Geochemistry Geophysics Geosystems

Supporting Information for

Assessment of seawater Nd isotope signatures extracted from foraminiferal shells and authigenic phases from volcanogenic sediments of the Adriatic Sea

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Introduction

Text S1 is the introduction of the model we used in the manuscript to quantitative estimation of tephra content during the leaching process

Text S1.

The quantitative estimation of tephra content during the leaching process. The equation is the following:

$$[Nd]_{leachate} \times \varepsilon Nd_{leachate} = [Nd]_{leaachate} \times \varepsilon Nd_{authigenic} + [Nd]_{tephra} \times \varepsilon Nd_{tephra} \times D_1$$

The $[Nd]_{leachate}$ is the concentration of the Nd leachates, and $\varepsilon Nd_{leachate}$ is the leachates Nd isotopic composition; the $\varepsilon Nd_{authigenic}$ is the foraminiferal Nd isotopic composition; $[Nd]_{tephra}$ and εNd_{tephra} is 81 ppm and 1 respectively (D'Antonio et al., 2016; Tomlinson et al., 2015).D1 is the dissolved proportion of tephra material during the leaching process.

Moreover, if we take the dissolved unradiogenic detrital materials into the equation. The equation is

$$[Nd]_{leachate} \times \varepsilon Nd_{leachate} = [Nd]_{leachate} \times \varepsilon Nd_{authigenic} + [Nd]_{detrital} \times \varepsilon Nd_{detrital} \times D_2$$

$$[Nd]_{leachate} \times \varepsilon Nd_{leachate} = [Nd]_{leachate} \times \varepsilon Nd_{authigenic} + [Nd]_{detrital} \times \varepsilon Nd_{detrital} \times D_3 + [Nd]_{tephra} \times \varepsilon Nd_{tephra} \times D_4$$

The $[Nd]_{detrital}$ is 30 ppm we used in the paper. D_2 is the dissolved proportion of unradiogenic detrital material during the leaching process for the samples out of tephra layers. D_3 is the average value of all D_2. D_4 is the modified dissolved proportion of tephra material during the leaching process.

Figure S1 is the comparison of REE pattern of different materials, which is aimed to demonstrate the main extracted phase in the leaching process

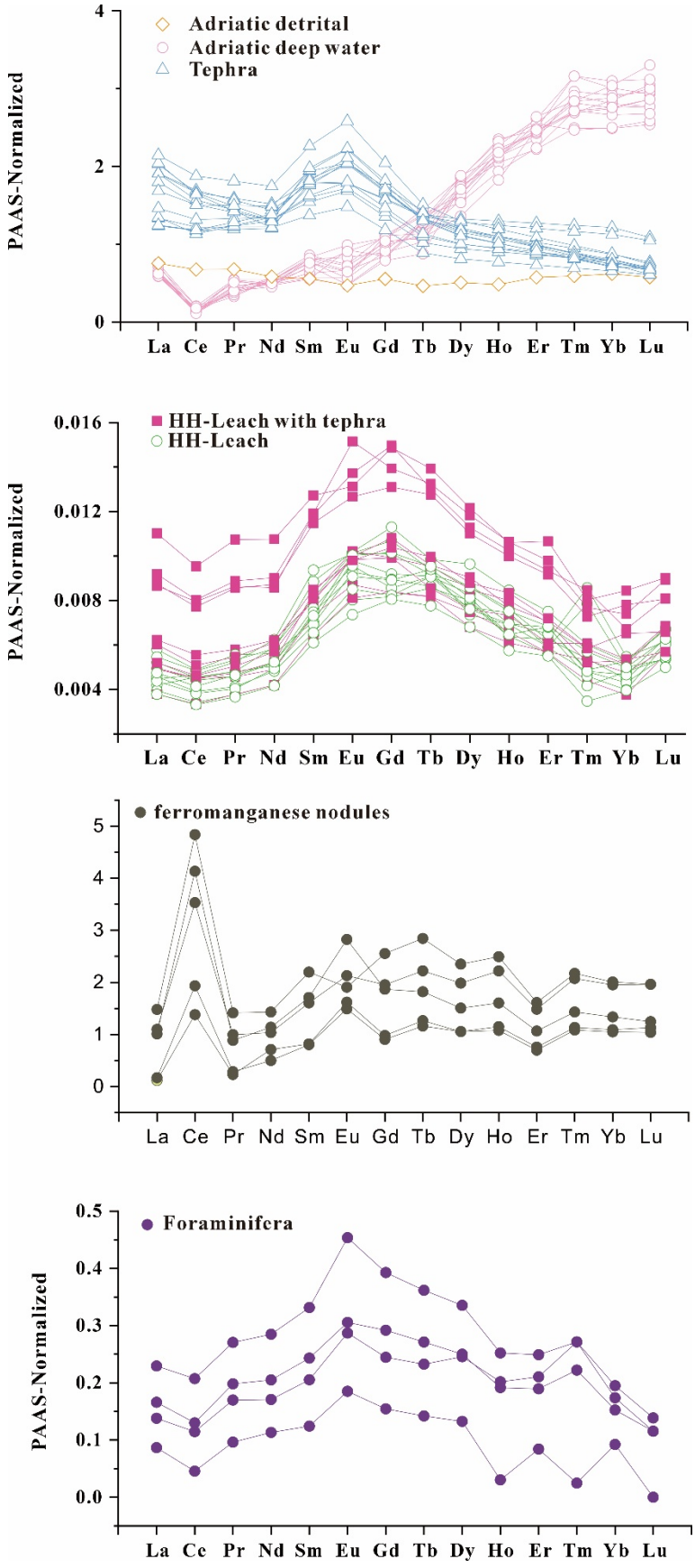
Adriatic detrital
Adriatic deep water
Tephra
PAAS-Normalized
4
2
0
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
HH-Leach with tephra
HH-Leach
PAAS-Normalized
0.016
0.012
0.008
0.004
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
ferromanganese nodules
5
4
3
2
1
0
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu
Foraminifera
PAAS-Normalized
0.5
0.4
0.3
0.2
0.1
0.0
La Ce Pr Nd Sm Eu Gd Tb Dy Ho Er Tm Yb Lu

Figure S1. The REE pattern of Adriatic deep-water (Bau et al. 1997; Censi et al., 2007); Vesuvius volcano (Ayuso et al.,1998); detrital sediments over the South Adriatic Sea (Wu et al., 2018); HH-leachates of MD90-917; ferromanganese nodules (Pattan et al., 2007); foraminifera (Haley et al., 2005)