

Distribution of particle-reactive trace elements and Hf-Nd isotopes between the truly dissolved, nanoparticulate/colloidal and suspended loads in rivers

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Rivers have a major impact on the chemical composition of seawater. However, rather little is known about the distribution of particle-reactive elements in the different “size-fractions” of river water: (i) suspended particles ($>0.2 \mu\text{m}$), (ii) nanoparticles and colloids (NPCs, $0.2 \mu\text{m} - 10\text{kDa}$), and (iii) the truly dissolved fraction ($<10\text{kDa}$). In this study, we investigate the distribution of the Rare Earth Elements and Yttrium (REY) and of Hf and Nd isotopes in these different physical pools. The shale-normalised (subscript SN) REY patterns of the dissolved ($<0.2 \mu\text{m}$) and the particulate ($>0.2 \mu\text{m}$) REY pools do not exhibit uniform REY_{SN} patterns. In marked contrast, the truly dissolved ($<10 \text{kDa}$) REY_{SN} patterns are remarkably similar to that of NPCs-poor seawater, corroborating recent findings [1,2]. We will discuss the potential impact of, for example, HFSE budget, pH, dissolved organic matter, catchment geology, climate, and seasonal variations on the HFSE distribution between the size pools with the aim to better understand the role of NPCs in transporting these elements into the oceans.

[1] Merschel, G. et al. (2017). *Geochim. Cosmochim. Acta* 213, 383-399.

[2] Pourret, O. & Tuduri, J. (2017). *Scientific Reports* 7, #5857.