

# **Clockwise metamorphic *P-T* path of hornblende eclogite rock from Nagaland Ophiolite Complex, NE India: new evidence of warm subduction**

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The Nagaland Ophiolite Complex (NOC) lies at the eastern margin of the Indian plate and marks the suture zone between the Indian plate and the Burmese microplate. Several high-pressure (HP) metamorphic rocks are recorded from this terrane, which gives us invaluable insights into the dynamics of Neo-Tethys oceanic crust subduction before the final India-Asia collision. In this work, a HP rock metamorphosed to hornblende eclogite facies is reported for the first time from the northern margin of the NOC. The protolith of the rock is a sedimentary rock and shows gneissic banding, consisting of alternating quartz-rich and amphibole-rich layering. Metamorphic *P-T* conditions and *P-T* path of the hornblende eclogite rock was determined with the help of phase diagram calculations in isobaric *T-MO<sub>2</sub>* and isochemical *P-T* space. Pseudosections were calculated in the MnNCKFMASHTO system using the software Perple\_X 6.9.1 [1] and the updated internally consistent thermodynamic data set of [2]. Prograde and peak metamorphic *P-T* conditions were determined with the help of isopleth thermobarometry. The hornblende eclogite rock shows prograde metamorphism in the lawsonite blueschist facies field at ~12 kbar and ~360 °C. The rock attained peak metamorphism at ~570 °C and ~14 kbar in the hornblende eclogite facies field. The post-peak retrograde *P-T* path appears to follow cooling during decompression, as evidenced by post-peak replacement of sodic-calcic amphibole by glaucophane and breakdown of rutile to titanite. Summarizing, the hornblende eclogite rock records a clockwise metamorphic *P-T* path. The peak *P-T* estimates of the hornblende eclogite rock suggests a geotherm of ~11.5 °C/km that indicates a warm subduction, as reported from the central part of the NOC.