CONTROLS ON THE DEDOLOMITIZATION OF TOP OF VILLA MÓNICA FORMATION, TANDILIA SYSTEM

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Dedolomitization is the process of replacement of dolomite by calcite which mostly occurs under meteoric water influence. The shallow marine deposits of the Villa Mónica Formation (VMF) (~1150-720 Ma) constitute here is a good example of where to study this process. VMF is the older unit of the sedimentary basin infill in Tandilia System (Buenos Aires, Argentina), and it is formed by a lower section (22 m) mainly composed of quartz-arkosic sandstones, and an upper mainly dolomitic section (36-52 m) with thin interbedded green claystone levels and ending with red claystone and purple marl. The contact between the top of VMF and the base of the Colombo Formation is an erosive surface. Previous studies indicate that the VMF was affected by deep burial diagenesis followed by telogenesis. However, the expression of the weathering processes over the dolostones is poorly known. Thus, the proposal of this work is to recognize and characterize features related to weathering processes in the last meters of the upper section of the VMF.

With the aim of determining the weathering features imprinted in rocks, sedimentary sections from quarry outcrops drill cores from subsoil sections located in the Sierras Bayas-Olavarría area were described. In addition, 35 samples were selected for petrographic, X-ray diffractometry (XRD), Scanning electron microscopy (SEM-EDS) and stable isotope analysis of C and O.

The upper contact of the VMF presents deep weathering overimposed on dolomites, claystones and marls modifying the petrologic characteristics of the last 3 to 5 meters of the unit. The main features of weathering at mesoscale are the presence of "*terra-rossa*" discontinued levels (up to 50-60 cm thick), silicified dolomite levels, friable dolomite and marly levels staining with iron oxides. At microscale, Fe-oxides are common and appear as inter- and intragranular cements; siliceous cements are mainly composed of chert filling secondary voids and as dolomite replacement; and calcite cements appear obliterating latest spaces of secondary porosity. XRD results obtained from both unaltered dolomite and weathered dolomite samples were compared in order to determine the main differences between primary and secondary components. Unaltered dolomite is composed almost entirely by dolomite (stoichiometric), while weathered dolomite shows dolomite, calcite, quartz, hematite and illite in different proportions according to the sample. SEM-EDS analysis was performed to detect evidence retained and/or non-retained rhombic morphologies, replacements and cementations with high resolution, and to generate geochemical mappings. C and O isotopes stables results were obtained from samples of weathered dolostones showing values influenced by meteoric fluids.

Mesoscale observed variations on top of the VMF represented by friability, changes in coloration, silicification, oxides distribution together with mineralogical changes, replacements and isotopic variations allow to affirm that the predominant processes affecting the top of the unit was the dedolomitization that can be assumed as related to intense physicochemical changes under subaerial exposure.

Considering that dolostones of VMF were interpreted as a post-Sturtian cap-dolostone (~ 720-710 Ma), here we propose that widespread pervasive dedolomitization may represent a post-glaciation interval during which the dolostone succession were exposed to weathering.