

EXOTIC NON-UHP TERRANE IN THE SULU UHP BELT, NE CHINA

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The small Haiyangsuo peninsula in the NE Sulu UHP terrane has discontinuous exposures of massive metagabbroic intrusives to foliated amphibolite and gneiss with minor granulite pods along the coast over an area of about 15 km². Petrologic and geochronological investigations indicate that these rocks show no evidence of eclogite-facies metamorphism and have Pre-Triassic zircon SHRIMP U-Pb ages for intrusion and metamorphism. Gneissic rocks are dominant and have protolith ages of about 2500 Ma; the Early Proterozoic (~ 1845 Ma) metamorphism formed layered amphibolite with minor granulite lenses in gneiss. Granulite displays first granulite-facies recrystallization of Grt (Alm₅₅₋₆₄GrS₁₈₋₁₉Prp₁₆₋₂₅) + Pl + Opx + Cpx + Qtz ± Prg ± Bt at about 1850 Ma and amphibolite-facies overprint for coronal Grt (Alm₄₂₋₅₈GrS₁₉₋₄₄Prp₁₄₋₂₅) around Pl together with Hbl + Pl at 415 ± 80 Ma. Gabbroic bodies are characterized by: (1) distinct intrusive contacts with foliated Grt-bearing gneissic rocks; and (2) the occurrence of pale reddish fine-grained coronal metagabbro in the cores of massive blocks, and gradational to garnet amphibolite near the margins. In coronal metagabbros, the primary assemblage of Opx (En₄₉₋₅₄) + Cpx (Jd₀₂₋₀₈Aug₉₂₋₉₈) + Pl + Ilm ± Qtz is well preserved. Most Opx and some Cpx grains are partially rimmed by aggregates of Amp (II) + Qz ± Ab, and fine-grained garnet coronas develop at interfaces between plagioclase and other phases; some smaller coronas consist of Cpx + Pl + Grt or Qtz + Cpx + Pl ± Grt. Garnet amphibolites display various extents of recrystallization: Opx was entirely replaced by Hbl but minor relict Cpx and primary textures are preserved. Plagioclase grains were pseudomorphosed by fine-grained Zo + Ky + Pl (II). With increasing amphibolite recrystallization, coarser idoblastic Grt (~ 0.4 mm), Hbl (0.2 - 0.5 mm), Zo (up to 0.3 mm), and Pl occur, and the corona texture is not apparent. Ilmenite is rimmed by titanite; no rutile was found. Zircon separates from metagabbro yield intrusive age of 1735 ± 21 Ma and amphibolite-facies recrystallization at 340 ± 40 Ma. These metamorphic and gabbroic rocks in Haiyangsuo were finally intruded by thin granitic dikes; zircon separates from one granitic dike yields complex metamorphic cores of 780 - 580 Ma and igneous overgrowth at 158 ± 3 Ma. The Jurassic dike is coeval with granitic intrusions in Rushan (15 km west of this region; SHRIMP U-Pb zircon ages of 161 ± 3 Ma) of the Sulu terrane. No Triassic age of 220 - 240 Ma was obtained for gneissic, mafic and granitic rocks of the Haiyangsuo region. These petrological and geochronological characteristics conclude that this region is exotic from the Triassic Sulu HP-UHP terrane in east China and was juxtaposed with the Sulu in Jurassic time.