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Eclogite-facies relics and inferred ultrahigh-pressure metamorphism in the North Dabie Complex, central-eastern China

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ABSTRACT

Mineral assemblages and microstructures of a newly identified (retrogressed) eclogite (sensu lato) in the North Dabie Complex (NDC), central-eastern China, indicate early very high-pressure metamorphic relics preserved in a dominant amphibolite-facies host, where no eclogite (sensu stricto) has been positively identified before. The investigated eclogitic rock shows distinct multistage recrystallization, with granulite- and amphibolite-facies assemblages overprinting eclogite-facies relics. The minimum temperature for the eclogite-facies metamorphism is estimated to be ~800–820 °C. A spectacular microstructure of oriented quartz needles (~2–20 μm wide, ~5–200 μm long) in matrix Ca-Na clinopyroxene implies the prior existence of a non-stoichiometric "supersilicic" omphacite stabilized at ultrahigh-pressure (UHP, ≥25 kbar) conditions, although no coesite or coesite pseudomorphs have been found in the samples. The absence of coesite may be due to the lack of free silica at UHP conditions or the consumption of silica during retrograde reactions. The inferred UHP conditions metamorphism is further supported by Sm-Nd ages that are equivalent to Triassic metamorphic ages from UHP eclogites in the southeastern Dabie Mountains. This finding expands the UHP terrane northward about 50 km; spatial distribution of subduction/collision-related UHP rocks includes parts of the NDC.