

Sand dunes development of Peski Saryishikotrau desert from the latest Pleistocene, in Kazakhstan

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Introduction

In central Asia, deserts and semi-deserts develop in wide areas under the continental climate. In this area, research of past environmental evolution is important to estimate sustainability of human activities and water resources. Recently, some researches analyze of endorheic lake sediments in central Asia and show the lake level changes and dry-wet cycles in Holocene. In eastern Kazakhstan, around Lake Balkhash and Ili River delta, the Ili-project team revealed the environmental changes that e.g., lake level changes, the river meandering changes and terrace developments (e.g., Endo et al., 2010).

However, developments of erg (sand sea) and environmental changes about dry-wet cycles in central Asia are almost unknown. But, recently, Maman et al.,(2011) shows that sand dunes around Aral Sea region were formed from 7 to 5ka by OSL dating.

Peski Saryishikotrau desert located around Lake Balkhash and Ili River delta is known as a sand sea. But the development and environmental change records are unknown. This study aims to clarify the relationship between the evolutions of sand sea and climate changes in this desert area.

Methods

Land surveying, magnetic susceptibility measurement, sampling for grain size analyses and OSL dating from some trench sites of sand dunes, were done in Aug.2010, Mar.2011 and Sep.2011. Geomorphological map and sand dunes map was created from DEM.

Results and discussion

Field researches coupled with analyses of high-resolution satellite images indicate the most of sand dunes in this area have been already covered by vegetation. And, the result of DEM mapping classifies the sand dunes by wavelength (WL) and height (H) parameters. The group1 dunes (1km<WL<5km, H<50m) are Draa (mega longitudinal dune), the group2 dunes (0.5km<WL<5km, H<10m) and group3 dunes (WL<0.5km, H<10m) are mainly longitudinal dunes. And these dune patterns suggest wind regime shift in past time.

From the results of OSL dating(Kondo et al., 2011), the pre-Ili river terrace deposit overlane by sand dunes of group2 and 3, gave the age of latest Pleistocene, and the sediments of group3 dunes indicate mid-Holocene. These results suggest that development of the group2 dune and group3 dune had continued from latest Pleistocene to mid-Holocene.

In addition to the developments of sand dunes, add other materials about environmental changes from the Ili project research, we discuss about the climate changes in central Asia from latest Pleistocene to mid-Holocene.

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