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New look at the boundary of Precambrian and Palaeozoic Europe – recent deep seismic data from the SW margin of the East European Craton in Poland

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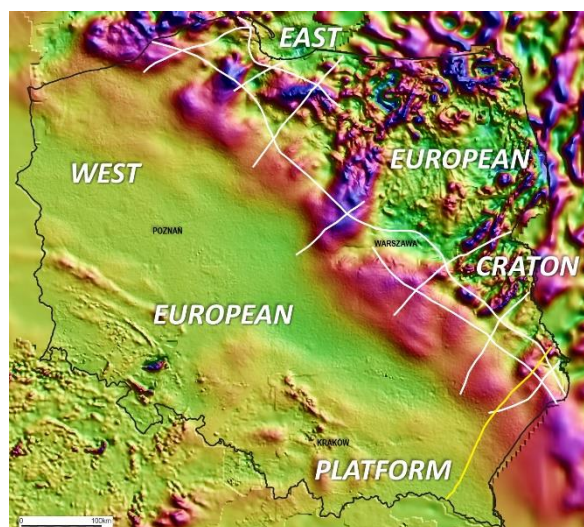
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The SW edge of the East European Craton (EEC) in Poland is limited by the Teisseyre – Tornquist Zone (TTZ) that marks a boundary with the Palaeozoic West European Platform. The recently acquired regional deep reflection survey PolandSPAN and the re-interpreted POLCRUST-01 deep seismic profile (respectively white and yellow lines on Fig. 1) revealed new features of the cratonic basement and its sedimentary cover, allowing for better understanding of the relationship between the EEC and Palaeozoic Platform.



In the NW segment of the study area analysis of seismic data integrated with gravity-magnetic modelling suggest the association of the TTZ with a thin-skinned fold-and-thrust belt involving Ordovician and Silurian sediments of the Caledonian foreland basin. The Caledonian deformation front was developed due to the buttressing effect of a basement ramp occurring directly above the TTZ that represents a Precambrian suture buried beneath the foreland basin and overprinted by successive extensional tectonics. In front of the Caledonian orogenic belt thick Silurian foredeep sedimentary wedge developed above the Cambrian-Ordovician Baltica passive margin sequence.

Figure 1: Magnetic map of Poland

Foredeep infill is underlain by a regional onlap surface caused by a progradation of the foredeep infill toward the cratonic interior. The ensuing tectonic evolution included latest Carboniferous regional uplift and erosion and Permo-Mesozoic subsidence punctuated by Triassic thick-skinned normal faulting and Late Jurassic regional uplift and erosion within the NW part of the study area, followed by Late Cretaceous – Paleogene regional inversion.

Deep seismic data from SE Poland revealed that the SW edge of the EEC is overthrust by an approx. 15 km thick thrust stack (Radom – Kraśnik Block, RKB) that imbricates Neoproterozoic to Devonian

sediments. Its leading edge corresponds to a triangle zone related to the jump of the basal detachment from a basement-cover interface to Silurian shales. A minor amount of slip that has been conveyed to the Lublin Basin – a major Palaeozoic sedimentary basin filled by Neoproterozoic – Carboniferous strata and located in front of the RKB - was accommodated by gentle thin-skinned compressional deformations of the post-Silurian series. The data available from W Ukraine suggest that key elements of this Variscan thin-skinned thrust system continue south-eastward, where they ultimately plunge under the Carpathians.