Carbon, Oxygen and Nitrogen isotope record across the T/J boundary, Doniford section, Somerset, England

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The Triassic-Jurassic transition period is recognized as one of the "big five" Phanerozoic extinction events. Co-eval to the biotic changes, $\delta^{13}C$ record for carbonates and sedimentary organic matter (OM) displays large fluctuations in both marine and terrestrial realms suggesting large perturbations of carbon cycle. Increasing evidences involved the Pangea break-up, with the CAMP emplacement as a trigger for observed environmental changes [1].

This paper examine sedimentary and geochemical changes occuring in the well preserved Doniford section, Somerset, England which presents alternation of laminated shale, marl, and limestone with a good exposure of the Rhaetian-Hettangian transition. A high resolution sampling was carried out across the Lilstock Fm and the Blue Lias Fm. Carbonates and OM were quantified and analysed for $\delta^{13}C$ and $\delta^{18}O$, $\delta^{13}C$ and $\delta^{15}N$, respectively, in order to highlight changes in primary production.

High carbonate content sediments of the Lilstock Fm are organic poor. This OM is characterized by low hydrogen content and low thermal maturation. On the other hand, spectacular accumulations of OM, hydrogen rich, displaying features of type I and type II kerogens, occur in sediments from the Blue Lias Fm.

Increasing $\delta^{18}O$ value of carbonates can be interpreted as evidence of climatic changes, while $\delta^{13}C$ value variations in both organic matter and carbonates may depicted changes in the nature of primary producers, an hypothesis sustained by the evolution of $\delta^{15}N$ values in OM. Interpretations of these records will be further discussed regarding consequences of an abrupt event affecting atmosphere chemical composition, the CAMP emplacement.

[1] Schaltegger *et al*. (2008, in press) *EPSL.*

Effects of inundation and dessication on salt cycling in a saline disposal basin, Loveday Lagoon, South Australia

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Loveday Lagoon is a decommissioned salt disposal basin intercepting saline waters before they reach the Murray River. The surface water is hypersaline (EC ~69mS/cm) while the deeper groundwater is relatively less saline (~50-55mS/cm). By contrast, the shallow groundwater within the bed sediments of the basin has salinities averaging ~91mS/cm. This indicates that the basin sediments are a significant store and source of salts. The sediments are strongly aggregated clays forming polygonal pedal structures, with a spatial distribution of these forms correlating to the frequency of wetting-drying cycles. Salinity measurements of pore waters within the pedal structures indicate high levels of spatial heterogeneity with electrical conductivity ranging from ~73mS/cm within the pedal structures, up to ~136mS/cm at sediment surfaces and adjacent to cracks dissecting the material. This suggests not only the concentration of salts via capillary flow and diffusion at the surfaces but also that stored salts can be released, via cracks and macropores, to the water column when the system is inundated. The cracks also provide pathways for down-profile, advective flow and salt accessions to the underlying groundwater, with possible implications for the discharge of saline groundwater to the Murray River. Comparison of sediments across zones experiencing different wetting and drying cycles suggests that restrictive water allocations and climate change will increase the density and depth of cracking with commensurate risks of salt leaching during flooding episodes.