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Late Paleozoic-Early Triassic magmatic activity of Argentina and the significance of new Rb—, Sr ages from northern Patagonia

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Abstract

The main outcrops of late Paleozoic-Early Triassic magmatic rocks of Argentina are found on the eastern side of the Andes between 28°S and 36°S (Frontal Cordillera) and in the northern part of the Patagonian Platform (North Patagonian Massif) between 39°S and 44°S. These rocks belong to three magmatic episodes “dated, respectively, at about 350-330, 280-210, and 240-210 Ma” and consist of granitic bodies of batholithic size associated with coeval silicic to intermediate volcanics. In both regions, late underformed granites and granodiorites predominate over tonalites and diorites; gabbros are not common, but microdioritic dikes are abundant. All sequences show typical calc-alkaline trends, but although the older units are metaluminous, the younger events become peraluminous with slight transitions to peralkaline composition in the more differentiated types. Despite the magmatic similarities between the Frontal

Cordillera and the North Patagonian Massif, these areas differ in other aspects of geologic history. A comparative scheme of the igneous and tectonic evolution of both regions during late Paleozoic-Early Triassic times is given, and the principal geologic features of two eruptive complexes studied in the North Patagonian Massif are summarized. New Rb-Sr whole rock isochron ages obtained from the North Patagonian Massif eruptive complexes confirm the existence of Early to Middle Carboniferous (332-317 Ma) plutonic and plutonic-volcanic activity in northern Patagonia. These ages are older than those previously reported for the same sequences, which were considered Permian or Triassic according to K-Ar data and Rb-Sr errorchrons. Hence, a re-evaluation of some Permian or Triassic ages previously obtained in other sectors of the North Patagonian Massif is suggested. Moreover, the new ages, together with field observations, indicate that the plutonic episode had a volcanic counterpart not reported in former studies. These data support the hypothesis that a major magmatic cycle developed in the North Patagonian Massif during the Early-Middle Carboniferous, and that since that time a process of progressive uplift and cratonization has taken place in the region.

## RESUMEN

Los principales afloramientos en Argentina de rocas ígneas del Paleozoico superior-Triásico inferior se encuentran en el flanco oriental de los Andes entre 28°S y 36°S (Cordillera Frontal) y en el norte de la Plataforma Patagónica entre 39°S y 44°S (Macizo Norpatagónico). Se han reconocido tres ciclos ígneos "datados en 350-330, 280-260, y 240-210 Ma" constituidos por cuerpos graníticos de dimensiones batolíticas y vulcanitas silíceas a intermedias. Granitos y granodioritas predominan ampliamente sobre tonalitas y dioritas; los gabros son muy raros, pero diques básicos y microdioríticos son abundantes. Entre las vulcanitas predominan las ignimbritas riolíticas y las dacíticas. Estas son secuencias calcoalcalinas, siendo las unidades más antiguas ligeramente básicas y metaaluminosas, mientras que las más jóvenes son más ácidas y peraluminosas y en los términos más diferenciados tienden a ser peralcalinas. A pesar de la similitud de las secuencias ígneas de la Cordillera Frontal y el Macizo Norpatagónico se observan importantes diferencias en la historia geológica de ambas regiones, las cuales se describen sucintamente. Las nuevas edades obtenidas por isócronas Rb-Sr sobre roca total confirman la existencia en el Macizo Norpatagónico de un importante ciclo plutónico-volcánico Carbónico inferior a medio (332-317 Ma). Estas edades son más antiguas que las obtenidas anteriormente por K-Ar o por errorcronas Rb-Sr y ponen de manifiesto, conjuntamente con la

información de campo, la presencia de importantes secuencias volcánicas de esta edad, no registradas aún en Argentina. Estos datos permiten inferir que desde el Carbónico inferior a medio se produjo en el Macizo Norpatagónico un progresivo levantamiento y cratonización en toda esta región.



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