Anomalous $\Delta^{13}C_{carb-org}$ in Marinoan Cap dolostones

P. SANS-JOFRE[1], M. ADER[1], R. TRINDADE[2] AND A. NOGUEIRA[3]

[1]IPGP, Université Paris 7, France (*correspondence: sansjofre@ipgp.jussieu.fr)
[2]IAG, Universidad de São Paulo, Brazil
[3]Universidad federal Do Para, Brazil,

We present new carbon isotope data on carbonate and associated organic matter in 15m thick cap dolostones from Brazil (Araras Group), covering glacial deposits correlated to the Marinoan event (~635Ma). These carbonates were spared from major diagenetic and thermal events as indicated by petrography, oxygen isotopes and biomarkers (MPI-1). Carbon isotopic ratios for both organic matter and carbonate are extremely homogeneous through the studied section, with negative $\delta^{13}C_{carb}$ around -5‰ and low $\Delta^{13}C_{carb-org}$ ($\Delta^{13}C_{carb-org} = \delta^{13}C_{carb} - \delta^{13}C_{org}$) around 22‰. These values are anomalous when compared to the typical values of 1±3‰ and 30±3‰, characterising most of the geological time. All other Marinoan cap dolostones for which organic carbon $\delta^{13}C$ data are available, including series in Brazil, North China and South China show comparable isotopic anomalies suggesting that they are of global significance.

Assuming that organic carbon and carbonate originate from the same surface waters in these platform dolostones, only three factors would control the $\Delta^{13}C_{carb-org}$: a variation in the fractionation factor associated with the precipitation of carbonate, the diagenetic overprint of the isotopic composition of sedimentary OM or carbonate, and a decrease in the photosynthetic fractionation factor (ε_p), which in turn would imply low atmospheric p_{CO2} or an important change in biological factors (e.g., cell-size, organisms growth rate). We will discuss these possibilities and their implications on the paleoenvironmental hypotheses proposed for the end of the Neoproterozoic.

Rodingites dikes: Metasomatism and metamorphism in the Frido Unit (Southern Apennines)

M.T.C. SANSONE[1]* AND G. RIZZO[2]

[1]Department of Geological Sciences, University of Basilicata, Campus Macchia Romana, 85100 Potenza, Italy (cristi.sansone@unibas.it)
[2]Department of Chemistry, University of Basilicata, Campus Macchia Romana, 85100 Potenza, Italy (giovanna.rizzo@unibas.it)

Ophiolitic sequences are in the remnants of the Liguride accretionary wedge which is now part of the Southern Apennine Chain. The Liguride tectonic units derived from the western Tethys ocean which separated the European plate from the African one. The studied ophiolitic rocks emplaced in the Ligurian domain of the Alpine Tethys Ocean during the middle Jurassic. These units outcrop extensively in the southern Apennines in the northeastern slope of the Pollino Ridge. Liguride Units include sequences characterized by HP/LT metamorphic overprint in the Frido Unit. The orogenic HP/LT metamorphism, related to underplating of the ophiolitic rocks at the base of the Liguride accretionary wedge during subduction of the Alpine Tethys, produced a mineral assemblage typical of the lawsonite-glaucophane facies. Rodingites outcrop as dikes cutting through serpentinites and are a few centimeters thick, grey-whitish and show a ductile deformation. The ultramafic rocks consist of serpentinized peridotite derived from lherzolites and subordinately harzburgites. Petrography and mineral chemistry of rodingites facilitated the finding of the igneous and metamorphic mineral assemblages related both to the primary magmatic protolith and to the subsequent metamorphic evolution. Rodingites show granoblastic texture. The primary igneous assemblage consists of plagioclase and clinopyroxene; these minerals cannot be preserved in rodingites due to a more accentuated rodingitic alteration. The metamorphic mineral assemblage consists of garnet, prehnite, chlorite, pumpellyite and quartz. Accessory minerals are titanite, epidote, opaque minerals, zircon and apatite. The veins cut through rodingites filled of prehnite, pumpellyite, chlorite and calcite and show cataclastic-mylonitic deformations. In order to obtain mineral chemistry electron microprobe analyses were performed on the garnet, chlorite, titanite and ilmenite. Garnet overgrowing on plagioclase is hydrogrossularite. Typical rodingitization reactions in rodingitic dikes are shown by the replacement of plagioclase by hydrogrossularite.