

A global database of radiogenic Nd and Sr isotopes in marine and terrestrial samples

(<http://doi.org/10.5880/GFZ.4.3.2019.001>)

Citation

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Blanchet, Cécile L. (2019): A global database of radiogenic Nd and Sr isotopes in marine and terrestrial samples. V. 2. GFZ Data Services. <http://doi.org/10.5880/GFZ.4.3.2019.001>

The data are supplementary material to:

Blanchet, Cécile L. (in revision): A database of marine and terrestrial radiogenic Nd and Sr isotopes for tracing earth-surface processes. Earth System Science Data

and the accompanying R-Code

Blanchet, Cecile (2018): R Code for mapping (contour maps) the Nd and Sr isotopic signature of marine and terrestrial sediments. figshare. Code. <http://doi.org/10.6084/m9.figshare.6990260.v3>

Blanchet, Cecile (2018): R Code for mapping (contour maps) the Nd and Sr isotopic signature of marine and terrestrial sediments. figshare. Code. <http://doi.org/10.6084/m9.figshare.6990260.v3>

The data represent an update to

Blanchet, Cécile (2018): A global database of radiogenic Nd and Sr isotopes in marine and terrestrial samples. V. 1. GFZ Data Services. <http://doi.org/10.5880/GFZ.5.2.2018.001>

1. Data Description

The database presented here contains radiogenic neodymium and strontium isotope ratios measured on both terrestrial and marine sediments. It was compiled to help assessing sediment provenance and transport processes for various time intervals. This can be achieved by either mapping sediment isotopic signature and/or fingerprinting source areas using statistical tools (e.g. Blanchet, 2018b, 2018a).

2. Data Records

The database has been built by incorporating data from the literature and the SedDB database and harmonizing the metadata, especially units and geographical coordinates. The original data were processed in three steps. Firstly, a specific attention has been devoted to provide geographical coordinates to each sample in order to be able to map the data. When available, the original geographical coordinates from the reference (generally DMS coordinates, with different precision standard) were transferred into the decimal degrees system. When coordinates were not provided, an approximate location was derived from available information in the original publication. Secondly, all samples were assigned a set of standardized criteria that help splitting the dataset in specific categories. We defined categories associated with the sample location ("Region", "Sub-region",

"Location", which relate to location at continental to city/river scale) or with the sample types (terrestrial samples – “aerosols”, “soil sediments”, “river sediments”, “rocks” - or marine samples – “marine sediment” or “trap sample”). Thirdly, samples were discriminated according to their deposition age, which allowed to compute average values for specific time intervals (see attached table "Age_determination_Sediment_Cores_V2.txt"). A first version of the database was published in September 2018 and presented data for the African sector. A second version was published in April 2019, in which the dataset has been extended to reach a global extent. The dataset will be further updated bi-annually to increase the geographical resolution and/or add other type of samples.

3. File description

This dataset consists of two tab separated tables: "Dataset_Nd_Sr_isotopes_V2.txt" and "Age_determination_Sediment_Cores_V2.txt". "Dataset_Nd_Sr_isotopes_V2.txt" contains the assembled dataset of marine and terrestrial Nd and/or Sr concentration and isotopes, together with sorting criteria and geographical locations. "Age_determination_Sediment_Cores_V2.txt" contains all background information concerning the determination of the isotopic signature of specific time intervals (depth interval, number of samples, mean and standard deviation). Column names are explained in respective files.

A full reference list is provided in the file “References_Database_Nd_Sr_isotopes_V2.rtf”. Finally, R code for mapping the data and running statistical analyses is also available for this dataset (Blanchet, 2018b, 2018a).

Column names

Table 1 Column names in file Age_determination_Sediment_Cores_V2.txt

Column names	Description	Unit	Comments
Label	Name of the sample or sediment core (mostly from original publication)		
Region	Broad location of the sample (continent or ocean scale)		
Sub-region	More detailed location (island, country)		
Location	Specific location (river, city, PSA...)		
Sample type	soil sediment (soil or surface sediment), river sediment, marine sediment, aerosol (deposited dust sample), trap sample (sediment trap), rocks		
Grain-size fraction	Grain-size fraction on which the measurements were done (bulk: all fractions)	micrometers	
Time interval	P = present (sediment surface sample), S1= Sapropel 1, S3 = Sapropel 3, S4 = Sapropel 4, S5 = Sapropel 5, S6 = Sapropel 6, LGM = Last Glacial Maximum		See table Age_determination_Sediment_Cores.csv

[Sr] ppm	Concentration in Strontium in the detrital fraction	parts per million	
87Sr/86Sr	Isotopic ratio of Sr-87 to Sr-86	No unit	
[Nd] ppm	Concentration in Neodymium in the detrital fraction	parts per million	
143Nd/144Nd	Isotopic ratio of Nd-143 to Nd-144	No Unit	
eNd(0)	epsilon Neodymium value (i.e., normalized to the uniform chondritic value and per 10,000)		
Longitude original	Original longitude (from the reference publication)		
Longitude (Dec. degrees)	Recalculated or estimated (if not given in the reference) longitude	decimal degrees	
Latitude original	Original latitude (from the reference publication)		
Latitude (Dec. degrees)	Recalculated or estimated (if not given in the reference) latitude	decimal degrees	
Notes on coordinates	mention if coordinates are estimated or have been corrected		
Notes on sample	specific information about the sample (from the reference publication)		
Reference	Original reference publication of the sample		
Date of contribution	When the sample was added to the database		
Source	Origin of the data point: Literature search, own (own measurements), author contribution (from first author or co-author), external contribution (from peers and colleague), sedDB (from the Sed Database, www.earthchem.org/seddb), Scheuven (from the data compilation of Scheuven et al., 2013), Padoan (from the dataset produced by Padoan et al. , 2011), Jeandel (from the compilation produced by Jeandel et al., 2007).		

Table 2 Column names in file Age_determination_Sediment_Cores_V2.txt

Column names	Description	Unit
Label	Name of the sample or sediment core (mostly from original publication)	
Time interval	Sapropel (S1, S3, S4, S5, S6) or Last Glacial Maximum (LGM)	
Core depth interval (cm)	Depth interval covering the time interval	cm
Duration (kyr)	Duration of the time interval	kyr
Number of samples	Number of samples used to calculate the radiogenic Sr and Nd isotopes	count
$^{87}\text{Sr}/^{86}\text{Sr}$	Averaged value of the isotopic ratio of Sr-87 to Sr-86 for the n samples	
Std. Dev	Standard deviation (2-sigma) of the averaged isotopic ratio of Sr-87 to Sr-86 for the n samples	
eNd(0)	Averaged value of the epsilon Nd (i.e. Isotopic ratio of Nd-143 to Nd-144 normalized to the uniform chondritic value and per 10,000) for the n samples	
Std. Dev	Standard deviation (2-sigma) of the averaged epsilon Nd value for the n samples	
Identifier	Measurement or method used to determine the extent of the specific time interval	
Reference	Original reference publication of the sample	