Geophysical Research Abstracts, Vol. 8, 07649, 2006
SRef-ID: 1607-7962/gra/EGU06-A-07649

Impact of plate margin processes on the establishment of the cratonic Baltic and Moscow basins, Late Vendian-Early Palaeozoic

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The epeirogenic Baltic and Moscow basins were established in Late Vendian-early Palaeozoic times on the East European Craton. They show different underlying tectonic frameworks. The Moscow Basin is superimposed on a Middle-Late Proterozoic rift system, whereas the Baltic Basin does not show any evident tectonic precursors. The developement of these basins occurred as a response of the lithosphere to processes along the Baltica plate margins, i.e. the dissemination of the Rodinia supercontinent. A simple post-rift basin stage cannot explain the origin of the Moscow depocentre in the Late Vendian, as there is a considerable time span between the syn-rift and epeirogenic basin stages. The onset of basin subsidence took place immediately after igneous activity terminated in adjacent rift systems. It is implied that (extensional) tectonic stresses may have been redistributed in the craton as the Early Vendian rifts grew stronger, leading to a shift of strain accumulation to other regions. The Moscow Basin overlies the junction zone between the major crustal segments of Fennoscandia, Sarmatia, and Volgo-Uralia. The main part of the basin is confined to the first segment, which is the youngest (and weakest?) of the three segments. The Baltic Basin, linked to the Moscow depocentre in the east, was established in Cambrian time and was related to the opening of the Tornquist Sea to the west. Based on rheological modelling, it is confined to an area of weak lithosphere. The modelling indicates that tectonic extension of the order of 1012 Nm can induce subsidence of a few hundred metres, which is sufficient to explain the thickness of Cambrian deposits in the Baltic region. In summary, in-plane tectonic forces are likely involved in the establishment of large intra-cratonic depocentres during the incipient stages of the development of the East European Platform.