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EARLY PALEOZOIC ACCRETIONAL EVOLUTION OF NORTH CHILE-ARGENTINA ANDES

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Early Paleozoic basaltic to spilitic pillow lavas and ultramafic rocks exposed in a belt of more than 1300 km long in Northern Chile and Argentina (22°-33°S) may be interpreted, on the basis of recent geochemical studies, as a part of an oceanic basin that separated Gondwanaland from Pacific microcontinental blocks to the west. Basic Ordovician volcanism records observed along E-W Puna transversal section show at Cordón de Lila-Qda. Honda belt, in the west, and at Faja Eruptiva de la Puna oriental (FPE), in the east, marked geochemical similarities. They exhibit, together with the west slope Precordillera pillow basalts and ultramafic rocks (Kay et al., 1984), trace element signature in accordance with oceanic basalts (enriched to transitional oceanic ridge basalts-oceanic island tholeites) or back-arc basalts (Coira y Koukharsky, 1991).

Ordovician magmatic activity continued with high-K calc-alkaline dacitic to rhyolitic lavas, subvolcanic and volcaniclastic rocks synchronous with Arenigian-Llandeilian sedimentation in the FPE, near the stable Ordovician continental margin. A western magmatic arc developed, in the Arequipa-Belén-Antofalla old cratonic blocks, almost simultaneously with the east belt (FPE). Their plutonic facies represented by granitoids of 502 Ma to 425 Ma (Mpodozis et al., 1983) form the known western Faja Eruptiva de la Puna (FPW) (Palma et al., 1986). The volcano-sedimentary sequences (dacitic to rhyolitic lavas, volcanoclastic rocks and rhyolite intrusives) outcrop at Cordón de Lila (Niemeyer, 1989) and extend more than 150 km to the east as volcaniclastic aprons on the eastern flank of a chain of submarine to subaerial volcanoes (Breitkreutz et al., 1989). Geochemical characteristics of the dominant siliceous facies as well as of the scarce basalt-andesite lavas confirm their arc signature (Koukharsky et al., 1988; Coira et al., 1989; Koukharsky et al., 1988; Coira et al., 1989; Koukharsky et al., 1989).

The above elements suggest a geodynamic model in which on both sides of an oceanic basin evolved almost simultaneously two magmatic arcs

(FPE and FPW) related to two subduction zones of opposed polarity as proposed by Dalziel and Forsythe (1985) or east dipping subduction zones as indicated by Ramos (1988), the latter model being more consistent with the regional deformation style. A back-arc or intra-arc basin tectonic setting for the initial basic Early Paleozoic volcanism, instead of an oceanic environment, does not wholly agree with the magmatic, sedimentary, stratigraphic and tectonic features of Ordovician sequences.

Collision of Arequipa-Antofalla and South America continental blocks during the Ocloyic tectonic phase marked the closing of the oceanic basin, the emplacement of FPE granitoids and the end of the Early Paleozoic evolution in the Puna. The ocean basin at 28°-33°S was shut later, at Middle to Upper Devonian (Ramos et al., 1986) when the Chilenia microcontinent collided with the Precordillera continental margin.

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