



AntarcticCRUST-08: New crustal model of Antarctica region based on seismic data - next step for building global crustal model with resolution of 1 x 1 degree

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Different tectonic units cover the Antarctic territory: platform, orogen and depression structures. This structural variability is reflected both in thickness and physical properties of the crust. Previous crustal model (CRUST 2.0. Bassin et al. 2000 [1]) have 2x2 degree resolution and don't meet present-day requirements.

A lot of new seismic data and regional compilations became available during last several years. We used data of deep seismic reflection, refraction and receiver functions studies as well as existing regional models (e.g. for Maud Land region, Hoffmann et al., 2003 [2]) from published papers and integrate them in a new model at a uniform grid with resolution of 1x1 degree. A new digital 3D model for the crust of Western and Eastern Antarctica and surroundings have been built. The existing data were verified and crosschecked. We present a suite of crustal models within the main tectonic units: West Antarctica rift system (WARS), the Transantarctic Mountains (TAMs), and East Antarctica (EA). As the first result, we demonstrate 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 crustal model comprises 3 layers of crystalline crust. For each of the three basic layers the thickness and the P-wave seismic velocity (V_p) are displayed. The West Antarctic rift system is one of the largest zones of continental extension on the Earth. The seismic data show a thin extended continental crust. Crustal thickness of WARS is variable from 21 km in the Bentley subglacial trench, to 32 km in the southern flank of the Marie Byrd Land. Transantarctic Mountains: 4000 km long, peaks 4 km above Sea Level, 200-300 km wide. TAMs are characterized by the rather strong variations of the Moho depth (28-40 km). Further inland, beneath the TAM, the estimated Moho depths range from 30-33 km (30 km from the coast) to 36-40 km (85 km from the coast), deepening away from the coast beneath the TAM. Crustal thickness of EA is variable from 31 km in the Wilkes basin, to 50 km in the Western Maud Land Region. This crustal model also should be used in the gravity modeling and in the modeling of the upper mantle.

[1] Bassin et al., The Current Limits of Resolution for Surface Wave Tomography in North America, // EOS Trans AGU. 2000. 81(48), Fall Meet. Suppl., Abstract F897. (<http://mahi.ucsd.edu/Gabi/rem.html>)

[2] M. Hoffmann, A. Eckstaller, W. Jokat, H. Miller, 2003. Development of a 3-D Crustal Model in the Western Dronning Maud Land Region, Antarctica, from the Interpretation of different geophysical data sets.