Tectonomagmatic evolution of the Earth and the Moon: comparative study

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Comparative study of tectonomagmatic evolution of the Earth and the Moon showed closeness of the lunar magmatism to the Palaeoproterozoic terrestrial one. Geological development of the both bodies became after solidification of their global magmatic oceans, which resulted in appearance the primordial sialic crust on the Earth and anorthositic on the Moon. The further tectonomagmatic evolution of the both bodies occurred in two major stages. On the Earth magmas, derived from depleted mantle sources, predominated in Archean and, especially, in the early Paleoproterozoic (2.5-2.2 Ga) when magmas of siliceous high-Mg series (SHMS) were common. At c. 2.2-2.0 Ga they were globally replaced by geochemically-enriched magmas (Fe-Ti picrites and basalts as well as high-Ti alkaline rocks); it was followed by changing of plume-tectonics to plate tectonics regime (Bogatikov et al., 2000).

On the Moon magmatic activity began on the highlands c. 4.4-4.35 Ga from the magnesian suite, which was rather close to the terrestrial SHMS on its geochemistry and isotopy. Such activity lasted till $\sim$3.9 Ga and was changed by plume-related basaltic volcanism including low- and high-Ti varieties, occurred within large maria depressions with thinned crust at the boundary 3.9-3.8 Ga. These magmas were close to MORB and OIB consequently.

Thus, the Moon, as compared to the Earth, evolved more quickly and by shortening scenario: on the both bodies a new enriched mantle-derived magmas began to involve in the processes on their outer shells at the middle stages of their evolution.

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Bogatikov, O.A. et al. (2000). Magmatism and Geodynamics. Terrestrial Magmatism throughout the Earth's History. Gordon and Breach. Publ., 511 p.