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A new Research Project on the Dynamic Processes beneath the Northern Tibetan Plateau

Felix M. Schneider (1), Xiaohui Yuan (1), Frederik Tilmann (1), and Rizheng He (2)

(1) Helmholtz Centre Potsdam German Research Centre for Geosciences - GFZ, Germany (felix.schneider@gfz-potsdam.de), (2) CAGS - Chinese Academy of Geological Sciences, Beijing, China

We present a new Sino-German cooperation project in the northern Tibetan plateau: *Unraveling the Dynamic Processes beneath the Northern Tibetan Plateau - Paleozoic Collision and Cenozoic Destruction of Mantle Lithosphere and Plateau Uplift*. The project is funded by the German Research Foundation (DFG) and the National Natural Science Foundation of China (NSFC) and involves seismic experiments as well as data analysis. The project aims to study fundamental questions on plateau building, processes that modify and destroy continental lithosphere and which control lithospheric dynamics beneath orogenic belts.

The northern Tibetan Plateau features widespread Cenozoic volcanism. While the multiple terranes that constitute the Tibetan plateau become older from south to north, the magmatic events within the plateau become younger from south to north. This indicates more recent tectonic acitivity in the northern Tibetan plateau, which is in fact expanding towards Northeast. Seismic observations beneath Northern Tibet show poor Sn wave propagation and low Pn wave velocities, while the shallow mantle shows low seismic velocities and strong seismic anisotropy.

What is causative for those observation and what is the mode and mechanism of uplift in Northern Tibet? Is it either caused by thickening of the Indian and Eurasian mantle lithosphere or are those observations rather explained by removal of Eurasian mantle lithosphere? What is the extend of the Indian plate beneath Tibet? Does a gap between Indian and Eurasian mantle lithosphere exist or do they meet beneath northern Tibet?

Northern Tibet is constituted of the Hoh Xil Songpan-Ganzi and the North Qingtang terranes, which collided in the Triassic (around 250 Ma). What is the subduction polarity of the Paleozoic Tethys ocean separating both terannes? Is the Triassic fault reactivated in Cenocoic as indicated by a Moho jump at the fault location?

To tackle those questions we plan to deploy and analyze two linear passive-source seismic arrays in northeastern Tibet as well as to include in our analysis data from the temporal TITAN deployments, that have been conducted in Tibet from 2008 to today. To resolve the crustal and upper mantle structure of the area we are performing surface wave tomography using ambient noise and earthquakes and plan to jointly invert them with receiver functions. We will present a project overview as well as first results.