Geophysical Research Abstracts
Vol. 15, EGU2013-1560, 2013
EGU General Assembly 2013

The deep structure beneath the Pamir - Hindu Kush region from teleseismic tomography

Sofia-Katerina Kufner (1), Bernd Schurr (1), Xiaohui Yuan (1), Marcelo Bianchi (1), Christian Haberland (1), Christian Sippl (1), Felix Schneider (1), and Anatoly Ischuk (2)

(1) GFZ, Potsdam, Germany (kufner@gfz-potsdam.de), (2) Tajik Academy of Sciences, Dushanbe, Tajikistan

The Pamir – Hindu Kush orogenic system is surely one of the least studied corners along the India-Eurasia collisional belt despite featuring several tectonically unique features. The lack of modern geophysical data from the region left the deep processes and structures that cause and host the unique intermediate depth earthquakes here mostly in the dark. To shed light on some of these processes we image the seismic velocity structure in the upper mantle and transition zone. We implemented a tomographic inversion for P-wave velocities based on teleseismic earthquakes recorded at temporal and permanent seismic stations within the study region.

Our study is mainly based on the temporary seismic deployments from the TIPAGE (Tien Shan Pamir Geodynamic Project), FERGHANA and TIPTIMON (Tien Shan Pamir Monitoring Program) projects. Within the framework of these projects, 40, 20 and 25 mostly broadband stations were deployed from mid-2008 to mid-2010 and from June 2012 onwards within Tajikistan and Kyrgyzstan. These data were complemented by a similar number of permanent stations covering in the course most of central Asia. We measured so far more than 30,000 phase arrivals from approx. 700 earthquakes occurring at epicentral distances between 20 to 180 degree. This data set is inverted simultaneously for velocity anomalies and station corrections. To account for the large variations of crustal thickness beneath the study region, we implemented a newly determined Moho model for the Pamir and surroundings, which is based on receiver function analysis.

The resulting tomographic model extends to depths of approximately 500 km and covers the area between 67 to 79 degree East and 36 to 44 degree North. We will present preliminary P wave velocity images based on the currently available data set.