Can stable Ba isotopes in corals be used to reconstruct riverine runoff?

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The reconstruction of continental runoff into the oceans is of vital importance for understanding the factors and mechanisms driving Monsoon variability. Coral-derived Ba/Ca ratios have been employed as proxies for the transport of Ba into the coastal marine environment via riverine runoff [1]. However, Ba/Ca profiles can be influenced by a number of processes other than river discharge and if compared to other paleo-salinity tracers, the results do not always agree [2]. More recently, stable barium isotopes have been suggested to provide a new approach for investigating continental runoff as well as the marine biogeochemistry of barium [3]. Corals have the potential to record a continuous, well-dated, and high-resolution surface water Ba isotope signal that is expected to vary mainly as a function of river runoff. However, a major hindrance for the use of this proxy is that the coral skeleton is prone to contamination by different phases, which may alter the original signal and render the elemental ratios or isotope compositions measured inaccurate for paleo-salinity reconstructions. In order to assess the possible influence of such processes, we compare the efficiency of batch cleaning and flow through cleaning methods to extract seawater Ba isotope compositions from the material used to produce the *Porites* coral reference material JCp-1. Once a reliable cleaning method is established, a comparison between ambient seawater Ba isotope compositions and the corresponding signatures in the coral carbonate is required with the purpose of establishing and quantifying potential fractionation of the stable Ba isotopes during incorporation into coral carbonate, the existence of which a recent culture study has indicated [4]. This research is essential in order to be able to provide quantitative estimates and reconstructions of past riverine runoff.

[1] McCulloch et al. (2003) *Nature* **421**, 727-730. [2] Sinclair (2005) *EPSL* **237**, 354-369. [3] Cao et al. (2016) *EPSL* **434**, 1-9. [4] Pretet et al. (2015) Depos Rec **1**, 118-129.