Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10216, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10216
EGU General Assembly 2008

Crustal velocity structure of the Rwenzori region, Uganda, from isotropic and anisotropic travel-time tomography

A. Jakovlev (1), G. Rümpker (1), I. Koulakov (2), N. Ochmann (3)

(1) J. W. Goethe University of Frankfurt am Main, Germany, (2) Institute of Petroleum Geology and Geophysics, SB RAS, Novosibirsk, Russia, (3) BGR, Hannover, Germany (jakovlev@geophysik.uni-frankfurt.de / Fax: +49 (0) 69-79840131, Phone: +49 (0) 69-79840147)

The Rwenzori region in Uganda forms part of the western branch of the East-African rift system. During the period from May 2006 to October 2007, a temporary seismological network was operating in the area to constrain the seismic structure of the crust and upper mantle from recordings of local and teleseismic earthquakes. Here we use local earthquake tomography to resolve the 3D velocity structure of the crust down to a depth of about 20 km. Results based on P and S-wave arrival times exhibit a pronounced negative velocity anomaly near the western flank of the Rwenzori Mts. in the upper 5 km. At the surface, this area is characterized by geothermal activity in relation to the Buranga hot springs. As depth increases the negative anomaly gradually widens and shifts to the East. The results are supported by sensitivity tests to constrain the resolving power of the data. We also made an attempt to derive the 3D anisotropic velocity structure in the region. For the anisotropic inversion, we assume that the elastic properties of the crust can be characterized by a simplified form of transverse isotropy, which can be defined by four parameters: a fast and slow velocity and two angles to determine the orientation of the fast velocity axis. Average isotropic velocity variations obtained from the 3D anisotropic model are in good agreement with the results from the purely isotropic inversion. We find that the fast axes in the northern region of the Rwenzori Mts. are dominantly oriented NS, approximately parallel to the strike of mayor faults. Several tests are performed to constrain the uncertainties of the model.