

INTERPRETATION OF POTENTIAL FIELD ANOMALIES AND PETROPHYSICAL PROPERTIES OF THE FENNOSCANDIAN SHIELD

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The Geological Surveys of Finland, Norway and Sweden, together with the Northwest Regional Geological Centre of Russia and its subsidiaries, compiled Precambrian Geological Map, Magnetic DGRF-65 Anomaly Map and Bouguer Anomaly Map 1:1,000,000 of the Fennoscandian Shield plus joined their information on density and magnetic properties of 232,000 bedrock samples in 1997 - 2000. The goals of the project include finding geophysical characteristics to distinguish exposed Precambrian rocks (Fennoscandian Shield) from surrounding rocks of the same age, covered by Phanerozoic sediments (East European Platform). The boundary of the Shield is not shown in the magnetic, pseudogravimetric or Bouguer anomaly signatures. Instead both regional and local magnetic anomalies are low in the central part of the Shield, and roughly concentric with the Fennoscandian land uplift area. The average of magnetic anomaly increases to a radius of 500 km and drops near zero outside. At the bedrock surface this regional positive anomaly ring is associated with Neoarchaeon-Mesoproterozoic igneous rocks, mainly acid in composition. Correlation with petrophysical properties reveals that the anomalies are partly caused by unexposed sources at depth. Study is going on upon the geological nature of the structure and its possible connections to other lithospheric characteristics of the Shield. A comparison of internal and external genetic models is made. The Shield outside the structure consists of accreted Precambrian terrains of Kola, Sveconorwegian orogeny and Lofoten area. These terrains are characterized by higher magnetization in their central parts, than in the border areas, thus differing in nature of the major central geophysical ring structure of the Shield.