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

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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 ( $\delta^{13}\text{C}_{\text{PDB}}$ ) and oxygen ( $\delta^{18}\text{O}_{\text{PDB}}$ ) 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).