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The global Moho depth map for continental crust

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Different tectonic units cover the continents: platform, orogens and depression structures. This structural variability is reflected both in thickness and physical properties of the crust. We present a new global Moho map for the continental crust, derived from geophysical data selected from the literature and regional crustal models. The Moho depth is represented with a resolution of 1x1 on a Cartesian grid. A large volume of new data has been analyzed: mostly active seismic experiments, as well as receiver functions and geological studies. We have used the following regional studies: for Europe and Greenland, models EPcrust [Molinari and Morelli, 2011]and EUNAseis [Artemieva and Thybo, 2103]; for North Asia, Moho models from [Cherepanova et al., 2013; Iwasaki et al., 2013; Pavlenkova, 1996]; for Central and Southern Asia, model AsCrust [Baranov, 2010] with updates for India [Reddy and Rao, 2013]; China [Teng et al., 2013];Arabian [Mechie et al., 2013]; for Africa, the model by [Pasyanos and Nyblade, 2007] as a framework and added many others regional studies; for South America, models by [Assumpção et al.,2013; Chulick et al.,2013; Lloyd et al., 2010]; for North America, the model by [Keller, 2013]; for Australia, the model by [Salmon et al., 2013]; for Antarctica, model ANTMoho [Baranov and Morelli, 2013] with update for West Antarctica (POLENET project, [Chaput et al., 2013]). For two orogens we have found the maximum depth at - 75 km (Tibet and Andes). In our model the average thickness of the continental crust is about 34 km (st. deviation 9 km) whereas in CRUST 2.0 model the average Moho for continental areas is about 38 km. The new Moho model for continents exhibits some remarkable disagreement at places with respect to global model CRUST 2.0. The difference in crustal thickness between these two models may amount up to 30 km, mainly due to improved resolution of our model's Moho boundary. There are significant changes in several regions: among them, Darfur, Africa (-22 km); Madagascar (-28 / +14 km), Andes (-30 km); Parana delta, South America (-20 km); California (-20 km); Gamburtsev Mountains, East Antarctica (+24 km). Such analysis remains in large part true also for a comparison with the Moho from the recent CRUST 1.0 model, except for a better agreement in the Americas. Our model provides a starting point for numerical modeling of deep mantle structures via a thorough revision of the crustal effects in the observed fields. This model will be used as a starting point in the gravity modeling of the lithosphere and upper mantle structures. Also it may be used for wave propagation modelling at continental scale, crustal correction in tomography and other seismological applications. The new model will be available for download in digital format. We plan to update the model in the near future by including new data, particularly in the most poorly covered regions.