



Simulation of the cycle of trace elements (PA, Th) with the coupled Ocean-biogeochemistry model ORCA-PISCES. Implementation of a reversible scavenging model

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231Pa and 230Th oceanic distributions are controlled by both particulate fluxes and oceanic ventilation. The 231Pa/230Th ratio is increasingly used for modern and paleo applications. However, whereas it is well known that these isotopes are removed from the water column by adsorption onto particles, their respective affinities towards different particle types (lithogenic, POC, carbonate, opal, etc.) are actively debated. Furthermore, the relative contributions of transports by water masses and particles are difficult to separate. Modeling has been shown powerful to address these issues (Marchal et al. 2000 Paleooceanography). The present work aims at simulating the cycles of these isotopes with the oceanic circulation model ORCA-2 (developed at LOCEAN, France, nominal resolution $2^\circ \times 1.5^\circ$, validated for other tracers: CFC, 14C, 3He and in progress for ^{99}Tc and ^{147}Sm) coupled with the biogeochemistry model PISCES (representing the fluxes of different particle types and including two particles sizes). We have implemented a reversible scavenging model in order to simulate the oceanic cycle of the trace elements. This model is using equilibrium distribution coefficients that control the partition between dissolved and particulate phase. We will show sensitivity experiments to the value of these equilibrium coefficients as a function of particle types and sizes. Data / model comparisons is an interesting approach to progress in our understanding of i) the processes controlling the cycles of these isotopes (notably, the respective significance of water mass and particle transports) and ii) global aspects of their distributions.