Palaeoproterozoic accretionary tectonics in the western part of the East European Craton as evidenced by geology and the EUROBRIDGE seismic experiment

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EUROBRIDGE multidisciplinary studies of the lithosphere in the East European Craton demonstrate the presence of juvenile Palaeoproterozoic crust which preserves geological and geophysical evidence of accretionary plate tectonics. Outboard of the Archaean protocontinent of Sarmatia there are several terranes younging from 2.2 to 1.9 Ga toward NW. Farthest out and youngest is the ca. 1.85 Ga West Lithuanian terrane that continues the crust in southernmost Scandinavia. The crystalline crust is three-layered, its variations in thickness, seismic velocity values, reflectivity and seismic structure generally corresponding to the geological subdivisions. The Moho relief is closely connected with the crustal structures, and the older crust is the higher Moho velocities appear to be. The 2.1-2.0 Ga belts atop and along the margin of Sarmatia have crustal thickness of ca. 50-km and significant reflectivity of the mid- and lower crust. This crust has also high velocities consistent with exhumation of lower crustal rock-units during subduction/collision. In contrast, the ca. 1.9-Ga crust to NW is relatively homogeneous with a thick lower crust.The West Lithuanian terrane has a specific seismic pattern and separated from the adjoining crustal belts by ca. 1.7-Ga boundary reaching into the mantle. The crust is 44 -km thick and features an upper crustal low-velocity layer defined by ca. 1.6 Ga anorthosite- and rapakivi intrusions.The observed crustal seismic/density structure and the upper mantle along EUROBRIDGE is mostly the result of the Palaeoproterozoic accretionary tectonics including a range of subductional-collisional events between ca. 2.0 and 1.7 Ga.