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A Review of Cuban Ophiolites: Structure and Tectonic Setting

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The Cuban Jurassic-Cretaceous ophiolite-related rocks crop out to the north of the island, along the so-called "northern ophiolite belt", one of the largest (> 1000 km in length) ophiolitic belts in the Caribbean. This belt is part of the Cuban fold belt, a tectonic unit made up of deformed and metamorphosed nappes accreted to the North America/ Yucatan margin during late Cretaceous to earliest Paleocene convergence. This process led to three important results: 1) closure of the proto-Caribbean ocean basin, 2) interruption of Cretaceous volcanic arc activity, and 3) tectonic emplacement of ophiolites. Cuban northern ophiolites represent fragments of an ancient oceanic lithosphere in which varied nature geological structure imbricated, frequently forming an ophiolitic mélange, which included blocks of high P/T metamorphic rocks. In the tectonic contact such ophiolite fragments are closely associated with pre-Albian, and Albian-Campanian volcanic arc sequences, although the relationship between them is still uncertain. In addition, ultramafic rocks occur as tectonic slabs of serpentinite (commonly associated with high-pressure rocks) embedded into a metasedimentary and/or metabasite matrix in terrains of continental nature and metamorphic complexes.

Even if they are tectonically dismembered, all the components of an ophiolite suite are to be well identified along the northern belt: mantle serpentinized peridotite, mantle-crust transition zone, banded and massive isotropic gabbros, diabase with no typical dyke swarm structure, and basaltic lavas, with associated pelagic sediments. On the other hand, geochemical features of mantle peridotites show tectonic affinities releated to both the suboceanic mantle peridotites, linked to suprasubduction areas, and the abyssal MOR peridotites. Geochemistry of the ophiolite-related basaltic lavas mostly reflects features of fore arc basalt as well as, in some cases probably contaminated MORB.

Several podiform chromitite bodies of bimodal composition are distributed along the northern ophiolitic belt. Chromitites occur mainly toward the upper part of a mantle tectonite close to, or in, the mantle-crust transition zone, generally forming lenticular bodies of varying sizes. Some bodies have been described embedded into banded gabbros. The chromitites predominantly exhibit massive textures with postmagmatic deformation prints, however fine disseminated and nodular textures are also present. The Cr-spinel chemistry and the varied parental magma suggest a suprasubduction zone environment during the chromitite formation process, with variations from the axial zone of a volcanic arc to the back-arc or fore-arc.

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