

CHIARA CIVIERO

Università degli Studi di Trieste, via E. Weiss 1, Palazzina C, 34128, Trieste, Italy
(+339)3484196620 ◊ chiara.civiero@units.it; civierochiara@gmail.com

My current research uses broadband seismology to understand the interior of the Earth. I am particularly focused on using body and surface waves to tomographically image the crustal and mantle structure at regional and global scales. I am also interested in combining seismic observations with constraints from geology, geochemistry, geodynamic modeling, and plate reconstructions. My work is driven by trying to provide an integrated view of the deep Earth structure and dynamics.

RESEARCH EXPERIENCE

Università degli Studi di Trieste, Trieste, Italy

June 2023 - Present

Research Fellow (RTD-B)

Project Aim (Rita Levi Montalcini Fellowship):

- Teleseismic, multi-frequency tomography of the whole mantle beneath Europe to constrain the geodynamic mechanisms responsible for the seismic and volcanic activity.

Institut de Ciències del Mar, Barcelona, Spain

May 2022 - June 2023

Postdoctoral Researcher

Project Aim (Severo Ochoa Postdoctoral Fellowship):

- Azimuthally anisotropic Rayleigh phase velocity maps of the Euro-Mediterranean region from ambient noise.

Advisor: Prof. Antonio Villaseñor.

DIAS, Dublin, Ireland

October 2018 - April 2022

Postdoctoral Research Fellow

Project Aims:

- 2D Global Phase-Velocity Tomography using a massive dataset of dispersion curves and Temperature-Velocity relationships from geophysical-petrological modeling obtained with the Litmod tool.
- Waveform tomography of the lithosphere and the underlying mantle structure beneath the Afro-Arabian rift system with constraints from geochemistry and plate reconstruction models.

Advisor: Prof. Sergei Lebedev.

Instituto Dom Luiz, Lisbon, Portugal

August 2016 - September 2018

Postdoctoral Researcher

Project Aim:

- Imaging of the crust and upper mantle underlying Iberia, northwestern Morocco, Canary and Madeira Islands by integrating a large set of onshore and offshore seismic data.

Advisors: Prof. Susana Custódio, Prof. Graça Silveira.

Visiting Research Experience:

University of Cambridge, UK – Implementation of the FMTOMO tomographic code

March 2017

Advisor: Prof. Nicholas Rawlinson.

EDUCATION

Imperial College London, London, UK

October 2012 - May 2016

Ph.D, Geophysics

Project Title: Understanding the Nature of Mantle Upwelling Beneath East Africa.

Supervisors: Dr. James Hammond, Prof. Saskia Goes.

University of Trieste, Trieste, Italy

October 2008 - November 2011

Master of Science (MSc), Theoretical Geophysics

Thesis Title: Seismological and gravitational investigation of the Carpathian-Pannonian region, Central Europe.

Supervisors: Prof. Carla Braitenberg, Prof. Gregory Houseman.

University of Leeds, Leeds, UK

January - June 2011

Erasmus Placement

Project: Seismic Wave propagation beneath South Carpathians using SPECFEM3D.

Supervisor: Prof. Gregory Houseman.

Università degli Studi di Padova, Padova, Italy

October 2005 - October 2008

Bachelor of Science (BSc), Earth Sciences

Thesis Title: Composition of olivine and pyroxene in basanites of Cameroon and implications for a pyroresenitic mantle source.

Supervisor: Prof. Andrea Marzoli.

TEACHING AND TUTORING EXPERIENCE

Università degli Studi di Trieste, Trieste, Italy

June 2023 - Present

Lecturer:

Informatics for Geosciences (for BSc students in Geology)

Volcanism and Internal Processes (for BSc students in Geology)

Research methods and skills (for PhD students)

Instituto Dom Luiz, Lisbon, Portugal

June 2018

BSc thesis examiner:

Diogo Rodrigues, BSc thesis in Geophysics "Correlation between seismic activity, surface deformation, and crustal velocity in Iberia, SW Europe".

Imperial College London, London, UK

2012 - 2016

Graduate teaching assistant:

Seismology (supervised by Dr. Ian Bastow)

Field Geophysics (12 days in Morocco - supervised by Dr. Adrian Muxworthy)

Global Geophysics (supervised by Prof. Jenny Collier)

Geohazards (supervised by Prof. Saskia Goes)

Graduate Student co-tutor:

Josh Taylor, MSc thesis in Geophysics (2013) "Synthetic travel time anomalies of mantle plumes".

FIELDWORK

- **North Atlantic.** Offshore expedition (3 weeks) for the recovery of OBSs within the "SEA-SEIS" project (www.sea-seis.ie). *April - May 2020*

- **Morocco.** Teaching Assistant in the Field Geophysics course (12 days) for MSc students at Imperial College London. *March 2013*
- **Alps and Apennines.** Several fieldworks during the BSc and MSc, University of Padova and Trieste. *2005-2011*

SKILLS

Computer Literacy: *Operating Systems:* Windows (98, XP, Vista, 10), Linux (Ubuntu), Unix (Sun), Mac, DOS.
Professional Software: SAC, GMT, QGIS, GPlates, TauP Toolkit, ParaView, SPECFEM3D (basic).
Other: Microsoft Word, Excel and PowerPoint, LaTeX, Open Office, Adobe Illustrator CS2, Inkscape.
Programming languages: Matlab, Python, Bash scripting, AWK.

Languages: Italian (mother tongue), English (fluent), Spanish (good), French (sufficient), Portuguese (sufficient)

PEER-REVIEWED PUBLICATIONS

- Duarte J. C., Riel N., **Civiero, C.**, Silva S., Rosas F., Almeida J., Schellart W., Almeida J., Terrinha P., Ribeiro A. (2025) Evidence of oceanic plate delamination in the Northern Atlantic. doi: <https://doi.org/10.21203/rs.3.rs-690433/v1>.
- **Civiero, C.**, De Min, A. (2025) Tomographic consistency in imaging lower-mantle plumes and their link to European Cenozoic Rift Volcanism. *Earth and Planetary Physics*. doi: 10.26464/epp2025056.
- **Civiero, C.**, Bonadio, R., Villaseñor, A. (2025) Azimuthally anisotropic Rayleigh-wave phase-velocity maps of Europe. *Tectonophysics*. doi: <https://doi.org/10.1016/j.tecto.2025.230788>.
- **Civiero, C.**, Lebedev, S., Xu Y., Bonadio, R., Lavoué, F. (2024) Toward tectonic-type and global 1D seismic models of the upper mantle constrained by broadband surface waves. *Bulletin of the Seismological Society of America (Special Issue on Modern Seismic Tomography)*.
- Bonatto, L., Schlaphorst, D., Silveira, G., Mata, J., **Civiero, C.**, Piromallo, C., Schimmel, M. (2024) Unveiling the distinct structure of the upper mantle beneath the Canary and Madeira hotspots, as depicted by the 660, 410, and X discontinuities. *Journal of Geophysical Research: Solid Earth*. doi: <https://doi.org/10.1029/2023JB028195>.
- **Civiero, C.**, Celli, N. L., Tesauro, M. (2023) Revisiting the geodynamics of the Middle East region from an integrated geophysical perspective. *Journal of Geodynamics*. doi: <https://doi.org/10.1016/j.jog.2023.102005>.
- **Civiero, C.**, Carvalho, J., Silveira, G. (2023) Mantle structure beneath the Macaronesian volcanic islands (Cape Verde, Canaries, Madeira and Azores): a review and future directions. *Frontiers in Earth Science*. doi: 10.3389/feart.2023.1126274.
- **Civiero, C.**, Lebedev, S., Celli, N. L. (2022) A Complex Mantle Plume Head Below East Africa-Arabia Shaped by the Lithosphere-Asthenosphere Boundary Topography. *Geochemistry, Geophysics, Geosystems*. doi: <https://doi.org/10.1029/2022GC010610>.
- **Civiero, C.**, Custódio, S., Neres, M., Schlaphorst, D., Mata, J., Silveira, G. (2021) The role of the seismically slow Central-East Atlantic Anomaly in the genesis of the Canary and Madeira volcanic provinces. *Geophysical Research Letters*. doi: <https://doi.org/10.1029/2021GL092874>.
- Arroucau, P., Custódio, S., **Civiero, C.**, Dias, N. A., Silveira, G., Diaz J., Villaseñor A. (2021) PRISM3D: a 3D preliminary reference seismic model for Iberia and adjacent areas. *Geophysical Journal International*. doi: <https://doi.org/10.1093/gji/ggab005>.

- **Civiero, C.**, Custódio, S., Duarte, J. C., Mendes, V. B., Faccenna, C. (2020) Dynamics of the Gibraltar arc: a complex interaction between plate convergence, slab pull and mantle flow. *Journal of Geophysical Research: Solid Earth*. doi: <https://doi.org/10.1029/2019JB018873>.
- **Civiero, C.**, Armitage, J.J., Goes, S., and Hammond, J.O.S. (2019) The seismic signature of upper-mantle plumes: application to the northern East-African Rift. *Geochemistry, Geophysics, Geosystems*. doi: <https://doi.org/10.1029/2019GC008636>.
- **Civiero, C.**, Custódio, S., Rawlinson, N., Strak, V., Silveira, G., Arroucau, P., Corela, C. (2019). Thermal nature of mantle upwellings below the Ibero-western Maghreb region inferred from teleseismic tomography. *Journal of Geophysical Research: Solid Earth*. doi: <https://doi.org/10.1029/2018JB016531>.
- **Civiero, C.**, Strak, V., Custódio, S., Silveira, G., Rawlinson, N., Arroucau, P., Corela, C. (2018). A common deep source for upper-mantle upwellings below the Ibero-western Maghreb region from teleseismic P-wave travel-time tomography. *Earth and Planetary Science Letters*. doi: <https://doi.org/10.1016/j.epsl.2018.07.024>.
- **Civiero, C.**, Hammond, J.O.S., Goes, S., Fishwick, S., Ahmed, A., Ayele, A., Doubre, C., Goitom, B., Keir, D., Kendall, M., Leroy, S., Ogubazghi, G., Rumpker, G., Stuart, G.W. (2016) Small-scale thermal upwellings under the Northern East-African Rift from S travel-time tomography, *Journal of Geophysical Research: Solid Earth*. doi: 10.1002/2016JB013070.
- **Civiero, C.**, Hammond, J.O.S., Goes, S., Fishwick, S., Ahmed, A., Ayele, A., Doubre, C., Goitom, B., Keir, D., Kendall, M., Leroy, S., Ogubazghi, G., Rumpker, G., Stuart, G.W. (2015) Multiple mantle upwellings beneath the Northern East-African Rift System from relative P-wave traveltime tomography, *Geochemistry, Geophysics, Geosystems*. doi: 10.1002/2015GC005948.

Submitted and in preparation:

- **Civiero, C.**, Shirzad, T., Bonadio, R., Villaseñor A. S-wave velocity structure of Europe from joint inversion of Rayleigh wave phase and group velocities (under review in *Journal of Geophysical Research: Solid Earth*).
- Davidson, S. C., Lebedev, S., Xu, Y., Gibson, S. A., **Civiero, C.**, Fullea, J. Reconciling seismic and thermo-chemical models of cratonic lithosphere (under review in *Geochemistry, Geophysics, Geosystems*).
- **Civiero, C.**, Tsekhmistrenko, M. Multifrequency P-Wave Tomography: A 3D Model of the whole European Mantle (in preparation).

COMMUNICATION AND CONGRESSES

Invited talks

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| • University of Cambridge, Bullard Laboratories, UK | <i>February 2025</i> |
| • AGU24 Annual Meeting, Washington, United States | <i>December 2024</i> |
| • EGU23 General Assembly, Wien, Austria | <i>April 2023</i> |
| • Institut de Ciències del Mar, Barcelona, Spain | <i>February 2023</i> |
| • Instituto Dom Luiz, Lisbon, Portugal | <i>March 2022</i> |
| • Instituto Dom Luiz, Lisbon, Portugal | <i>October 2021</i> |
| • Trinity College Dublin, Ireland | <i>November 2020</i> |
| • GFZ Potsdam, Germany | <i>September 2020</i> |

- Instituto Dom Luiz, Lisbon, Portugal *July 2019*
- SUBITOP Topo-Europe Conference, Granada, Spain *May 2019*
- University of Münster, Münster, Germany *June 2018*
- CNES, Paris, France (short-listed for a postdoc position and winner) *May 2018*
- CEED, University of Oslo, Norway (short-listed for a postdoc position) *February 2016*

Congresses/conferences

More than 20 Communications and international congresses: AGU Fall Meeting, EGU General Assembly, IASPEI, ESC, SSA and others.

SCHOLARSHIPS, GRANTS AND TRAVEL AWARDS

- Italian National Scientific Qualification as associate professor in Solid Earth Geophysics (SSD: GEO/10) *2023*
- Premio Giovani Ricercatori "Rita Levi Montalcini" (MUR). Aim: tomographic imaging of the mantle beneath Europe with constraints from receiver functions and numerical modeling. *2022*
- "Severo Ochoa Centre of Excellence" Fellowship, Institut de Ciències del Mar, Barcelona, Spain. Aim: to study the whole mantle structure beneath the Atlantic Ocean and Mediterranean Sea. *2021*
- Marie Skłodowska-Curie Actions Seal of Excellence (Horizon 2020), Score: 93.2%. *2021*
- SUBITOP Topo-Europe Conference Travel Grant, Granada, Spain. *2019*
- CNES Post-doctoral Grant to study the structure of Mars, ISAE-Supaero, Toulouse Cedex 4, France (awarded but refused to accept the postdoc at DIAS). *2018*
- COST Action ES1401 Travel Award (TIDES Project). *2018*
- VERCE Summer School's Travel Award, University of Liverpool, UK. *2015*
- EGU Young Scientist's Travel Award. *2014*
- Janet Watson Departmental Scholarship, Imperial College, UK. *2012*
- Erasmus Work Placement Scholarship, University of Trieste, Italy. *2011*

ACADEMIC RESPONSIBILITIES AND OUTREACH ACTIVITIES

Academic responsibilities and Editorial work

- Delegate for Ongoing Student Guidance, MIGe (*2023-Present*).
- Convener of the session "Integrating Plate Tectonics, Volcanism, and Geodynamics: Insights from the Lithosphere and Underlying Mantle Structure", IASPEI25 (*September, 2025*).
- Co-convener of the session "Seismology 101", EGU (*May, 2022*).
- Co-convener of the session "Causes and consequences of mantle upwellings", EGU (*April, 2018*).
- Co-convener of the session "Geodynamics of the Caucasian-Arabian Syntaxis and the East African Rift system", EGU (*April, 2017*).
- Editor of *Seismica* and *Frontiers in Earth Science* journals.
- Peer-reviewer of articles for international scientific journals such as: *Geophysical Journal International*, *Tectonophysics*, *Geophysical Research Letters*, *Journal of Geophysical Research*, *Frontiers in Earth Science*, *Physics of the Earth and Planetary Interiors*, *Physics of the Earth and Planetary Interiors*, *Communications Earth and Environment*, *Nature Communications*, *Scientific Reports*.

- Judge for the Outstanding Student Poster and PICO (OSPP), EGU and AGU award.
- Organizer of bi-weekly seminars for external speakers in DIAS (*June 2021 - March 2022*).

Outreach activities

- Lecturer and Laboratory Assistant during the Summer Training Module – “Laboratorio sull’Interno della Terra” aimed at introducing high-school students to the structure of the Earth, the magnetic field, and gravity, *2024*.
- Volunteer at the outreach stand “Minerali dalla Terra e dallo spazio: dalle profondità terrestri alle altezze cosmiche” at TriesteNEXT, *2024*.
- Laboratory Assistant during the rock-density measurement activity using a hydrostatic balance, organised in collaboration with the Immaginario Scientifico for high-school students, *2025*.
- Co-Representative of the Early-Career Scientists of the EGU, Seismology section, 2021 (curator of the SENSOR blog, winner for the BestBloPost 2021).
- Participation of the EGU21 Mentoring Programme (assigned student: Aleksandra Dewiszek).
- Contribution to the SEA-SEIS blog and live video link-ups with Irish and Italian primary school students during the North Atlantic expedition, *2020*.
- On the National Geographic Magazine, article “A tectonic plate may have peeled apart—and that could shrink the Atlantic Ocean”, *2019*.
- Participation to the European Researchers’ Night in Lisbon and Dublin, *2016, 2019*.
- Publishing articles concerning the environment for education of children in rural sub-Saharan Africa. Right for Education, online platform (www.rightforeducation.org), *2016*.

NON-ACADEMIC WORK

ETIndex, London (www.engagedtracking.com)

May - September 2016

Carbon Data Analyst

Collating and analysing corporate emissions data to produce the ET Carbon Rankings.

CAREER BREAK

Maternity leave

October 2023 - March 2024

6 months