

## Geodynamic implications of amphibolites from the Mariana forearc

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Naked forearcs, such as in the Izu Bonin Mariana system, are a unique window into the structure and development of the crust. JAMSTEC Shinkai diving in the S. Mariana forearc retrieved three amphibolites from an area dominated by peridotite. In this study, we explore the geochemistry and geochronology of these rocks and recover information about their origin and path to the collection site. This information has ramifications for the tectonic evolution of the IBM system and the fate of crust in oceanic terranes.

The recovered samples are a garnet amphibolite and two epidote amphibolites. The epidote amphibolites have trace element compositions similar to enriched MORB, whereas the garnet amphibolite is either a residue after melting or crystal cumulate. There is little to no evidence for the involvement of subducted fluids in the genesis of any of these samples. Sm-Nd, Lu-Hf, and <sup>40</sup>Ar-<sup>39</sup>Ar ages of the garnet amphibolite indicate ascent and cooling at 25 Ma. The high Lu/Hf ratio in the garnet amphibolite result in anomalously high bulk rock <sup>176</sup>Hf/<sup>177</sup>Hf ratios. Comparing the Hf and Nd isotopic values to those of oceanic basalts suggests a Mesozoic model age of original crystallization. This rock has an Al-in-hornblende peak pressure of 1.5 GPa.

We interpret the amphibolites to be the foundered and metamorphosed remains of crustal roots from Cretaceous-aged terranes around the IBM that ascended due to complex mantle dynamics in the S. Mariana Forearc around 25 Ma, coeval with the opening of the Parece-Vela Basin.