

# New age constraints for the Mamil Choique Granitoids: dating a muscovite biotite leucotonalite-granodiorite in the Sierra de Mamil Choique, SW North Patagonian Massif

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The Early Permian to Early Triassic magmatism in the W-SW margin of the North Patagonian Massif (NPM) is mainly represented by the Mamil Choique Granitoids (MCG) or Mamil Choique Formation ((1), (2), (3), (4)). These ca. 281-259 Ma granitoids ((5), (6), (7))] intrude the metamorphic Cushamen Formation (CF), the youngest detrital zircon of which is ca. 440 Ma (8). Age of the main metamorphic peak of CF is constrained by a WR Rb-Sr dating of S2-granites of ca. 370 Ma (9). The mainly weakly peraluminous calc-alkaline crustal derived MCG (3) that crop out in an area of more than 350 km<sup>2</sup> in the Sierra de Mamil Choique (41° 50.6'S 70° 09.0'W) consist of four units: banded biotite ± amphibole tonalite and granodiorite, foliated and banded biotite-muscovite monzogranite, porphyric biotite-muscovite monzogranite and muscovite-garnet monzogranite. In the central part of the Sierra a discontinuous ENE-EW trending belt of CF septa is made up by a parallel variable south dipping 2-20 m wide septa of different length. Granitoid facies in clear cut contact with the septa are locally deformed and, in many cases, interlayered either folded with axial planes parallel to the metamorphic fabric or boudinated. The aim of this contribution is to present the age of one of these interlayered/boudinated granites to unravel if they belong either to the metamorphic history of the CF or to the magmatic history of the Mamil Choique Granitoids. The dated sample RC78b (41° 50'S 70° 13'W) is a medium grained muscovite±biotite leucotonalite-granodiorite with overgrown muscovite blasts. Field observations indicate that this rock does not correspond to any of the main facies so far recognized in the Sierra. Thin biotite folias/schlieren next to the sharp contact with CF are represented in thin sections by disaggregated fine grained biotite±quartz folias. Zircons were dated with a MC-ICP-MS Neptune at Centro de Pesquisas Geocronológicas of the Sao Pablo University. 58 measurements were used due to the high concordance (90-110%) and low common Pb content. One or two (core-rim) 20µm spots per analyzed zircon were measured. A calculated concordia age of 272.4 ± 1.1 Ma (MSWD= 0.023) was obtained from n=24 and an inherited age of 1056.9 ± 11 Ma (MSWD= 0.47) from n=6. The remaining data (n=28), shows a pattern with smaller peaks in 509, 630, 840, 1050 and 1280 Ma. The youngest zircons are characterized by very low Th/U (~0.2) and an average of U of 790 ppm while Th/U of the Grenvillian inherited zircons is close to 1.0 with average U of 76 ppm. The new age is within the range of ages calculated for the MCG being in consequence younger than the age for the CF syn-S2 granites. Besides the main peak of 272.4 ± 1.1 Ma, age distribution pattern of sample RC78b shows smaller peaks at 509, 630, 840, 1050 and 1280 Ma which are roughly equivalent to the peaks for the CF septa located 1.5 km further north ((4), (5), (6), (10), (11)). These smaller peaks in sample RC78b might result from the incorporation of zircons from Bt folias of the host. In the zircon spectra of CF septa ((4), (5), (6), (10), (11)) the peak at 287 Ma might suggest incorporation of zircons from the banded tonalite-granodiorite of MCG. Alternatively, the smaller peaks could be considered as inherited from a source with contributions of partial melts from the Cushamen Formation. Instead of being representative of another main granite pulse of the sierra, this 272 Ma leucotonalite-granodiorite may be a highly evolved peraluminous differentiate of the 281 ± 2 Ma MCG banded tonalite-granodiorite (6) or even result from partial melting of the CF due to the thermal input of the voluminous early Permian magmatic pulse. On going U-Pb dating as well as petrological research will address this issue.

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