

## Late Holocene fluvial landform chronology and paleo-climate in the middle basin of Ili River, Kazakhstan.

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### 1. Introduction

In drylands of Central Asia, precipitation change has a major effect on water environment especially hydrology. But about paleo-environment change little is known in this region. Ili River flows into Balkhash Lake from Tiensian Mountain. It has the largest discharge of the rivers flowing into Balkhash Lake and supplies 80 percent of the total inflow. In Balkhash Lake, several gravity cores have been obtained and Holocene lake level changes are reconstructed (eg., Endo et al., 2009; Chiba et al, 2010; Sugai et al., 2010).

Understanding the cause and mechanism producing such lake level changes is important to lead new insight into paleo-environment in the Central Asia. To know the relationship between Ili River behavior reflecting environmental conditions of the river its basin including Balkhash Lake.

In this study, the history of paleo-climate and avulsion were made clear up based on the analysis of fluvial deposits inc. the paleo-channel fill of Ili River.

### 2. Methods

Fluvial landforms of Ili River paleo-channels were classified by satellite images from google earth and DEM data from SRTM3. The paleo-channels were dated by AMS-14C method and OSL dating from the channel-fill deposits. Deposits were also examined on particle analysis and magnetic susceptibility.

### 3. Result and discussion

The middle part of Ili River was classified into five geomorphic surfaces from T1 to T5. T1 is covered with vegetated rough dunes. The outcrops eroded by Ili River has two cycles of fluvial sediment units which is upper-fining from middle sand to silt and are covered with sand dune. T2 is distributed along paleo-channel turning to the north at Bakbakthy. Aeolian sand dunes smaller than those on T1 surface covers T2 surface. The top of paleo-channels on T2 has well-sorted fine sandy sediments thought as aeolian sand. T3 is distributed along paleo-channel turning to the north at Bakanas and has paleo-channels which had larger discharge than modern channel (Shimizu and Sugai 2010).

T4 is distributed along the main stream of modern Ili River and formed after the main channel of Ili River moved to the west. Large Flood is likely to flow into paleo-channels on T4. T5 is the floodplain of Modern channel of Ili River and along the channel.

About 30ka after deposition of T1, T2 was formed before 4ka. Meanwhile, Balkhash Lake has a low-level period. 4.2ka from OSL dating (Kondo et al, 2011) is the last active age of paleo-channel on T2 after deposition age in the downstream of Kurti River (Sugai et al, 2012). And then the channel was covered with aeolian sand. T3 has four 14-C ages. Two of them obtained from shale in sorted sand thought as fluvial sediments show about 1500 years ago, the others show from humic soil showing that the channel changed back marsh about 700 years ago. That is to say, in high-level period of Balkhash Lake (Chiba et. al., 2010), the main channel of Ili River was forming T3 with repeating avulsion, and was moved to T4. And then T3 became terrace and covered with aeolian sand.

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