



New crustal model of South America based on seismic data

Alexey Baranov

Schmidt Institute of Physics of the Earth, Russian Academy of Sciences, Geodynamics laboratory, Moscow, Russian Federation (baranov@ifz.ru)

The continental crust is the most heterogeneous layer within the Earth.

Previous global crustal model (CRUST 2.0 [2]) for South America has resolution 2x2 degree. A lot of new seismic data became available during last years. The existing data were verified and crosschecked.

We use data of deep seismic reflection, refraction and receiver functions studies and existing regional models from published papers and integrate them in a new model at a uniform grid with resolution 1x1 degree. It was used approximately 70 papers with seismic and gravity data. We use the same technique as for Asia region (AsCrust-08 [1]). First result is a new Moho map for the region. The new map demonstrates the large differences with previous models. It turns out that many regions are more heterogeneous than it was demonstrated by the previous compilations. The thickness of the crust ranges between 18 km on the Peruvian coast and 65 km beneath the central Andean plateau. The complex crustal model consists of three layers: upper, middle and lower crust. Besides depth to the boundaries, we provide average P-wave velocities in the upper, middle and lower parts of the crystalline crust. Limits for V_p velocities are: for upper crust 5.7-6.2 km/s, for middle 6.0-6.6 km/s, for lower crust 6.6-7.4 km/s. Also we recalculated seismic P velocity data to density in crustal layers using Nafe-Drake dependence and age of the crust.

Results:

Moho map and the velocity structure of the crust are much more heterogeneous than in previous maps CRUST 2.0 (Bassin et al., 2000), and CRUST 5.1 (Mooney et al., 1998). Our model offers a starting point for numerical modeling of deep structures by allowing correction for crustal effects beforehand and to resolve trade-off with mantle heterogeneities. This model can be used for the gravity modeling of the lithosphere and mantle structure.

[1] A. A. Baranov,

A New Model of the Earth's Crust in Central and South Asia.

Izvestiya, Physics of the Solid Earth, 2010, Vol. 46, No. 1, pp. 34–46.

[2] Bassin, C., G. Laske, G. Masters,

The Current Limits of Resolution for Surface Wave

Tomography in North America, // EOS Trans AGU. 2000. 81(48), Fall Meet. Suppl., Abstract F897. (<http://mahj.ucsd.edu/Gabi/rem.html>)