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Date of birth: 07/08/1987

Nationality: Italian

**2019 – current**      **Researcher** at IGG-CNR (Pisa).

**Post-doctoral research experience:**

- 2018-2019**      **Postdoctoral researcher**, IGG-CNR (Pisa). In the framework of the H2020 GECO project (Geothermal Emission Gas Control).
- 2017-2018**      **IGG-CNR Associate**. Collaboration in the framework of the geodynamics and geological processes research area.
- 2018-2020**      **Principal investigator** in the *National Geographic Society* funded project “Magnesite as proxies for paleo-CO<sub>2</sub> fluxes through the Earth’s crust”. Grant Number: EC-426R-18.
- 2017-2018**      **Postdoctoral researcher**, University of Pisa (Italy) Department of Earth Sciences. In the framework of the SIR project “*Thalmigen: Thallium: Mineralogy, Geochemistry and Environmental Hazards*”.
- 2014 – 2017**      **Teaching assistant**, Monash University (Australia), School of Earth, Atmosphere and Environment

**Education:**

- 2018**      **Doctor of Philosophy (Ph.D.)**, Monash University (Australia), Thesis title: “*Metasomatic oxidation of subduction zone mantle: implication for arc metallogeny*”. Supervisors: Dr. Andrew G. Tomkins and Dr. Oliver Nebel.
- 2013**      **Master degree of Geosciences and Geotechnologies (MSc) – 110/110 (cum laude)**, **University of Pisa (Italy)**, Thesis title: “*A natural analogue of CO<sub>2</sub> mineral sequestration in the Ligurian ophiolites, The Castiglioneccello magnesite deposit (Tuscany, Italy)*”. Supervisors: Dr. Chiara Boschi and Dr. Giovanni Zanchetta.
- 2010**      **Bachelor of Geological Science (BSc)**; University of Pisa (Italy), Thesis title: “*Hydrogeological characterization and groundwater evolution of the Lucca plain aquifer, central Italy*”. Supervisor: Dr. Roberto Giannecchini.

### Trainings:

**2017** *Neptune Familiarization training.* Corso per utilizzo dello spettrometro multicollettore Neptune Plus. Istruttore: Christian L'Herault, Field Service Engineer, Thermo Fisher. N° Protocollo: CNR-IGG 0003773 06/12/2018.

**2016** **Training** course: Advanced Scanned Electron Microscopy advanced training, at the Monash Centre for Electron Microscopy (Monash University, Australia).

### Workshops

**2018** **Workshop:** *"Earth, Life and Climate: The carbon cycle"* IGG-CNR (Pisa).

**2018** **Workshop:** *"The Iberian Pyrite Belt", Spain:* Volcanogenic Massive Sulfide (VMS) and environmental pollutions connected with mining activity.

**2016** **Workshop** and Scientific fieldtrip: Porphyry systems of central and southern British Columbia (British Columbia, Canada), organised by the Society of Economic Geologists.

**2014** **Workshop** and Scientific fieldtrip: Ore deposits of Western Tasmania (Tasmania, Australia). Organised by the Society of Economic Geologists Monash University Student Chapter.

**2013** **Workshop:** *Fluids in the Earth.* Department of Earth Science, Naples University (Italy). Aimed at the study of fluids in the crust and Earth's mantle with particular attention to fluid inclusion study and thermodynamics.

**2013** **Workshop** with scientific fieldtrip: *Elba island: a window into a crustal magmatic system and its mineralisations.* Organised by Section of Earth and Environmental Sciences, University of Geneva.

### **Open access repositories e rapport interni**

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2023. *Calibration and Method Validation for Lead (Pb) Isotope Ratio Measurements performing by ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa). GFZ Data Services. <https://doi.org/10.5880/fidgeo.2022.039>

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2023. *Calibration and Method Validation for Boron (B) Isotope Ratio Measurements performing by*

*ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa). GFZ Data Services. <https://doi.org/10.5880/fidgeo.2023.002>

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2023. *Calibration and Method Validation for Strontium (Sr) Isotope Ratio Measurements performing by ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa). GFZ Data Services. <https://doi.org/10.5880/fidgeo.2023.003>

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2023. *Calibration and Method Validation for Neodymium (Nd) Isotope Ratio Measurements performing by ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa). GFZ Data Services. <https://doi.org/10.5880/fidgeo.2023.004>

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2022. *Lead (Pb) isotope ratio measurements by new ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa) Rapporto Interno IGG-CNR, num. prot. 1099/22042022.

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2022. *Strontium (Sr) isotope ratio measurements by new ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa), Rapporto Interno IGG-CNR num. prot. 1100/22042022.

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2022. *Neodymium (Nd) isotope ratio measurements by new ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa), Rapporto Interno IGG-CNR, num. Prot. 1101/22042022

02/03/2018 - 01/05/2018 Messa a punto di un nuovo protocollo analitico per l'analisi isotopica tramite spettrometria di massa presso l'IGG-CNR. Ho fatto parte di un team IGG-CNR che si è occupato della messa a punto della metodologia analitica per l'analisi isotopica dello **stronzio** utilizzando lo spettrometro di massa multicollettore Neptune Plus (N° Protocollo: CNR-IGG 0003770 06/12/2018).

02/05/2018 - 01/07/2018 Messa a punto di un nuovo protocollo analitico per l'analisi isotopica tramite spettrometria di massa presso l'IGG-CNR. Durante questo periodo mi sono occupato insieme ad un team IGG-CNR della messa a punto della metodologia analitica per l'analisi isotopica del **neodimio** utilizzando lo spettrometro di massa multicollettore Neptune Plus (N° Protocollo: CNR-IGG 0003774 06/12/2018).

02/07/2018 - 01/09/2018 Messa a punto di un nuovo protocollo analitico per l'analisi isotopica tramite spettrometria di massa presso l'IGG-CNR. Durante questo periodo ho fatto parte di un team IGG-CNR che si è occupato della messa a punto della metodologia analitica per l'analisi isotopica del **piombo** utilizzando lo spettrometro di massa multicollettore Neptune Plus (N° Protocollo: CNR-IGG 0003775 06/12/2018).

01/09/2017 - 01/03/2018 Messa a punto di un nuovo protocollo analitico per l'analisi isotopica tramite spettrometria di massa presso l'IGG-CNR. In questo periodo ho seguito l'installazione del nuovo spettrometro di massa multicollettore Neptune Plus (Ottobre 2017) presso l'IGG-CNR di Pisa e dopo un corso di formazione specifico (ref) ho fatto parte di un team IGG-CNR per la messa a punto della metodologia analitica per l'analisi isotopica del **boro** con lo spettrometro Neptune Plus (N° Protocollo: CNR-IGG 0003771 06/12/2018).

Di Giuseppe P., Salvadori M., Dini A., Pennisi M., Cornacchia I., Vezzoni S., **Rielli A.**, Agostini S. 2022. *Boron (B) isotope ratio measurements by new ThermoFisher Neptune Plus Mass Spectrometer in the NEPTUNE-TIMS Laboratory* (Istituto di Geoscienze e Georisorse, CNR di Pisa), Rapporto Interno IGG-CNR, 1102/22042022.

#### **Publications in peer-reviewed scientific journals**

Brogi, A., Liotta, D., Dini, A., & **Rielli, A.** (2023). Geology of Montecastelli Pisano (inner Northern Apennines, Italy): normal and transfer fault zones affecting a dismantled ophiolite bearing orogenic wedge. *Journal of Maps*, 19(1), 2242723.

**Rielli A.**, Boschi C., Dini A. 2022b. Tectonically driven carbonation of serpentinite by mantle CO<sub>2</sub>: Genesis of the Castiglioncello magnesite deposit in the Ligurian ophiolite of central Tuscany (Italy). *Ore Geology Reviews*, 105022.

**Rielli A.**, Tomkins A.G., Nebel O., Brugger J., Etschmann B., Evans K., Wykes J. L., Vasilyev P., Paterson D.J. 2022a Incipient metal and sulfur extraction during melting of metasomatised mantle. *Earth and Planetary Science Letters*, 117850.

Herlaux M., Kouzmanov K., Gialli S., Laurent O., **Rielli A.**, Dini A., Menzies C. A., Kalinaj M., and Fontboté L. 2020. Tourmaline as a tracer of late-magmatic to hydrothermal fluid evolution: the world-class San Rafael tin deposit, Peru. Accepted for publication, *Economic Geology*.

Marger K., Harlaux M., **Rielli A.**, Baumgartner L. P., Dini A., Dutrow B., and Bouvier A. 2020. Développement and Re-Evaluation of Tourmaline Reference Materials for *In Situ* Measurement of Boron  $\delta$  Values by Secondary Ion Mass Spectrometry. *Geostandards and Geoanalytical research*.

Boschi, C., Bedini, F., Baneschi, I., **Rielli, A.**, Baumgartner, L., Perchiazzi, N., Ulyanov, A., Zanchetta, G., Dini, A., 2020. Spontaneous serpentine carbonation controlled by underground dynamic microclimate at the montecastelli copper mine, Italy. *Minerals*, 10 (1), art. no. 1.

**Rielli, A.**, Tomkins, A. G., Nebel, O., Brugger, J., Etschmann, B., and Paterson, D., 2018a, Garnet peridotites reveal spatial and temporal changes in the oxidation potential of subduction: *Scientific reports*, v. 8, no. 1, p. 1-9.

**Rielli, A.**, Tomkins, A. G., Nebel, O., Raveggi, M., Jeon, H., Martin, L., and Ávila, J. N., 2018b, Sulfur isotope and PGE systematics of metasomatised mantle wedge: *Earth and Planetary Science Letters*, v. 497, p. 181-192.

**Rielli A.**, Rielli, A., Tomkins A. G, Nebel O, Brugger J, Eschmann B, Zhong R, Yaxley G. M, and Paterson D, 2017, Evidence of sub-arc mantle oxidation by sulphur and carbon: *Geochemical Perspectives Letters*, v. 3, p. 124 - 132. DOI: 10.7185/geochemlet.1713

Eggseder M. S., Cruden A.R., Tomkins A.G., Wilson S.A., **Rielli A.**, Li C., Baumgartner J., Faivre D., *In review 2018*. Tiny particles building huge ore deposits – Particle-based crystallisation in banded iron formation-hosted iron ore deposits (Hamersley Province, Australia). *Ore geology Reviews*. <https://doi.org/10.1016/j.oregeorev.2018.10.001>

**Rielli A.**, Tomkins A.G., Nebel O., Brugger j., Etschmann B., Paterson D. *In review 2020*. Caught in the act: Incipient metal extraction during melting of metasomatically oxidised mantle. *GEOLOGY*.

### **Conference abstracts:**

Bicocchi G., Orlando A., Ruggieri G., Borrini D., **Rielli A.**, Boschi C. Towards zero emission geothermal plants in the framework of the H2020 GECO project: Insights on gas re-injection in geothermal reservoir and serpentinite carbonation from batch reactor experiments“ EGU 2020 General assembly. EGU2020-691

Boschi C., Baneschi I., Bonini M., Brogi A., Dini A., Gola G., Lelli M., Liotta D., Norelli F., Manzella A., Montanari D., Montegrossi G., Orlando A., Raco B., **Rielli A.**, Ruggieri G., Santilano A. & Trumphy E. - H2020 GECO - Geothermal Emission Control- Project. 2019 SIMP-SGI-SOGEI congress.



Pennisi M., Agostini S., Dini A., Dordoni M., Di Giuseppe P., **Rielli A.**, Provenzale A., Rodushkin I. 2019. Boron isotope analyses in fluid samples: PTIMS versus MC-ICP-MS (Neptune Plus). International Symposium on Isotope Hydrology IAEA.

**Rielli A.**, Boschi C., Dini A., 2019. Tectonically controlled carbonation of serpentinites in the Ligurian ophiolites: The genesis of the Castiglioncello magnesite deposit, *Goldschmidt Abstracts*, 2019, 2833. Oral presentation.

Boschi C., **Rielli A.**, Dini A., Baneschi I., Gola G., Montegrossi G., Orlando A., Ruggieri G., Trumpy E. From CO<sub>2</sub> geothermal emissions to commercial material in the framework of the H2020 GECO project: What we can learn from the Ligurian ophiolites. *Goldschmidt Abstracts*, **2019** 343.

Dordoni, M., Pennisi, M., Agostini, S., Dini, A., Di Giuseppe, P., Rielli, A., Provenzale, A., Bianchini, G., Natali, C., Marchina, C., Cidu, R. (2019). *First isotopic analyses in fluid samples using MC-ICP-MS (NEPTUNE PLUSTM): results on Boron-poor fluvial and rain water (Adige basin)*. Congresso SIMP-SGI-SOGEI "Il tempo del pianeta Terra e il tempo dell'uomo: le geoscienze tra passato e futuro", 6-19 Settembre 2019, Parma, Italia (Presentazione Orale).

Tomkins A., **Rielli A.**, Nebel O., Brugger J., Etschmann B., Evans K., Vasilyev P., Wykes J & Paterson D (2019). Caught in the Act: Incipient Metal Extraction during Melting of Metasomatically Oxidised Mantle. *Goldschmidt Abstracts*, **2019** 3395

Dini A., Pennisi M., Agostini S., Di Giuseppe P., **Rielli A.** 2018. At the root of the geothermal field of Larderello: boron isotope constraints. *Goldschmidt Abstracts*, **2018** 583

**Rielli A.**, Tomkins A.G., Nebel O., Brugger J., Etschmann B., 2017. Oxidation state of melt generated at the site of mantle metasomatism. *Goldschmidt Abstracts*, **2017** 3356.

**Rielli A.**, Tomkins A.G., Nebel O., Brugger J., Zhong R. 2016. Carbon-driven oxidation of the sub-arc mantle in the early Earth. Goldschmidt conference 2016, Yokohama. *Goldschmidt Abstracts*, **2016** 2630.

**Rielli A.**; Tomkins A.G. 2015. Understanding Cu-Au metallogeny at convergent margins: Oxidation of the sub-arc mantle and genesis of arc-related ore deposits. SEG conference 2015, Hobart.

**Rielli A.**, Tomkins A.G. and Nebel O., 2015. Sulfate- and carbonate-driven oxidation of the sub-arc mantle – insights from orogenic garnet peridotites of Norway. *Goldschmidt Abstracts*, **2015** 2638. Oral presentation.

Boschi C., Dallai L., Dini A., **Rielli A.** & Ruggieri G. 2014. CO<sub>2</sub> release and carbonation of Tuscan serpentinites, SIMP-SGI (Italian geological society and Italian society of mineralogy and petrology) joint conference, Milan, September 2014.

**Grants and Awards:**

- 2018 National Geographic Society Early Career Research Grant.** Grant Number: EC-426R-18.  
Project title: Magnesite deposits as proxies for paleo-CO<sub>2</sub> fluxes through the Earth's crust.
- 2015 Monash University – Victoria Museum Collaborative PhD Top-up Scholarship.** Proposal title: “Melting of metasomatised mantle beneath western Victoria (Australia) – new insights on mantle-to-crust sulfur and fO<sub>2</sub> cycling”.
- 2016 Resourcing Future Generations Research Grant** from the International Union of Geological Sciences, proposal title: “Metasomatic alteration of the sub-arc mantle: Implication for arc metallogeny and the redox state of the deep Earth”.
- 2016 Society of Economic Geologists Foundation Grant,** complete funding for the workshop “Porphyry systems of central and southern British Columbia” (British Columbia, Canada).
- 2016 International Association of GeoChemistry Research Grant,** Proposal title: “Sulfur cycling at subduction zones – Implication for mantle oxygen fugacity and arc Cu-Au metallogeny”.
- 2016 Monash University Travel Grant and Study Away Grant,** to attend the Goldschmidt conference in Yokohama (Japan).
- 2016 Australian Synchrotron Beamtime;** 2016/3 XFM four days of beamtime at the Australian Synchrotron in Melbourne, Proposal Title: “Oxidation state of melt generated at the site of mantle metasomatism”.
- 2015 Monash University Travel Grant.** To attend the Society of Economic Geologists conference in Hobart (Australia).
- 2015 Monash University Travel Grant.** To attend the Goldschmidt conference in Prague (Czech Republic).
- 2015 Australian Synchrotron Beamtime;** AS152/XFM/9490. XFM three days of beamtime at the Australian Synchrotron in Melbourne, Proposal Title: “Metasomatic oxidation of the sub-arc mantle, new insights from synchrotron XANES analyses of iron oxidation in garnet”

- 2015      *Bicentennial Gold 88 Endowment research grant.* Proposal Title:  
"Understanding Cu-Au metallogeny at convergent margins: Oxidation state of  
the sub-arc mantle and genesis of arc-related ore deposits". Funded by the  
Australian Institute of Mining and Metallurgy (AusIMM).
- 2014      *Society of Economic Geologists (SEG) Student Research Grant.* Funded by  
Newmont Mining Corporation.
- 2014      *Monash Graduate Scholarship.*
- 2014      *Monash International Postgraduate Research Scholarship*

Andrea Rielli 06/09/2023

