Geophysical Research Abstracts, Vol. 5, 02239, 2003

WHY DOES THE EAST EUROPEAN PLATFORM HAS 3 KM OF SEDIMENTS? INSIGHTS FROM LITHOSPHERIC STRUCTURE, THERMAL REGIME, AND COMPOSITION

Irina M. Artemieva

EOST-IPG, Strasbourg 67084, France (irina@eost.u-strasbg.fr)

The East European Craton (EEC) comprises two Archean shields and the vast buried early Proterozoic East European Platform (EEP), that was rifted in Proterozoic and Paleozoic. The study seeks the answer how the tectono-magmatic events modified the lithosphere of the EEC and if they are responsible for the Phanerozoic subsidence of the EEP. To examine how the subcrustal lithosphere of the EEC was affected by Proterozoic-Paleozoic tectonic processes, (1) thermal regime of the lithosphere is analyzed from surface heat flow data, (2) lithospheric density variations of non-thermal origin are calculated from free-board constraints. Moho temperatures in the entire EEC follow the global trend for stable continents of crustal temperature variations with tectono-thermal age. Lithospheric thermal thickness is about 250-300 km for the ancient part of the Baltic Shield and decreases to 150-180 km in most of the EEP. While Proterozoic rifting is not reflected in the present thermal regime of the EEC, Paleozoic rifting resulted in a pronounced lithospheric thinning (to 120-140 km) in the southern parts of the EEP. The lithosphere of the Kola-Karelian province of the Baltic Shield is ~ 1.4 +/- 0.2 percent less dense than the Phanerozoic upper mantle. Lithospheric depletion (density deficit) is only about (0.4-0.8) +/- 0.2 percent for most of the EEP and decreases southwards to ~ 0 percent, the value found for the Phanerozoic lithosphere of western Europe. Low depletion values found for the EEP are typical of a younger lithosphere and suggest strong metasomatic modification of the platform lithosphere during Proterozoic and Paleozoic rifting. The results suggest that this rifting-related metasomatism led to the Phanerozoic subsidence of the EEP.