RADIOCARBON AGE OF A HOLOCENE TERRACE OF THE CHIKOI RIVER AT THE RUSSIA-MONGOLIA BORDER

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Abstract A well-developed terrace was identified along the Chikoi River at the Russia-Mongolia border. The terrace deposits consist of massive fine sands of more than 8 m with numerous organic-rich paleosol horizons. Resulting radiocarbon ages for paleosol horizons suggest that floodplain emergence and terrace formation occurred in the early Holocene.

Key words: fluvial terrace, radiocarbon age, Holocene, Mongolia

1. Introduction

In 2013 and 2014, a team of Mongolian, Japanese, and American researchers began survey and initial subsurface testing of archaeological sites along the Chikoi (Tsukh in Mongolian) River, where a number of high, stable alluvial terraces have been identified. The Selenga River runs from the Hangayn Range in the northern Mongolia to the northeast and flows into the Lake Baikal in Siberia, Russia. The Chikoi River, about 770 km in length, is a major middle-drainage tributary of the Selenga, and flows along the border between Mongolia and Russia. A well-developed terrace of the Chikoi River was identified during survey in 2014. Here, we report radiocarbon ages from two paleosol horizons that may hold clues about the timing of terrace formation.

2. Terrace Description

A well-developed terrace was found in the middle part of the Chikoi River 25 km north–northwest of Khuder Village, northern Mongolia (49.9978089°N, 107.2130908°E; Fig. 1).

A panoramic view of the study area to the east (Fig. 2) shows a wide terrace on the south side of Chikoi River. The relative height from the terrace tread to the modern riverbed is approximately 10 m. The terrace deposits are composed mainly of floodplain massive fine sands (Fig. 3), while riverbed deposits are pebble- to cobble-sized subrounded gravels (Fig. 4a). Total thickness of the terrace deposits is more than 8.3 m. The lithology of these terrace deposits resembles other south Siberian rivers (Buvit *et al*. 2003). A number of organic-rich horizons in the terrace deposits are

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classified as paleosols that indicate intermittent aggradation (Fig. 4b).

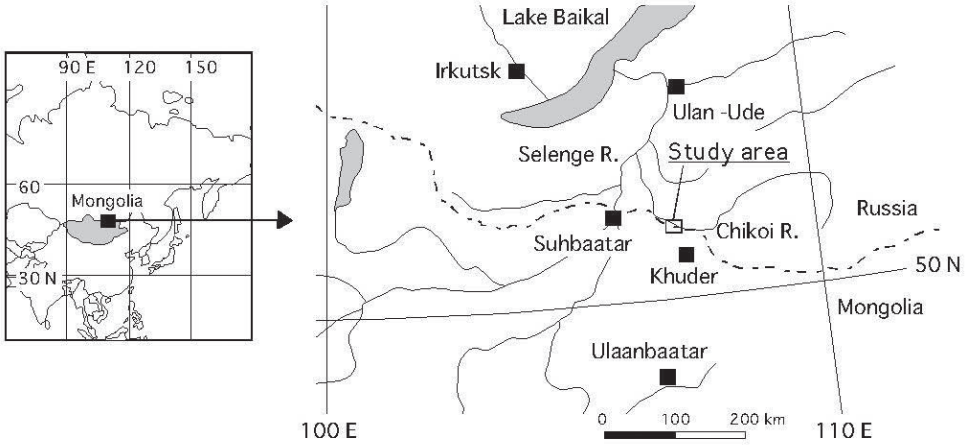

Fig. 1 Study area.

Fig. 2 A panoramic view of the terrace of Chikoi River.

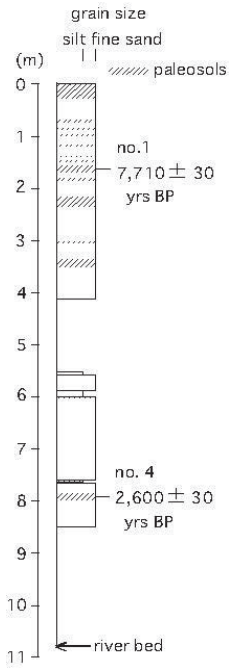

Fig. 3 Columnar section of the terrace deposits.

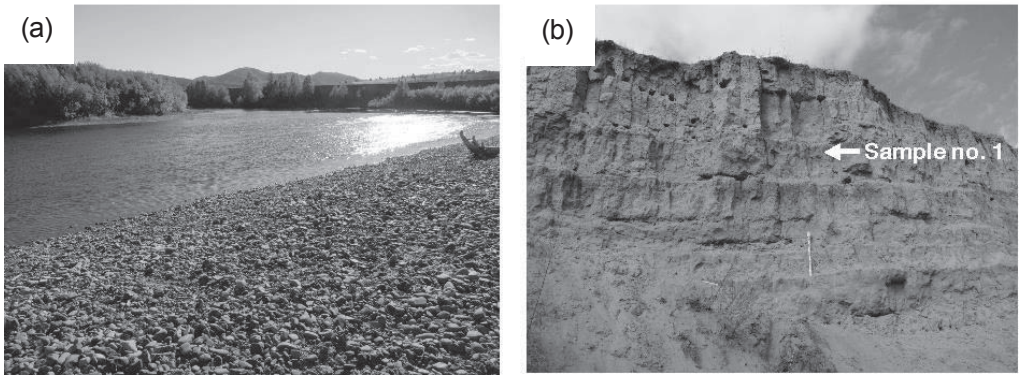

Fig. 4 Photograph of riverbed and terrace deposits.
Scale in (b) is 50 cm long.

3. Radiocarbon Ages of Terrace Deposits

Bulk paleosol samples were submitted to the Institute of Accelerator Analysis Ltd., Japan, for AMS radiocarbon dating. Samples no. 1 and no. 4 were collected from paleosols 1.65 m and 7.90 m beneath the terrace surface, respectively. The resulting conventional age of Sample 1 is 7,710 ± 30 yrs BP, while the age of Sample 4 is 2,600 ± 30 yrs BP (Table 1). The unexpected young age of Sample 4 is probably due to modern carbon contamination from the profile exposure.

Table 1 Radiocarbon age of the terrace deposits

Sample	Material	$\delta^{13}C$ (‰)	Conventional ^{14}C age (1 σ, yrs BP)	2 σ Calibrated ^{14}C age (2 σ, cal BP)	Laboratory number
no. 1	paleosol	-23.34±0.68	7,710±30	6,612-6,470 (95.4 %)	IAAA-142919
no. 4	paleosol	-23.93±0.45	2,600±30	812-768 (95.4 %)	IAAA-142920

Calibrated ^{14}C ages were calculated using IntCal 13 database (Reimer *et al.*, 2013) and OxCal v4.2 program (Bronk Ramsey, 2009).

4. Timing of Terrace Formation

Accumulation of the Chikoi River terrace correlates with other south Siberian formations. Thick fine floodplain sediments were deposited in the Last Glacial of the Late Pleistocene similar to south Siberia (Buvit *et al*. 2003). Floodplain emergence and terrace formation occurred in the early Holocene based on the age of Sample 1 in the upper part of the deposits. The Chikoi River induced aggradation-degradation change in such period.

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