

SEDIMENTARY ENVIRONMENTS OF CRYOGENESIS AT THE ARCHEAN-PROTEROZOIC BOUNDARY

NEGRUTSA, T. F. Geological Institute of Kola Science Centre, Russian Academy of Sciences, Apatity, Russia

Two levels of cryogenic sediments of different age are distinguished among the Neo-Archean – Palaeoproterozoic rocks, which are represented by the Sumian and Sariolian in the eastern Baltic Shield, and among their age analogs in other regions of the world. These are various mixtites with features of tillite and tillite-like rocks. The cryogenic sediments are associated spatially with volcanics, arkoses and graywackes on the one hand, and with mature quartz clastic sediments, on the other. There is a regular change in time from highly mature monomict and oligomict sediments, formed in amagmatic basins in hot humid and intermittently humid climate to mesomict and polymict sediments, which are followed by volcanic rocks overlain and partially replaced along strike by the tillite and tillite-like rocks. Together they mark a complete transgressive-regressive cycle of tectogenesis, during which the platform type of lithogenesis was replaced by rifting and active subcrustal, locally crustal, volcanism producing central-type volcanic structures, which subsided to form caldera and initiated intensive denudation in cold and frosty climate. Two complete series of this succession indicative of periodic changes of landscape-tectonic environment and climate: approximately in the period of 2700-2530 and 2530-2350 Ma ago. The cryogenic environments characterize two time intervals lasting about 60 million years each: 2590-2530 and 2410-2350 Ma.

The study was supported financially through grant 97-05-64871 of Russian Foundation for Basic Research.