Geophysical Research Abstracts,
Vol. 11, EGU2009-3677, 2009
EGU General Assembly 2009

Eocene Tibetan Plateau remnants preserved in the Northwest Himalaya

P.A. van der Beek (1), J. Van Melle (1), S. Guillot (1), A. Pêcher (1), P.W. Reiners (2), S. Nicolescu (2), and M. Latif (3)

(1) Laboratoire de Geodynamique des Chaînes Alpines, Université Joseph Fourier, Grenoble, France (pvdbeek@ujf-grenoble.fr, +33-476-51 40 58), (2) Department of Geosciences, University of Arizona, Tucson, USA, (3) Geological Survey of Pakistan, Islamabad, Pakistan

The northwest Himalaya shows strongly contrasting relief, opposing deeply incised mountain ranges characterized by extremely rapid exhumation and some of the highest peaks in the world (i.e., the Karakorum range and Nanga Parbat massif) to high-elevation, low-relief areas such as the 4000-m high Deosai plateau in northern Pakistan and the 5000-m high Tso Morari in Indian Ladakh. The origin and evolution of such plateau regions in the syntaxis of the most active continental collision in the world remain elusive. Here, we report the first low-temperature thermochronology (apatite fission-track, apatite and zircon (U-Th)/He) data from the Deosai plateau and use thermal history modelling to show that it has undergone continuous slow ($\leq$ 200 m/Myr) denudation and has thus remained tectonically stable for the last 35 Myr at least. The inferred history of constant slow denudation of the plateau contradicts the hypothesis that widespread low-relief surfaces in the northwest Himalaya result from efficient, km-scale glacial erosion during Quaternary times; such erosion would have been recorded as a phase of rapid recent denudation that is not observed in the data. Slow continuous denudation since Eocene times, i.e. only 15-20 Myr after the onset of India-Asia collision implies that the Deosai plateau surface developed early in the Himalayan history and limits the phase of orogenic relief growth in the Ladakh-Kohistan arc to the early Paleogene. Although thermochronology data do not directly record surface uplift, the simplest explanation for the inferred constant denudation rates is that the plateau had reached its present-day elevation already during the Eocene, as a later phase of surface uplift would have triggered an erosional response that would have been recorded by the thermochronology data. We use morphological analyses to characterise such plateaux and identify them at the scale of the entire northwest Himalaya and compare our thermochronological data with scattered published data from the other plateau and low-relief summit regions in the northwest Himalaya. We show that the plateau regions share common morphologic characteristics and denudation histories, which are comparable to those of the western Tibetan plateau. These results imply that they may be preserved remnants of an Eocene south-western Tibetan plateau that was more widespread than today and that was subsequently dissected by rivers following major faults.