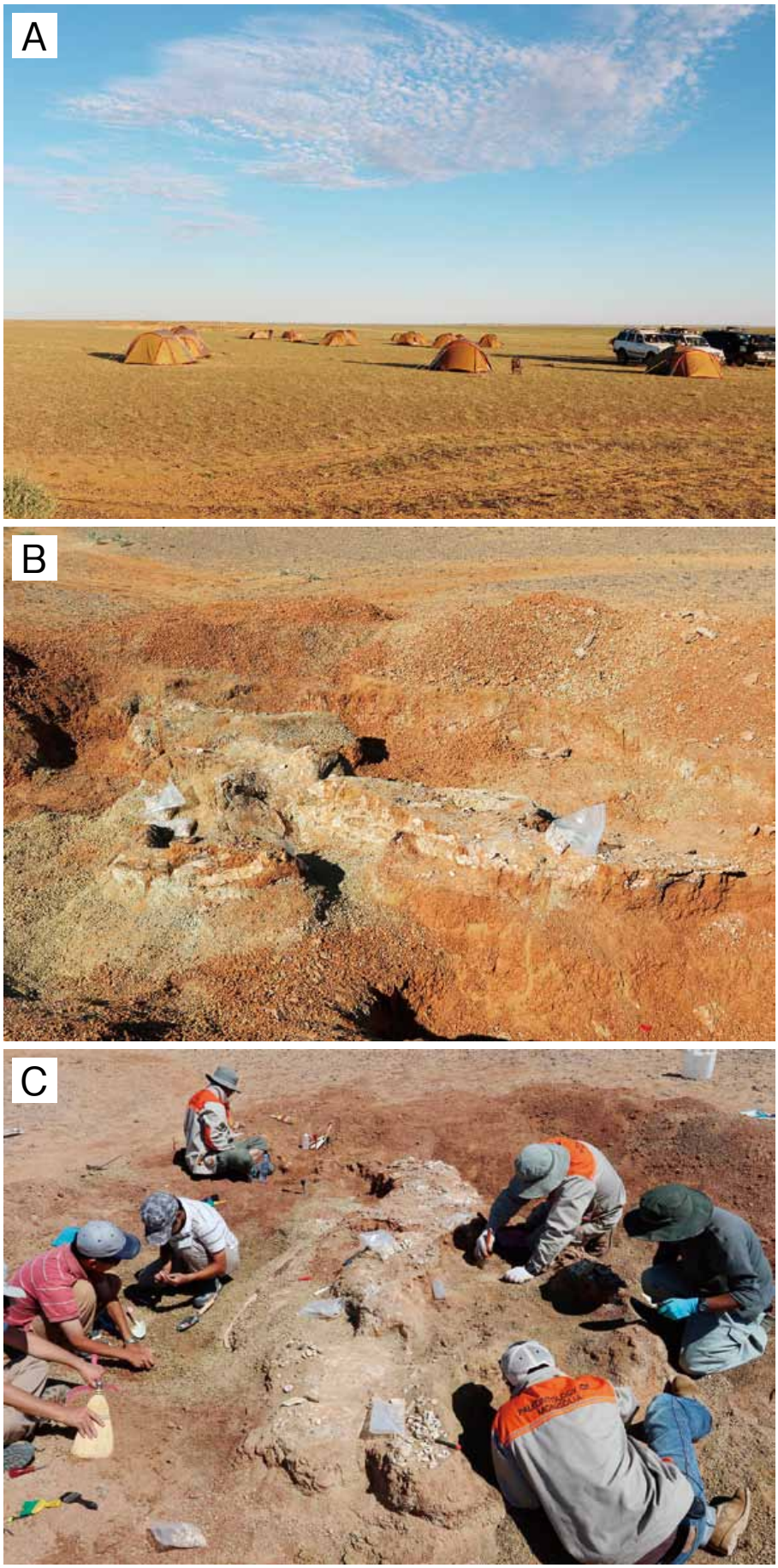

Figure 2. Shar Tsav locality. A. Base Camp in Shar Tsav. B. A partial skeleton of sauropod. C. Excavation of sauropod

Figure 3. Amtgai and Bayshin Tsav localities. A. Ankylosaurid femur. B. Excavation of hadrosaur skeleton

Figure 4. Khavirgiin Zoo locality. A. Large sauropod trackways.