Geophysical Research Abstracts
Vol. 12, EGU2010-3097, 2010
EGU General Assembly 2010


# Minimal erosion in central Tibet since the Eocene and implications for plateau development

Alexander Rohrmann (1,2), Paul Kapp (2), Peter Reiners (2), Jerome Gyunn (3), and Barbara Carrapa (4)

(1) Institut für Geowissenschaften, Universität Potsdam, Potsdam, Germany (rohrmann@geo.uni-potsdam.de), (2) Department of Geosciences, University of Arizona, Tucson, USA, (3) Exxon Mobil Exploration Company, Houston, USA, (4) Department of Geology and Geophysics, University of Wyoming, USA

The growth history of the Tibetan plateau remains elusive, despite its importance for assessing mechanisms of continental lithosphere deformation and associated changes in surface elevation and climate system dynamics. In contrast to the actively growing plateau margins, the interior of the modern Tibetan plateau is characterized by extremely low erosion rates. We present the first apatite (U-Th)/He low-temperature thermochronologic results from samples collected away from late Cenozoic rifts in the Lhasa and Qiangtang terranes of central Tibet. These data are complemented by apatite fission-track and K-feldspar 40Ar/39Ar results, to construct continuous cooling histories. The data indicate that in most places, low erosion rates ($< \sim 0.05$ mm/yr) were established by the time India collided with Asia $\sim$50 Myr ago, following earlier episodes of more rapid exhumation that correspond in time with documented Cretaceous – Eocene thrust belt activity. Findings of large-magnitude ($\geq$50%) upper-crustal shortening and substantial exhumation prior to 50 Myr ago, followed by minimal subsequent denudation, support the establishment of a proto-plateau in central Tibet prior to the Indo-Asian collision. Collectively, the exhumation history of central Tibet, away from the influence of late Cenozoic rifts, contrasts sharply with that of the Lhasa region in the southern Lhasa terrane and near the modern margins of the plateau which show prominent erosional signatures of the Indo-Asian collision. Any viable model of plateau development must explain these prominent spatial variations in exhumation history as well as the lack of a corresponding expression in the modern topography.