

# VU Research Portal

## Can we quantify sediment recycling in Italy's post-collisional subduction system?

Koornneef, Janne M.; Schriever, Vincent; Goede, Ayra; Boonstra, Julian; Bracco Gartner, Antoine J. J.; Luciani, Natascia; Ogata, Kei; Segadelli, Stefano; Iannace, Alessandro; Vroon, Pieter; Nikogosian, Igor; Davies, Gareth R.

2022

**DOI (link to publisher)**  
[10.46427/gold2022.9919](https://doi.org/10.46427/gold2022.9919)

**document version**  
Publisher's PDF, also known as Version of record

**document license**  
Unspecified

[Link to publication in VU Research Portal](#)

### **citation for published version (APA)**

Koornneef, J. M., Schriever, V., Goede, A., Boonstra, J., Bracco Gartner, A. J. J., Luciani, N., Ogata, K., Segadelli, S., Iannace, A., Vroon, P., Nikogosian, I., & Davies, G. R. (2022). *Can we quantify sediment recycling in Italy's post-collisional subduction system?*. <https://doi.org/10.46427/gold2022.9919>

### **General rights**

Copyright and moral rights for the publications made accessible in the public portal are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

- Users may download and print one copy of any publication from the public portal for the purpose of private study or research.
- You may not further distribute the material or use it for any profit-making activity or commercial gain
- You may freely distribute the URL identifying the publication in the public portal

### **Take down policy**

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

**E-mail address:**  
[vuresearchportal.ub@vu.nl](mailto:vuresearchportal.ub@vu.nl)

# Can we quantify sediment recycling in Italy's post-collisional subduction system?

JANNE M. KOORNNEEF<sup>1</sup>, VINCENT SCHRIEVER<sup>1</sup>,  
AYRA GOEDE<sup>1</sup>, JULIAN BOONSTRA<sup>1</sup>, ANTOINE J. J.  
BRACCO GARTNER<sup>1</sup>, NATASCIA LUCIANI<sup>1</sup>, KEI  
OGATA<sup>2</sup>, STEFANO SEGADELLI<sup>3</sup>, ALESSANDRO  
IANNACE<sup>2</sup>, PIETER VROON<sup>1</sup>, IGOR NIKOGOSIAN<sup>1</sup> AND  
GARETH R. DAVIES<sup>1</sup>

<sup>1</sup>Vrije Universiteit Amsterdam

<sup>2</sup>University of Naples

<sup>3</sup>Seismic and Soil Service

Presenting Author: j.m.koornneef@vu.nl

Recycling of Earth's crustal components through subduction contributes to the observed geochemical heterogeneity in worldwide lavas, yet quantifying the in- and output fluxes is difficult because of the unknown compositions of subducted components and sediment transfer processes in subduction zones. Italian post-collisional magmatism is often mafic but potassium-rich, suggesting a significant contribution of subducted sediments in this complex geodynamic setting. Isotopic and elemental variability in the volcanic products across Italy likely reflects sediment recycling with variable composition and quantity from north to south.

Here we report the geochemical compositions of sediments that accreted to the Apennine accretionary prism whose lateral counterparts have potentially subducted and contributed to the Italian melt source. The aim is to use the major-, trace- and Sr-Nd-Pb isotope compositions of the sediments and Italy's volcanic products to quantify subduction recycling through melt modelling.

Sediments were collected from the northern-, central- and southern Apennines (Liguria, Emilia-Romagna, Umbria and Calabria) with a focus on exhumed units from below the various decollement levels. These included Triassic to Jurassic deep sea sediments in ophiolitic sequences deposited in the Ligurian-Piemonte Oceanic Basin, and Triassic to Neogene distal units of the Adria continental margin. End-member compositions are defined by deep sea clays and metapelites rich in K<sub>2</sub>O, SiO<sub>2</sub>, LILE, HFSE, REE with high <sup>87</sup>Sr/<sup>86</sup>Sr (0.7458) and <sup>206</sup>Pb/<sup>204</sup>Pb (19.4), and marls poor in K<sub>2</sub>O, SiO<sub>2</sub>, LILE, HFSE, REE, but rich in CaO and Sr, with low <sup>87</sup>Sr/<sup>86</sup>Sr (0.7083) and <sup>206</sup>Pb/<sup>204</sup>Pb (18.7).

The geochemical compositions of the most primitive volcanics and olivine-hosted melt inclusions will be used to reconstruct subduction recycling processes by melt modelling of a sediment metasomatized mantle wedge. Sediment transport mechanisms, sediment/vein mineralogy, melting behavior, and melt extraction processes will be evaluated.