

## **BARBARA ORECCHIO**

Full Professor of Solid Earth Geophysics (GEOS-04/A), University of Messina.

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B. Orecchio carries out research activity in Geophysics, with particular reference to seismology, seismotectonics, and geodynamics. Her research topics include both methodological aspects (e.g., seismic tomography techniques, hypocenter location, and focal mechanism determination) and applications aimed at interpreting seismotectonic processes.

In particular, her research, also supported by continuous methodological developments, has provided new data and insights into the seismicity and seismotectonics of Southern Italy, significantly contributing to the advancement of knowledge in the Calabro-Peloritan Arc region. The resulting scientific production represents a substantial contribution to the international literature on these topics, with publications in leading ISI journals.

B. Orecchio is co-author of more than 50 publications in international ISI journals (h-index = 27, Scopus, May 2026), as well as numerous contributions presented at national and international conferences.

B. Orecchio is a member of the Board of Directors of the Italian Geophysical Union.

She is currently a member of the National Scientific Qualification (ASN) Committee for the disciplinary sector 04/A4 – Geophysics (2023-2026).

### **MAIN ACADEMIC ROLES**

- Member of the National Scientific Qualification Committee (ASN) for Full and Associate Professorships in the disciplinary sector 04/A4 – Geophysics (2023-2026).
- Member of the Quality Assurance Board of the University of Messina (since 07/11/2022).
- Member of the Board of Directors of the Italian Geophysical Union (since October 2021).
- Member of the Executive Board of the Interuniversity Center for 3D Seismotectonic Analysis with Territorial Applications (CRUST) (2016 – 2023).
- Coordinator of the MSc Degree Programme in Environmental and Territorial Protection and Management, University of Messina (2018–2020).
- Member of the Steering Committee of the MSc Degree Programme in Geophysical Sciences for Seismic Risk, University of Messina (since 20/11/2018).
- Member of numerous academic selection committees for recruitment of researchers and associate professors, PhD evaluation, research fellowships, and teaching assignments.

### **TEACHING ACTIVITIES**

- Course lecturer and chair of examination boards for the following courses:

- *Geophysical Tools – Geophysical Observation Methods and Remote Sensing* (6 ECTS), MSc in Geophysical Sciences for Seismic Risk, University of Messina (AY 2020/2021–present).

- *Geophysics and Remote Sensing* (6 ECTS), MSc in Maritime and Air Transport Sciences and Logistics, University of Messina (AY 2020/2021–present).
  - *Fundamentals of Earth Physics* (6 ECTS), BSc in Physics, University of Messina (AY 2012/2013–2020/2021).
  - *Geophysical Methods for Solid and Fluid Earth Investigation* (6 ECTS), MSc in Geophysical Sciences for Seismic Risk, University of Messina (AY 2019/2020).
  - *Environmental Remote Sensing* (6 ECTS), MSc in Environmental and Territorial Protection, University of Messina (AY 2016/2017–2018/2019).
  - *Physical Seismology* (6 ECTS), MSc in Physics, University of Calabria (AY 2008/2009, 2011/2012).
- Member of the PhD Board in Physics, University of Messina (since 2013).
  - Lecturer in PhD courses of Geophysics within the PhD programme in Physics (University of Messina).
  - Chair of MSc graduation committees in Environmental and Territorial Protection (2018–2020).
  - Supervisor and co-supervisor of numerous MSc and PhD theses.

### **MAIN RESEARCH TOPICS**

- Development of advanced methodologies for seismic tomography and earthquake location.
- Seismic tomography for imaging crustal and upper mantle structures.
- Analysis of seismicity and seismogenic processes, with particular focus on the Calabro-Peloritan Arc region.
- Waveform inversion for seismic moment tensor estimation; inversion of seismogenic stress fields and seismic strain analysis.
- Analytical prediction of ground motion for seismic hazard and risk assessment.
- Investigations of strong earthquakes and tsunamis in the Mediterranean area.

### **SCIENTIFIC RESPONSIBILITIES AND COORDINATION ACTIVITIES**

- Research Unit Leader (University of Messina) within the PRIN 2022 project: “Joining Exploration and Earthquake Seismology for Velocity Model Building and Seismogenic Process Characterization”.
- Member of the Board of Directors of the Italian Geophysical Union (since October 2021).
- Member of the Executive Board of the CRUST Interuniversity Center (2016–2023).
- Research Unit Leader (University of Messina) within the PRIN 2017 project: “Overtime tectonic, dynamic and rheologic control on destructive multiple seismic events – Special Italian Faults & Earthquakes: from real 4D cases to models”.
- Member of the Technical-Scientific Committee of the project: “HCH LowCost GeoEngineering Check – Low-cost multisensory system for diagnosis and protection of cultural heritage” (PO

FESR Sicilia 2014/2020). Coordinator of the University of Messina research group within the same project.

- Research Unit Leader (University of Messina) within the PRIN 2010–2011 project: “Active and recent geodynamics of the Calabrian Arc and accretionary complex in the Ionian Sea”.
- Scientific supervisor of numerous research fellowships, grants, and contracts in geophysics.

### **MAIN SCIENTIFIC PUBLICATIONS OF THE LAST 5 YEARS**

- Mancuso T., Cesca S., Grigoli F., Presti D., Totaro C., Orecchio B., *High-resolution analysis of the 2025 offshore seismic sequence in the Aeolian Archipelago (Southern Tyrrhenian Sea, Italy)*, **Geophysical Journal International**, doi: 10.1093/gji/ggaf532, 2026.
- Mancuso T., Scolaro S., Totaro C., Orecchio B., *Assessing Double-Couple Moment Tensor Reliability of Recently Developed Bayesian Inversion Algorithms*, **Bulletin of the Seismological Society of America**, 115(5), pp. 2109–2125, doi: 10.1785/0120250017, 2025.
- Scolaro S., Batlló J., Orecchio B., Presti D., Totaro C., *Re-Evaluating the Instrumental Magnitude of the Destructive 28 December 1908 Messina Earthquake (Southern Italy)*, **Seismological Research Letters**, 96(4), pp. 2167–2186, doi: 10.1785/0220240447, 2025.
- Billi A., Corbi F., Cuffaro M., Orecchio B., Palano M., Presti D., Totaro C., *Seismic slip channeling along the East Anatolian Fault illuminates long-term supercycle behavior*, **Nature Communications**, vol. 15, p. 1-11, ISSN: 2041-1723, doi: 10.1038/s41467-024-53234-0, 2024.
- Totaro C., Aloisi M., Ferlito C., Orecchio B., Presti D., Scolaro S., *3D seismic velocity models from local earthquake tomography furnish new insights on the Mount Etna volcano (Southern Italy)*, **Scientific Reports**, p. 1-13, ISSN: 2045-2322, doi: 10.1038/s41598-024-74349-w, 2024.
- Scolaro S., Batlló J., Orecchio B., Presti D., Stich D., Totaro C., *Modern Approaches for Historical Seismograms: Moment Tensor Inversion of the 1947 Squillace Basin, South Italy, Earthquake*, **Seismological Research Letters**, vol. 95, p. 2337-2351, ISSN: 0895-0695, doi: 10.1785/0220230423, 2024.
- Billi A., Cuffaro M., Orecchio B., Palano M., Presti D., Totaro C., *Retracing the Africa–Eurasia nascent convergent boundary in the western Mediterranean based on earthquake and GNSS data*, **Earth and Planetary Science Letters**, p. 1-15, ISSN: 0012-821X, doi: 10.1016/j.epsl.2022.117906, 2023.
- Orecchio B., Presti D., Scolaro S., Totaro C., *Seismic deformation in the Adriatic Sea region*, **Journal of Geodynamics**, p. 1-10, ISSN: 0264-3707, 2023.
- Totaro C., Aloisi M., Ferlito C., Orecchio B., Presti D., Scolaro S., *New insights on the active degassing system of the Lipari–Vulcano complex (South Italy) inferred from Local Earthquake Tomography*, **Scientific Reports**, vol. 12, p. 1-10, ISSN: 2045-2322, 2022.
- Cirillo D., Totaro C., Lavecchia G., Orecchio B., de Nardis R., Presti D., Ferrarini F., Bello S., Brozzetti F., *Structural complexities and tectonic barriers controlling recent seismic*

*activity in the Pollino area (Calabria–Lucania, southern Italy) – constraints from stress inversion and 3D fault model building*, **Solid Earth**, 13, 205–228, <https://doi.org/10.5194/se-13-205-2022>, 2022

- Orecchio B., Scolaro S., Batlló J., Neri G., Presti D., Stich D., Totaro C., *New Results for the 1968 Belice, South Italy, Seismic Sequence: Solving the Long-Lasting Ambiguity on Causative Source*, **Seismological Research Letters**, vol. 92, p. 2364-2381, ISSN: 0895-0695, doi: 10.1785/0220200277, 2021.
- Neri G., Orecchio B., Presti D., Scolaro S., Totaro C., *Recent Seismicity in the Area of the Major, 1908 Messina Straits Earthquake, South Italy*, **Frontiers in Earth Science**, vol. 9, p. 1-16, ISSN: 2296-6463, doi: 10.3389/feart.2021.667501, 2021.
- Orecchio B., Neri G., Presti D., Scolaro S., Totaro C., *Seismic deformation styles in the upper and lower plate domains of the Calabrian subduction zone, south Italy*, **Journal of Geodynamics**, vol. 145, p. 1-12, ISSN: 0264-3707, doi: 10.1016/j.jog.2021.101847, 2021.