

SIMILARITIES AND DISTINCTIONS BETWEEN TECTONIC-MAGMATIC PROCESSES IN EARLY PRECAMBRIAN AND PHANEROZOIC

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Geological, petrological and geochemical data indicate that tectonic-magmatic processes in the early Precambrian was rather different from the Phanerozoic ones. Judging on situation on the Baltic and other shields, there were no any evidence for plate-tectonic activity till 2 Ga ago. The main structural provinces were represented by coeval: (1) vast areas of extension with mantle- derived magmatism (granite-greenstone terranes with irregular network of greenstone belts in the Archean, and cratons in the early Paleoproterozoic with systems of grabens, large dyke swarms and layered intrusions); (2) granulite belts of moderate pressures with crustal-derived enderbite- charnockite magmatism among them; and (3) transitional mobile zones between these low- and high-grade terranes, evolved in extensional regime. As a whole, these provinces formed regional structural zonation. Situation could be described in terms of plume tectonics. Composition of the mantle-derived melts was also different from the Phanerozoic: komatiite-basaltic series in Archean and siliceous high-Mg (boninite-like) series in early Paleoproterozoic. This suggests another composition of mantle plumes formed in the former case by mildly- depleted ultrabasic source and highly depleted in the latter. Clear geological evidence of plate tectonics activity appeared only from 2 Ga ago, simultaneously with the first appearance of geochemically enriched Fe- Ti basalts, typical for the Phanerozoic within-plate magmatism. So, this boundary marked the main turning point in evolution of the Earth.