

# Significance of negative excursions within the positive $\delta^{13}\text{C}_{\text{carbonate}}$ Lomagundi - Jatuli event of Paleoproterozoic: Umra subbasin, Aravalli Supergroup, India

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The Paleoproterozoic metasediments of the Umra subbasin within the Aravalli Supergroup, India, have wide and extensive outcrops of carbonates unconformably overlying the Archean Mewar Gneissic Complex. These carbonates were sampled at a very high resolution at four different sections and analysed for C and O isotope concentrations. Negative  $\delta^{13}\text{C}_{\text{carbonate}}$  signatures embedded within an overall positive  $\delta^{13}\text{C}$  excursion (up to +6.8 ‰ PDB) were obtained from two such sections. Several geochemical proxies (Fe, Mn, Sr, Ce/Ce\*,  $\Sigma\text{REE}$  and TOC) have shown that the negative  $\delta^{13}\text{C}_{\text{carbonate}}$  values are of pristine marine character and not the result of any organic remineralization. Analyses of stratigraphic variations (depth versus  $\delta^{13}\text{C}_{\text{carbonate}}$  plots) and intra-basinal correlation of these sections show that the deposition of the carbonate unit started with positive  $\delta^{13}\text{C}_{\text{carbonate}}$  values (>4 ‰ PDB), which was followed by two negative  $\delta^{13}\text{C}_{\text{carbonate}}$  (-6.4 ‰ and -3.8 ‰ PDB) excursions, separated by an overall positive  $\delta^{13}\text{C}$  value, in the lower part of the succession. The  $\delta^{13}\text{C}_{\text{carbonate}}$  values eventually increase towards the top (up to 6.8 ‰) and stabilizes. Paleoproterozoic positive  $\delta^{13}\text{C}_{\text{carbonate}}$  excursion during 2200-2060 Ma, known as the Lomagundi-Jatuli Event [1], was associated with negative excursions, reported from Paso Serevino Formation, Uruguay [2] and Woolly Formation, Australia [3], and these negative excursions were considered to be of secondary origin. The pristine in nature of negative  $\delta^{13}\text{C}$  values obtained from this study has been interpreted in terms of fluctuations in the oxygen content in the atmosphere. Based on the results the study, a modified  $\delta^{13}\text{C}_{\text{carbonate}}$  versus age curve has been proposed for the Lomagundi-Jatuli event.

[1] Schidlowski et al. (1976) *Geochim Cosmochim Acta* **40**, 449-455.

[2] Maheshwari et al. (2010) *Precamb Res* **182**, 274-299.

[3] Bekker et al. [2016]. *J Geol Soc* **173**, 689-700.