



The Archean Salma eclogites, Kola Peninsula, Russia: Petrology, geochronology and significance for insight into the Archean crust-forming processes

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Metamafic rocks were recently found in the central part of the Belomorian Mobile Belt, Baltic Shield that give evidence of hitherto unrecognized eclogite-facies metamorphic event and testify to the oldest now known high-pressure metamorphism worldwide. The eclogitic rocks referred to here as the Salma eclogites occur as hundred meter-scale bodies of coarse-grained Grt-Cpx-Pl-Hbl +/- Ky mass emplaced along with the grey gneisses of TTG affinity. Eclogite-facies metamorphism is indicated by widespread Cpx-Pl symplectites interpreted as the product of exsolution of the jadeite component from omphacite during decompression. In a few cases relicts of omphacite contained 32 mole% jadeite have been found amongst the symplectite colonies. Peak metamorphic conditions reconstructed for the Salma eclogite reached about 700°C and 14 -15 kbar. The study on the retrograde P-T evolution shows lower pressures, of only 10 to 11 kbar, but nearly the same temperature suggesting that Salma eclogites were uplifted into the crustal level extremely rapidly. The observed textures further show a retrograde amphibolite-facies overprint at pressures less than 10 kbar. The Salma eclogites disclose the direct evidence for their partial melting in situ which has occurred during the progressive stage of eclogitic metamorphism. The frozen silicic melts in the eclogites display the kyanite-bearing mineral assemblage of adakitic affinity which was formed under 670 - 710°C and 12.5 - 13.5 kbar. Zircons from the frozen partial melt have been dated both by LAS ICP-MS and SHRIMP II techniques and yielded two age populations of 2866-2875 Ma and 2755 - 2778 Ma, likely indicating the age of magmatic crystallization during eclogite-facies metamorphism and the age of recrystallization by the subsequent amphibolite-facies event, respectively.