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Petrotectonic implications of metabasites of the Eastern Andean Metamorphic Complex at Lago O´Higgins-San Martin, southern Patagonia

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The Eastern Andean Metamorphic Complex (EAMC) in southwestern Patagonia (4°-52°S) is a 450 km long belt mainly composed by low-grade metasedimentary rocks of Upper Devonian-lower Carboniferous, and Permian-lower Triassic ages. Previous works have suggested a passive margin environment for the deposition of the protolith. The EAMC comprise scarce interleaved tectonic slices of marbles, metabasites, and exceptional serpentinite bodies. At Lago O´Higgins-San Martin (48°30'S-49°00'S) the metasedimentary sucessions are tectonically juxtaposed with lenses of pillowed metabasalts and greenschists having OIB, N-MORB, BABB and IAT geochemical affinities. The Nd-isotopic composition of metabasalts is characterized by $\varepsilon Nd_{(t=350\ Ma)}$ of +6 and +7. The metabasalts show no signal of crustal contamination, instead, the mantle source was probably modified by subduction components. New and already published provenance data based on mineralogy, geochemistry and zircon geochronology indicate that the quartz-rich protolith of metasandstones were deposited during late Devonian-early Carboniferous times (youngest single zircon ages around of latest Devonian-earliest Carboniferous times) sourced from igneous and/or sedimentary rocks located in the interior of Gondwana, as the Deseado Massif, for instance. Noticeable, the detrital age patterns of all samples reveal a prominent population of late Neoproterozoic zircons, probably directly derived from igneous and/or metaigneous rocks of the Brasiliano/Pan-African orogen or from reworked material from variably metamorphosed sedimentary units that crops out at the same latitudes in the extra-Andean region of Patagonia. We propose that the protolith of metabasites formed part of the upper part of an oceanic-like lithosphere generated in a marginal basin above a supra-subduction zone, where plume-related oceanic island volcanoes were generated. The closure of the marginal basin, probably in mid-Carboniferous times, or soon after. The oceanic lithosphere was likely underthrusted within an east-to-northeast-dipping subduction zone, where ophiolitic rocks and metasedimentary sequences were tectonically interleaved at the base of an accretionary wedge.