Geophysical Research Abstracts, Vol. 9, 07966, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-07966

Incision of fluvial terraces within an uplifting massif in the Gobi-Altay mountain range (Mongolia) : deciphering between tectonic and climatic processes

R. Vassallo (1), J-F. Ritz (2), R. Braucher (3), M. Jolivet (2), S. Carretier (4), C. Larroque (1), M. Todbileg (5), A. Arzhannikova (6), S. Arzhannikov (6) and D. Bourlès (3)

(1) Géosciences Azur, Sophia-Antipolis, Valbonne, France, (2) Laboratoire Dynamique de la Lithosphère, Université Montpellier II, France, (3) CEREGE, Aix-en-Provence, France, (4) LMTG, Toulouse, France, (5) Mongolian University of Science and Technology, Ulaan Baatar, Mongolia, (6) Institute of Earth Crust, Irkutsk, Russia.

Our study focuses on the evolution of the drainage network of a massif in an intracontinental transpressional domain during the Pleistocene-Holocene. The Ih Bogd massif, situated along the Bogd fault, a major intracontinental active strike-slip fault in the eastern Gobi-Altay (Mongolia), presents a morphology exceptionally well preserved and shows clear relationships between topography and structures. This allows the analysis of the morphological and tectonic evolution, and to better understand the mechanisms and the timing of the interactions between climate and tectonics within an uplifting massif in an arid context. We coupled morphotectonics and 10Be dating of strath terraces in the main drainage basin of Ih Bogd massif.

The morphology of the catchment-piedmont system strongly suggests a periodical formation of the alluvial surfaces, controlled by the climatic pulses, at the beginning of the wet interglacial periods. The incision rate deduced from the different elevations of straths (up to 6 mm/yr) exceeds of one order of magnitude the rock uplift rate (0.3 - 1 mm/yr). This excess is mostly due to ongoing drainage network growth at the core of the massif, and subsequent incision due to alluvial apron entrenchment near the outlet. This implies that fluvial response is mainly controlled by drainage growth, interaction with piedmont and cyclic climatic variations, rather than by rock uplift.