Testing the impact of diagenesis on stable isotope and trace element geochemistry in fossil foraminiferal calcite

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The geochemical composition of foraminiferal tests is a valuable archive for the reconstruction of palaeo-climatic, -oceanographic and -ecological changes. However, dissolution of biogenic calcite and re-precipitation of inorganic calcite (overgrowth and recrystallisation) at the seafloor and in the sediment column can potentially alter the original geochemical composition of the foraminiferal test, biasing any resulting palaeoreconstructions. This is particularly true for the wealth of new carbonate-based proxies that are increasingly utilised to understand the ancient Earth and in particular unravel the complexities of the carbonate system (e.g., δ11B and B/Ca) but the effect of diagenesis on these proxies is not well known. Here I will discuss the results of recent tests investigating the impact of diagenesis on a wide range of both new and old paleoceanographically important proxies (δ11B, δ13C, δ18O, Sr/Ca, B/Ca etc.) measured in fossil foraminiferal calcite from a variety of diagenetic settings. The ultimate aim being to better identify and quantify diagenetic effects to reduce uncertainty in our paleo-reconstructions.