

# Neodymium Isotope Budget in the Mediterranean Sea Inferred From Core-top Sediments, Seawater Data Synthesis and Box Model Calculation

[View Presentation](#) [Add to Schedule](#)

---

**Authors:** Kazuyo Tachikawa<sup>1</sup>, François Beny<sup>2</sup>, Marine Cornuault<sup>2</sup>, Abel Guihou<sup>3</sup>, Pierre Deschamps<sup>4</sup> and Marie Boyé<sup>5</sup>, (1)Aix Marseille Univ, CEREGE, Aix en Provence, France, (2)Aix Marseille Univ, CNRS, IRD, INRAE, Coll France, CEREGE, Aix en Provence, France, (3)Aix Marseille Univ, CNRS, IRD, INRAE, Coll France, CEREGE, Aix-en-Provence, France, (4)Aix Marseille Univ, CNRS, IRD, INRAE, Coll France, CEREGE, Aix-en-Provence Cedex, France, (5)Université de Paris, Institut de physique du globe de Paris, CNRS, Paris, France

Neodymium isotopic compositions ( $\epsilon_{Nd}$ ) of seawater and authigenic/biogenic phases have been used as a tracer of water masses in the modern and past ocean. However, the influence of boundary exchange and benthic flux on seawater  $\epsilon_{Nd}$  distribution is still to be quantified in various oceanic regions. The Mediterranean Sea is interesting to evaluate such influence because detrital  $\epsilon_{Nd}$  distribution and water circulation are well constrained. We analyzed  $\epsilon_{Nd}$  values of foraminiferal authigenic oxides, leachate and residual fractions of modern sediments along a zonal transect of Mediterranean Sea collected during GEOTRACES-A04N cruise to evaluate the faithfulness of authigenic  $\epsilon_{Nd}$  values with respect to seawater masses and the spatial distribution of exchangeable detrital Nd. The authigenic  $\epsilon_{Nd}$  ranged from -9.0 to -3.9 with the most radiogenic values in the easternmost basin. They generally agree with seawater signals except in the easternmost Levantine Sea where authigenic  $\epsilon_{Nd}$  is significantly higher than local seawater signature.

We hypothesize that (i) labile Nd in sedimentary Nile river particles is responsible for the higher authigenic  $\epsilon_{Nd}$  values; (ii) part of this labile Nd is a Nd source to seawater and (iii) benthic flux from other Mediterranean regions has a minor influence. To assess these hypotheses, we develop a box model calculation based on a compilation of available seawater Nd concentration and  $\epsilon_{Nd}$  data. The maximum surface water Nd concentration and highly variable  $\epsilon_{Nd}$  values in the surface layers are suggestive of net Nd flux to shallow waters in both western and eastern basins. Saharan dust inputs alone cannot account for the observed trend and the Nile river particles are essential radiogenic Nd source. Net Nd inputs from margins and dust combined with scavenging is a key process to Mediterranean Nd budget. Using the calibrated

model, we will discuss the sensitivity of Mediterranean water  $\epsilon_{Nd}$  to change in sources and water circulation.