



Structure of the Precambrian lithosphere along the CELEBRATION05 profile: constraints from geological and non-seismic geophysical data

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The crust in the Fennoscandian part of the Belarus-Baltic region is composed of Palaeoproterozoic terranes with different age and varying grades of metamorphism. 1.9-1.85 Ga amphibolite- to granulite-facies Belarus-Lithuanian terrane comprises the NW stretching Belarus-Podlysie (BPG) and East Lithuanian (EL) belts. Ca. 1.5 Ga EW-trending Polotsk-Kurzem fault zone (PKZ) clearly offset the pre-existing tectonic pattern. Available age determinations and PT studies demonstrated genetically different granulite terranes south and north from the PKZ, suggesting independent development of the terranes until 1.71-1.66 Ga ago (Bogdanova et al., 2001). Recently, the CEL05 wide-angle reflection and refraction profile revealed an upper mantle reflector beneath the southern margin of the PKZ at a depth of 60 - 65 km and difference between crustal and upper mantle P-wave velocities beneath the BPG and northern part of the PKZ (Grad et al., 2005). In our study we tried to find more evidence of this difference using other geophysical data. The 3-D gravity modeling of the area around CEL05 modeling showed that the BPG and PKZ have different density values in the crust. Two conductivity anomalies at a depth of 20 km and of about 120 km have been detected by previous MT studies within the PKZ. This suggests that the PKZ represents an ancient terrane boundary that may be reactivated ca. 1.5 Ga ago. The Telsiai and Druksiai Shear Zones in the Lithuanian part of the PKZ may be related to deformation zones in SE Sweden (Vejelyte and Motuza, 2004). Recent earthquakes near the city of Kaliningrad caused by a strike-slip movement along NW-SE trending fault (Wiejacz, 2004) suggest that this zone may be a present-day intra-plate tectonic boundary. This study is partly supported by the Swedish Institute Visby Programme.