Geophysical Research Abstracts, Vol. 7, 07922, 2005
SRef-ID: 1607-7962/gra/EGU05-A-07922

Tectonic control of the Pleistocene glacial sedimentation in the Altai mountains (orogenic belt of South Siberia)

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Mountain glaciation may be closely related to climatic changes. But as evidenced by our geomorphological study, the amount and type of glaciations in the active orogenic belt of South Siberia are controlled by active tectonics rather than climatic variations.

Analysis of area and altitude distribution of glaciation forms of relief in addition to analysis of morphotectonic characteristics (top and base surface) of the Altai mountain area reveals some peculiarities, which can be summarized as follows.

1) The axial part of Altai mountain country is the most tectonically active and it is characterized by the highest uplift rate as compared to northern part, contacting with West-Siberia plate. The recent September 2003 Chuya earthquake and the presence of paleoseismodislocations within its epicentral zone confirm the suggestions about the high tectonic activity of axial part of Altai from the Late Pleistocene - Holocene till present day.

2) The change of mountain glaciations area (from the Middle to Late Pleistocene) depends on variation of absolute altitude of mountain ranges and the value of erosion deepening during the interglacial period. Despite the evidence of strong fall of temperature in the Siberia in the Late Pleistocene (Karabanov et al., 2001) the valley type of glaciers during this period was predominant in the SE and central parts of Russian Altai and Mongolian Altai contrary to the valley-piedmont type of Middle Pleistocene glaciation. The change of the glaciation type was caused by intensive erosional deepening of valleys up to 250-500 m associated with tectonic uplift and growth of the ranges of axial part. The ice covers were formed several times during the Pleistocene in the Sorulukol'skaya and Dzhulukul'skaya depressions and Chulyshman plateau, which underwent insignificant uplift and erosional dipping of valley up to 100 m (Efimtsev, 1961). In the Teletskoe Lake region, which underwent relative

sinking, the Late Pleistocene troughs located above the Middle Pleistocene troughs (Vysotsky, 2003). This observation indicates the decreasing the area of the Late Pleistocene glaciation in comparison with the Middle Pleistocene glaciation.

Low altitude of Altai mountain is likely to be reason of lack of the traces of ancient glaciation (older than middle Pleistocene) within this area, whereas the first mountain glaciation occurred about 2.8 Ma within adjacent Sayan-Tuva region, indicating its high altitude in the Late Pliocene (Karabanov et al., 2001; Yarmolyuk, Kuzmin, 2004).
This study was supported by the Russian Science Support Foundation and Grant of President of RF (MK–2596.2004.5).