

Characteristics and Implications of Two Ophiolites “Trapped” within the West Philippine Suture Zone: the Case of the Sibuyan and Antique Ophiolite Complexes

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Abstract

The suture zone between the continent derived Palawan Microcontinental Block (PmB) and the oceanic – island arc related Philippine Mobile Belt (PMB) in central Philippines includes ophiolitic rock outcrops whose characteristics and current distributions provide information useful to continent-arc collision studies. These ophiolitic blocks are grouped into the Sibuyan Ophiolite Complex (SOC) in the Romblon Island Group (RIG) on the north and the Antique Ophiolite Complex (AOC) in western Panay Island on the south.

An interpretative reconstruction of the SOC and AOC suggest that these represent complete upper mantle and crust sequences consisting of harzburgites with subordinate dunites ± lherzolites, layered ultramafic and mafic rocks, isotropic gabbros, sheeted dikes/sills, and pillow basalts and basaltic/andesitic sheet flow units. Chert and mudstone in the RIG and chert, mudstone and rare calcarenite in the AOC conformably overlie the crustal sections. Also notable is the presence of serpentinite intrusions that enclose subrounded ophiolitic and chert megaclasts in Antique.

Paleontological analysis of the overlying sediments shows the presence of Late Cretaceous and Early to Middle Eocene faunal assemblages in rocks from Antique. Potassium-Argon isotopic dating on mica schists from two islands of the RIG yields ages of 12.2 ± 0.3 and 12.3 ± 0.3 Ma. Although these schists are in tectonic contact with the ophiolitic blocks, both are often considered as members of the basement complex of the RIG. The SOC and AOC were exhumed by the Middle Miocene based on the occurrence of ophiolitic clasts in sedimentary formations unconformably overlying the ophiolites.

Field and geochemical data indicate that the SOC probably consists of dismembered fragments of a subduction related marginal basin, whereas the AOC probably represents an agglomeration of oceanic ridge and fore-arc mantle-crust tectonic slices.