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Peculiarities of Quaternary tectonic evolution of the Altai Mountains

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The Altai Mountains form the northern part of the Central Asia orogenic belt and is a transpressional zone formed due to oblique thrusting. Its late Cenozoic reactivation is attributed to India-Eurasia collision, and to ongoing indentation India to Eurasia. Continued strain and stress build-up has been partly partitioned by propagation northward to Eurasia's interior along preexisting fault zones. Deformation along these zones has been responsible for building of the modern mountain belts. Geological and geomorphological data indicate that the impact of India-Eurasia collision on the northern Tien Shan, Altai and northern Kazakhstan regions showed up at 11, 5 and 3 Ma respectively.

Along with the morphotectonic analysis, analysis of sediment fillings of intermountain depressions and piedmont plains we study the distribution and extension of the Pleistocene glaciations within the Altai Cenozoic uplift which reveal some peculiarities of tectonic evolution of the Altai Mountains:

1) Rejuvenation of the mountain systems within Altai Mountains in south-eastern direction which is opposite to the stress propagation related to India-Eurasia collision.

2) The simplification of neotectonic structure in south-eastern direction. Fan-like system of mountain ridges and intermountain depressions in Russian Altai is changed in Mongolian Altai by several contiguous, sub parallel mountain chains with the narrow lowerings between. Goby Altai is formed by far distant, separate ridges pierced through piedmont depressions.

3) Steep bench of base level of orogen between North- and South-Eastern parts of Russian Altai which was formed at the edge of the middle- and the late- Pleistocene.

Clear-cut distinction of types of the middle Pleistocene glaciations in different parts of Altai Mountains argues for the fact that its orographic structure had been generally formed by the middle Pleistocene. At the same time drastic changes of glaciations type in the late Pleistocene (that occurred in spite of at least the same climatic changes) indicate significant relief rebuilding during interglacial period probably at the end of the middle Pleistocene.

Modern river incision and glacial deepening of the valleys, vertical displacements up to 50-100 m that cut the Pleistocene cirques, kars and troughs, great amount of giant seismically induced gravitational slope movements in the late Pleistocene moraines point out the ongoing Holocene uplifting and widening of the ridges of Russian Altai. Strong modern earthquakes in Russian and Goby Altai argue that the process of tectonic rebuilding of this mountain system which started at the edge of the middle- and the late- Pleistocene hasn't been completed yet.