

# ISOTOPIC STRONTIUM, CARBON AND OXYGEN STUDY ON NEOPROTEROZOIC MARBLES FROM SIERRA DE UMANGO, ANDEAN FORELAND, ARGENTINA

Varela, R.<sup>1</sup>, Valencio, S.<sup>2</sup>, Ramos, A.<sup>2</sup>, Sato, K.<sup>3</sup>, González, P.<sup>1</sup>,  
Panarello, H.<sup>2</sup> and Roverano, D.<sup>1</sup>

<sup>1</sup> Centro de Investigaciones Geológicas (CIG), UNLP-CONICET, Calle 1 N° 644, 1900 La Plata, Argentina; varela@cig.museo.unlp.edu.ar

<sup>2</sup> INGEIS, Pabellón INGEIS, Ciudad Universitaria, 1428 Buenos Aires, Argentina; susana@ingeis.uba.ar

<sup>3</sup> Centro de Pesquisas Geocronológicas (CPGeo), Universidade de São Paulo, Brasil; keisato@usp.br

The Umango Hill (La Rioja Province, 29°00'S-68°40'W) is one of the mountain blocks of the Sierras Pampeanas Occidentales. The crystalline basement is composed of basic igneous rocks and a siliciclastic-limestone sequence, both affected by amphibolite facies metamorphism. The metamorphic complex carries relics of granitic orthogneisses (~1000 Ma) and granitic intrusions of several ages (~520 Ma for the oldest). The siliciclastic-limestone sequence belongs to the Neoproterozoic-Early Palaeozoic and was interpreted as a platform covering the Mesoproterozoic cratonic basement. The metamorphism and deformation of the complex took place during the Early Palaeozoic.

Compositional and isotopic data of strontium ( $^{87}\text{Sr}/^{86}\text{Sr}$ ), carbon ( $\delta^{13}\text{C}_{\text{V-PDB}}$ ) and oxygen ( $\delta^{18}\text{O}_{\text{V-PDB}}$ ) of the marbles from the siliciclastic-limestone sequence are presented. The results are interpreted and correlated with the temporal variation curves of  $^{87}\text{Sr}/^{86}\text{Sr}$  and  $\delta^{13}\text{C}$  from Neoproterozoic marine carbonates.

Petrographic studies allowed identification of three types of marbles (Calcitic, Calcitic-dolomitic and Dolomitic) and Calc-silicate rocks. All these rocks are affected by prograde metamorphism that varies from upper greenschist up to upper amphibolite facies.

The samples containing high percentages of calcite (>85%) are those which have higher contents of Sr (498-1927 ppm) and the lowest contents of Mn (40-580 ppm). The samples containing Mn/Sr ratio between 0.03 and 0.76 might have constituted "closed systems" and could have kept the original isotopic composition, which corresponds to the seawater from which they were deposited.

The  $^{87}\text{Sr}/^{86}\text{Sr}$  vs. Mn/Sr and  $\delta^{18}\text{O}$  values of some samples lay close to the "Primary System" end. For these samples the  $^{87}\text{Sr}/^{86}\text{Sr}$  ratios are between 0.7072 and 0.7075. In the curve of  $^{87}\text{Sr}/^{86}\text{Sr}$  (Neoproterozoic time) the values for selected samples from Umango Hill fall between 640 and 580 Ma. The  $^{13}\text{C}$  content of the analyzed samples varies between -2.0‰ and +10.2‰ and the  $^{18}\text{O}$  between -25.7‰ and -4.7‰. The strongly positive  $\delta^{13}\text{C}$  values are characteristic of the late Cryogenian interval (730-590 Ma).