Abstract

Poland is located on conjunction of major European tectonic units the Precambrian East European Craton and the Paleozoic Platform of Central and Western Europe. This conjunction is known as Trans-European Suture Zone (TESZ). Geological and seismic structure under area of Poland is well studied by over one hundred thousand boreholes, over thirty deep seismic refraction and wide angle reflection profiles and other methods: vertical seismic profiling, magnetic, gravity, magnetotelluric, thermal. Compilation of these studies allows creation of detailed, high-resolution 3D P-wave velocity model for entire Earth's crust in the area of Poland. Model provides detailed six layer sediments (Tertiary and Quaternary, Cretaceous, Jurassic, Triassic, Permian, old Paleozoic), consolidated / crystalline crust and uppermost mantle. Continental suturing is a fundamental part of the plate tectonic cycle, and knowing its detailed structure allows understanding plate tectonic cycle. We present a set of crustal cross sections through the TESZ, illustrating differentiation in the structure between Precambrian and Wariscan Europe. National Science Centre Poland provided financial support for this work by NCN grant DEC- 2011/02/A/ST10/00284.

P-wave velocities in sediments



Tectonic sketch of the pre-Permian Central Europe in the contact of the East European Platform, Variscides and Alpine orogen. Blue frame shows location of the study area in Poland



the background of the geological division o Poland (Sokołowski 1968)



Velocity-depth distribution for all units and geo cal periods. The numbers of used boreholes are given in brackets. Total of 1188 boreholes were used in this study.



P-wave seismic velocities for the old Paleozoid sediments measured in boreholes (thin blue lines) and "virtual boreholes" from seismic prof les (thin green lines) among with moving of velocities average with depth (thick red lines) a fitted polynomial (thick black lines). Data from 492 boreholes and 741 "virtual boreholes" were used







High-Resolution 3D P-Wave Velocity Model in the Trans-European Suture Zone in Poland

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TQ average Vp [km/s]



Old paleozoic thickness [m]

Old paleozoic avg Vp [km/s]



1.5 2.0 2.5 3.0 3.5 4.0 4.5 5.0 5.5



Cretaceous average Vp [km/s]





Upper crust average Vp [km/s]

Profile P1: oryginal profile 2D model

