

Paper Number: 4179

Devonian accretion south of Chilenia

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The Paleozoic growth of the West Gondwana margin is thought to have resulted from successive terrane accretion. The Precordillera terrane (or in its more extended form, Cuyania) collided in Ordovician times and the hypothetical terrane of Chilenia (which has no known outcrops and whose dimensions are therefore hard to establish) in the Devonian. The Devonian collision of Chilenia is derived from the presence of high grade metamorphic rocks of that age in the Guarguaraz complex in western Argentina [1]. Chilenia has been considered to be a microcontinent underlain by late Proterozoic basement on the basis detrital zircons of that age, with no obvious other source, in Paleozoic successions of north central Chile. The Huincul lineament of the Neuquén basin has been proposed as the southern limit of Chilenia but this could be extended further since Devonian metamorphic rocks occur south of Bariloche [2].

New information based on SHRIMP U-Pb ages has revealed that following the inferred Devonian collision a Carboniferous and Permian subduction complex formed in the trailing edge of the terrane in Central Chile. North of Chilenia, the Devonian was a period of magmatic quiescence, and very few detrital zircons of that age have been found in the later sedimentary successions [3]. South of the Neuquen basin, however, Devonian zircons are abundant in the accretionary complex, and some Devonian plutonic rocks are also present [4]. The latter form two magmatic belts representing a double subduction environment – an eastern one built over continental crust of the North Patagonian Massif, and a western one formed in an oceanic environment. Thus, to the south of Chilenia, the microcontinent is replaced by a Devonian oceanic arc which was also accreted to the continental margin of Gondwana.

This scenario reflects a transition from Mariana-type subduction on the southwestern Gondwana margin to Andean-type subduction, starting in the Carboniferous, with accretionary complexes built mainly of oceanic material replacing elongated continental terranes.

Project Fondecyt 1130227 financed this research.

References:

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