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Late paleozoic orogeny in the northwestern Gondwana continental margin, western Argentina and Chile

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Abstract

During Early Carboniferous-Early Permian time, the segment of the northwestern Gondwana continental margin (western Argentina and Chile) between present-day latitudes 27°S and 50°S was structurally organized into a marginal orogen and a foreland rising into cratonic highlands. Orogenesis and magmatism were governed by subduction of an ancestral Pacific plate under Gondwana. During the Late Devonian-Early Carboniferous, former slope-rise deposits were thickened to form the orogen and were thrust slightly onto the foreland; parts of the orogen emerged above sea level. Following this early diastrophic phase, tectonic uplift in the orogen was regionally checked by erosion until the late Early Permian when uplift rates overcame erosion. The development of this orogen is peculiar in that throughout much of this time: a) the orogenic bett was partly occupied by marine areas; b) there was no reversal of provenance, so that foreland basins were continuously fed from the interior highlands; and c) the orogenic belt did not advance further onto the foreland. Thus the orogen stabilized in position and relief. Magmatism was intense during the period of orogenic stability and was dominated by plutonism; there are no remnants of a well developed volcanic arc. Reconstructions involving Late Devonian-Early Carboniferous collision of crustal masses against Gondwana and a seaward jump of the subduction trench are not entirely substantiated by available data. An alternative suggests that from the Late Devonian to the Early Permian the trench maintained approximately the same position seaward of present-day coastal exposures.