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Geochemical Features of a Subduction Initiation Ophiolite Type in Habana-Matanzas Region (Western Cuba)

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1 Abstract

We present new geochemical data for the upper mantle and crustal sections (whole-rock major and trace element compositions) as well as mineral chemical data, from the Northern Carbibbean ophiolites in the Habana-Matanzas region in Western Cuba. These ophiolites are part of the Northern Cuban Ophiolitic Belt (NCOB), extending for more than 1000 km along the island. The upper mantle peridotites are composed mainly of refractory harzburgite with tectonite textures, and show convex-downward patterns depleted in MREE normalized to chondrite values (McDonough and Sun, 1995). These geochemical trends are characteristic for depleted mantle wedge peridotites metasomatized by slab-derived, LREE enriched melts. The NCOB also includes abyssal peridotites having lower LREE/HREE ratios and displaying relatively homogeneous and flat patterns from MREE to HREE. These peridotites represent fragments accreted into the continental margin from a subducted oceanic lithosphere. Gabbro and dolerite units in the NCOB are systematically depleted in High Field Strength Elements (HFSE: Nb, Ta, Hf, Ti) and REE with respect to N-MORB (<1 X N-MORB). Their melt evolution was affected by subduction input. Spatially associated granitic rocks have a volcanic arc geochemical affinity. Some mafic extrusive rocks within the NCOB exhibit boninitic signatures, and may represent the products of subduction initiation magmatism, whereas other extrusive rock occurrences display N-MORB to E-MORB geochemical fingerprints, slightly modified by subduction derived fluids. Using these geochemical data and constraints, we present a tectonomagmatic model for the evolution of the NCOB within the framework of the Caribbean geology.

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