

## Curriculum Vitae

Name: **Marco LIGI**  
Date of birth: **24/04/1958**  
Citizen: **Italian**  
ORCID ID: **<https://orcid.org/0000-0002-5098-5907>**

### *Short Biography:*

Marco Ligi is presently Director of Research at the Institute of Marine Sciences, National Research Council (CNR) in Bologna. His scientific career started in La Spezia at ENEA as consultant on database management systems, at Rice University (Houston, Texas - USA) as one-year Visiting Research Scientist on seismic data processing, and for over 30 years, at the Institute of Marine Sciences.

His research interests started with numerical cartography and database management systems, in particular having responsibility for the Catalogue of Italian historical earthquakes and for the Italian Seas bathymetry database. Soon he shifted to geophysics and structural aspects of the origin and evolution of the ocean basins, using as tools multibeam and multichannel seismic data acquisition, processing and interpretation; inversion and modelling of magnetic and gravity data, and geophysical modelling. He then did research on tectonics and evolution of mid-ocean ridges and oceanic transform plate boundaries. He directed field work in the Bouvet Triple Junction region of the South Atlantic, and developed a model on the evolution of Triple Points, that was published by *Science*. Following field work in the equatorial Atlantic and in the Andrew Bain Fracture Zone (South West Indian Ridge) he developed the concept of oceanic “megatrasform”: a new type of plate boundary, published in *Geology*. He developed models on the thermal structure and melting patterns of the sub-ridge mantle in the vicinity of megatransforms in a paper published by *Nature*. He directed field work that led to the discovery of temporal variations in degree of melting at a segment of the Mid-Atlantic Ridge during 25 million years; articles in *Nature* and other journals reported on this discovery. He directed field works in the Red Sea and in the western Arabia lava fields, that led to a model of transition from continental to oceanic rifting, published in *Geology* and *Gondwana Research*. Current research is focused on geophysics of basic processes at accretionary plate boundaries such as mantle flow and melting modelling; recently he has been working on modelling temporal variations of seawater composition due to mantle/ocean chemical exchanges by hydration of oceanic mantle.

He led several oceanographic expeditions in the Mediterranean and Red Sea, Atlantic and Indian Oceans; he wrote 179 scientific papers: of these 92 are in JCR journals and 5 in journals such as *Nature*, *Nature Geoscience* and *Science*. He supervised several graduate students from Universities of Bologna, Modena, Bari and Rome, and served in many committees and panels. Since 2005, he has been coordinating researches in the field of geology of the oceans leading a large Italian group including researchers and students from Pavia, Modena, Roma and Camerino universities, and from ISMAR and IGAG CNR-institutes.

In 2013 he was nominated SGI-SIMP-SPI Distinguished Lecturer. In 2016 he was awarded "Prof. Luigi Tartufari" International Prize in Geosciences by Italian Academy of Sciences (Accademia Nazionale dei Lincei). In 2023 was member of the Accademia dei Lincei.

### **Education:**

Laurea (summa cum laude) in Geological Sciences at University of Bologna, March 3<sup>rd</sup>, 1983.

### **Appointments:**

- 2010– present:* Director of Research, Institute of Marine Sciences, National Research Council of Italy (CNR), Bologna.
- 2001– 2009:* Senior Research Scientist, Institute of Marine Sciences, National Research Council of Italy (CNR), Bologna.
- 1989– 2001:* Research Scientist, Institute of Marine Sciences, National Research Council of Italy (CNR), Bologna.
- 1988 – 1989:* Visiting Research Scientist, Rice University, Houston, Texas.
- 1986 – 1988:* Associate Research Scientist, ENEA/CREA, S. Teresa (La Spezia).
- 1985 – 1986:* CNR 1-year fellow, Institute of Marine Geology, Bologna.

### **Scientific interests:**

Geophysics of basic processes at oceanic transform and accretionary plate boundaries. Multichannel seismic data acquisition, processing and interpretation. Multibeam acquisition and data processing. Inversion and modelling of gravity data along Mid Ocean Ridges. Numerical cartography and geo-marine database management. Structure, composition and temporal evolution of Mid Ocean Ridges. Mantle flow modelling. Thermal structure and composition of the oceanic mantle. Mantle's Hot, Cold and Wet Spots. Igneous and tectonic processes during the transition from continental to oceanic rifts. Distribution and origin of water and volatiles in the Earth's mantle. Seawater/mantle geochemical exchange along mid-ocean ridges.

### **Experience:**

Led several marine geology expeditions in the Mediterranean Sea (Ionian and Tyrrhenian seas), Northern Red Sea, Central Atlantic (Azores region), Equatorial Atlantic (Vema, St. Paul and Romanche fracture zones), South Atlantic (Bouvet Triple Junction) and Indian Ocean (Andrew Bain Fracture Zone). Served in several committees and panels. Taught courses and supervised graduate students at the Universities of Rome, Bari, Modena and Bologna.

## Research Grants:

- PRIN– MIUR – 2019-2023, *Oceanic Megatransforms: a New Class of Plate Boundaries*. Funding allocated: € 538,000.0 (Pi **M. Ligi**)
- CBR – RFBR – 2019-2021, *Oceanic Transforms*. Funding allocated: € 120,000.0 (Pi. **M. Ligi**);
- SGS – Saudi Arabia – 2014-2017, *Geochemistry of Igneous Rocks from Dykes and Harrats in Western Saudi Arabia*. Funding allocated: € 320,000.0 (Pis N. Rasul & **M. Ligi**);
- PRIN – MIUR – 2014-2017, *Rift-to-drift transition in the Red Sea: Geodynamics, geochemistry, and high-resolution plate kinematics*. Funding allocated: € 323,000.0 (Pis **M. Ligi** & A. Schettino);
- CNR–DTA – 2010, *Acquisition of Multichannel Seismic Reflection Profile in the Central and Southern Tyrrhenian Sea*. Funding allocated: € 60,000.0 (Pis **M. Ligi** & C. Doglioni);
- PRIN – MIUR – 2006-2008, *Oceanic and Continental long offset transforms: comparison between Andrew Bain Transform (Indian Ocean) and North Anatolian Fault (Marmara Sea)*. Funding allocated: € 75,000.0 (Pis E. Bonatti & **M. Ligi**);
- EUROCORES/EUROMARGINS – 2004-2007, *Transition from a continental to an oceanic rift: geology and bio-geochemistry of the Northern Red Sea*. Funding allocated: € 286,000.0 (Pis E. Bonatti & **M. Ligi**);
- PNRA – 2004-2006, *Geology and geophysics of the Antarctica plate boundaries to the south of the Bouvet Triple Junction (South Atlantic)*. National Research Programme for Antarctica. Funding allocated: € 680,000.0 (**M. Ligi**).
- NATO – 2000-2001, *Lithosphere and Asthenosphere Controlled Oceanic Fracture Zones: Observations and Modelling*. Collaborative Linkage Grant. Funding allocated: € 30,000.0 (Pi **M. Ligi**);
- EASSS-EU – 1999-2000, *Tectonic and Pressure Controls on the Growth of Giant Volcanic Ridges in the Azores*. European Access to Seafloor Survey System (EASSS II) - EU Programme. Funding allocated: € 350,000.0 (Pi **M. Ligi**);
- ASI – 1999-2002, *Blending of multi-satellite and ship-borne gravity to model mantle thermal structure and crustal thickness at mid-ocean ridges and back-arc basins: case studies over the Equatorial Atlantic and Tyrrhenian Sea*. Agenzia Spaziale Italiana, Ricerca Fondamentale. Funding allocated: € 120,000.0 (Pi **M. Ligi**);
- CNR – 1996-2000, *Lithosphere formation along Mid Ocean Ridges and in Backarc Basins*. Progetto Strategico del CNR. € 800,000.0 (Pis. E. Bonatti & **M. Ligi**);
- PNRA – 1995-1998, *Bathymetry and Gravity of the Southern Oceans*. National Research Programme for Antarctica. Funding allocated: € 60,000.0 (Pi **M. Ligi**).
- ENEA – 1987, Geographical Information Systems for geo-marine data. Funding allocated: € 10,000.0 (Pi **M. Ligi**).

## International Prizes, Awards and Academy membership:

- In 2023: he was elected member of the Accademia dei Lincei.
- In 2016: he received the International Prize “Tartufari” from the Accademia dei Lincei.
- In 2014-2022: Professor habilitation in Structural Geology. MIUR - Abilitazione Scientifica Nazionale 2012.
- In 2014-2022: Professor habilitation in Geophysics. MIUR - Abilitazione Scientifica Nazionale 2012.
- In 2013: Distinguished Lecturer of the Geological Society, Mineralogical and Petrological Society and Paleontological Society of Italy. Lecture title: *The transition from continental to oceanic rift in the Red Sea: the birth of an ocean*.
- In 2006–2007: he was elected member of the ECORD Mid-Term Review International Committee.
- In 2001–2003: he was elected member of EUROCORE/EUROMARGINS Scientific Committee.

In 1999–2007: he was elected member of CROP (Italian Deep-Crustal Investigation) Scientific Committee.

## b. Track-Record

### 1. Ten Most Relevant Publications

- Ligi, M.**, E. Bonatti, W. Bosworth, Y. Cai, A. Cipriani, C. Palmiotto, S. Ronca and M. Seyler, Birth of an Ocean in the Red Sea: Oceanic-type Basaltic Melt Intrusions Precede Continental Rupture. *Gondwana Research*, **54**, 150-160, <https://doi.org/10.1016/j.gr.2017.11.002>, 2018.
- Ligi M.**, E. Bonatti, M. Cuffaro and D. Brunelli, Post-Mesozoic rapid increase of seawater Mg/Ca due to enhanced mantle-seawater interaction. *Scientific Reports* **3**, doi:10.1038/srep02752, 2013.
- Ligi, M.**, Bonatti, E., Bortoluzzi, G., Cipriani, A., Cocchi, L., Caratori Tontini, F., Carminati, E., Ottolini, L., Schettino, A. Birth of an Ocean in the Red Sea: Initial pangs, *Geochem. Geophys. Geosyst.* **13**, Q08009, doi:10.1029/2012GC004155, 2012.
- Ligi, M.**, Bonatti, E., Caratori Tontini, F., Cipriani, A., Cocchi, L., Schettino, A., Bortoluzzi, G., Ferrante, V., Khalil, S., Mitchell, N.C., Rasul, N. Initial burst of oceanic crust accretion in the Red Sea due to edge-driven mantle convection. *Geology* **39**, 1019-1022, doi: 10.1130/G32243.1, 2011.
- Ligi M.**, M. Cuffaro, F. Chierici and A. Calafato, Three-dimensional passive mantle flow beneath mid-ocean ridges: an analytical approach. *Geophys. J. Inter.*, 175(2), 783-805, DOI: 10.1111/j.1365-246X.2008.03931.x, 2008.
- Ligi M.**, E. Bonatti, A. Cipriani and L. Ottolini, Water-rich basalts at mid-ocean-ridge cold spots *Nature*, 434, 66-69, 2005.
- Bonatti E., **M. Ligi**, D. Brunelli, A. Cipriani, P. Fabretti, L. Gasperini and L. Ottolini, Mantle thermal pulses below the Mid-Atlantic Ridge and temporal variations in the formation of oceanic lithosphere, *Nature*, 423, 499-505, 2003.
- Ligi M.**, E. Bonatti, L. Gasperini, and A.N.B. Poliakov, Oceanic broad multifault transform plate boundaries, *Geology*, 30, 11-14, 2002.
- Ligi M.**, E. Bonatti, G. Bortoluzzi, G. Carrara, P. Fabretti, D. Gilod, A.A. Peyve, S. Skolotnev and N. Turko, Bouvet Triple Junction in the South Atlantic: Geology and evolution, *Journal of Geophysical Research*, 104, 29365-29385, 1999.
- Ligi M.**, E. Bonatti, G. Bortoluzzi, G. Carrara, P. Fabretti, D. Penitenti, D. Gilod, A.A. Peyve, S. Skolotnev and N. Turko, Death and transfiguration of a triple junction in the South Atlantic, *Science*, 276, 243-245, 1997.

### 2. H Index

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<i>Web of Science - H index:</i>	<b>25</b>
<i>Scopus - H index:</i>	<b>28</b>
<i>Google Scholar - H index:</i>	<b>34</b>

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### 3. JCR Publications

- 1 Borisov, D.G., Frey, D.I., Ivanova, E.V., Dmitrevskiy, N.N., Levchenko, O.V., Fomin, V.V., Ligi, M. Unveiling the contourite depositional system in the Vema Fracture Zone (Central Atlantic). *Scientific Reports*, 13, 13834, 2023.
- 2 Vincent, C., Maia M., Briaies, A., Brunelli, D., **Ligi, M.**, Sichel, S. Evolution of a cold intra-transform ridge segment through oceanic core complex splitting and mantle exhumation, St Paul Transform system, Equatorial Atlantic. *Geochemistry, Geophysics, Geosystems*, 24, e2023GC010870, 2023.

- 3 Frey, D.I., Krechik, V.A., Bashirova, L.D., Ostroumova, S.A., Smirnova, D.A., Kuleshova, L.A., Ponomarenko, E.P., Morozov, E.G., **Ligi, M.**, Dudkov, I.Yu., Sivkov, V.V. Multiple abyssal jets flowing into the Vema Deep, Romanche Fracture Zone. *Journal of Geophysical Research: Oceans*, 128, e2022JC019434, 2023.
- 4 Gasperini, L., **Ligi, M.**, Accettella, D., Bosman, A. Cuffaro, M., Lodolo, E., Martorelli, E., Muccini, F., Palmiotto, C., Polonia, A., Late Miocene to recent tectonic evolution of the Macquarie Triple Junction. *Geology*, 51, 146–150, 2023.
- 5 Skolotnev, S., Sanfilippo, A., Peyve, A., Palmiotto, C., Ivanenko, A., Cuffaro, M., Veklich, I., Muccini, F., Ponomarenko, E., Petracchini, L., Kuleshov, D., Basch, V., Dobrolyubov, V., Ferrando, C., Shkittin, N., Sani, C., Pugacheva, T., Bonatti, E., Dokashenko, S., Nestola, Y., Yakovenko, E., Bickert, M., Gladkich, P. and **Ligi, M.** Crustal accretion along the northern Mid Atlantic Ridge (52°–57°N): Preliminary results from expedition V53 of R/V Akademik Sergey Vavilov. *Ofioliti*, 48(1), 13–30, 2023.
- 6 Ali, M., Decarlis, A., **Ligi, M.**, Ball, P., Bosworth, W., Ceriani, A. The Red Sea rifting in central Egypt: constraints from the offshore Quseir. *Journal of the Geological Society*, 2022, <https://doi.org/10.1144/jgs2022-105>.
- 7 **Ligi, M.**, Cuffaro, M., Muccini, F., Bonatti, E. Generation and Evolution of the Oceanic Lithosphere in the North Atlantic. *La Rivista del Nuovo Cimento*, **45(7)**, 460–533, 2022.
- 8 Ali, M., **Ligi, M.**, Ceriani, A., Bouchaala, F., Bosworth, W., & Decarlis, A. Geophysical evidence for post-rift magmatism southwest of the Brothers Islands, Northern Red Sea (offshore Quseir, Egypt). *Tectonics*, 41, 1-26, e2022TC007228, 2022.
- 9 Basch, V., Sanfilippo, A., Skolotnev, S.G., Ferrando, C., Muccini, F., Palmiotto, C., Peyve, A.A., Ermolaev, B.V., Okina, O.I., **Ligi, M.** Genesis of oceanic oxide gabbros and gabbro-norites during reactive melt migration at transform walls (Doldrums Megatransform System; 7-8°N Mid-Atlantic Ridge), *Journal of Petrology*, 63, 1–23, 2022.
- 10 Gasperini, L., Zaniboni, F., Armigliato, A., Tinti, S., Pagnoni, G., Sinan Özeren, M., **Ligi, M.**, Polonia, A. Tsunami potential source in the eastern Sea of Marmara (NW Turkey) along the North Anatolian Fault system. *Landslides*, **19**, 2022.
- 11 Skolotnev, S.G., Peyve, A.A., Ivanenko, A.N., Dobrolyubova, K.O., Sanfilippo, A., **Ligi, M.**, Sokolov, S.Yu., Veklich, I.A., Petracchini, L., Basch, V., Ferrando, C., Sani, C., Bickert, M., Muccini, F., Palmiotto, C., Cuffaro, M., Kuleshov, D.A., Dobrolyubov, V.N., Shkittin, N.A., Dokashenko, S.A., Yakovenko, E.S., New Data on the Geological Structure of the Eastern Flank of the Charlie Gibbs Fracture Zone (North Atlantic). *Dokl. Earth Sc.*, **504**, 333–337 (2022).
- 12 Skolotnev, S.G., Peyve, A.A., Sanfilippo, A., Ivanenko, A.N., **Ligi, M.**, Veklich, I.A., Petracchini, L., Ponomarenko, E.P., Basch, V., Kuleshov, D.A., Ferrando, C., Dobrolyubov, V.N., Sani, C., Shkittin, N.A., Bickert, M., Dokashenko, S.A., Muccini, F., Yakovenko, E.S., Palmiotto, C., Pugacheva, T.L., Cuffaro, M. Peculiarities of the Tectonomagmatic Processes in the Interaction Area between the Icelandic Plume and the Bight Transform Fault (North Atlantic). *Dokl. Earth Sc.*, **504**, 233–239 (2022).
- 13 Skolotnev, S.G., Peyve, A.A., Sanfilippo, A., Ivanenko, A.N., **Ligi, M.**, Veklich, I.A., Petracchini, L., Basch, V., Kuleshov, D.A., Ferrando, C., Dobrolyubov, V.N., Sani, C., Shkittin, N.A., Bickert, M., Dokashenko, S.A., Muccini, F., Yakovenko, E.S., Palmiotto, C., Cuffaro, M. Geological-Geophysical Investigations in the North Atlantic during Cruise 53 of the R/V Akademik Sergey Vavilov. *Oceanology*, **62(4)**, 575–577, 2022.
- 14 Mitchell, C. N., Hernandez, K., Preine, J., **Ligi, M.**, Augustin, N., Izzeldin, A., Hübscher, C. Early stage diapirism in the Red Sea deep-water evaporites: Origins and length-scales. *Tectonophysics*, **831**:229331, 2022, <https://doi.org/10.1016/j.tecto.2022.229331>.
- 15 Skolotnev, S.G., Dobrolyubova, K.O., Peyve, A.A., Sokolov, S.Yu., Chamov, N.P., **Ligi, M.**, Structure of Spreading Segments of the Mid-Atlantic Ridge between the Arkhangelsky and Bogdanov Transform Faults, Equatorial Atlantic. *Geotectonics*, **56(1)**, 1–20, 2022
- 16 Sanfilippo, A., Sani, C., Rasul, N.M.A., Stewart, I.C.F., Vigliotti, L., Widinly, N., Osemi, A., **Ligi, M.** Hidden but Ubiquitous: The Pre-Rift Continental Mantle in the Red Sea Region. *Frontiers in Earth Science* 9:699460, 1–22, 2021.

- 17 Gasperini, L., **Ligi, M.**, Stanghellini, G. Pseudo-3D techniques for analysis and interpretation of high-resolution marine seismic reflection data. *Bulletin of Geophysics and Oceanography*, 62(4), 599–614, 2021.
- 18 Skolotnev, S.G., Sanfilippo, A., Peyve, A.A., Nestola, Y., Sokolov, S.Yu., Petracchini, L., Dobrolybova, K.O., Basch, V., Pertsev, A.N., Ferrando, C., Ivanenko, A.N., Sani, C., Razumovskii, A.A., Muccini, F., Bich, A.S., Palmiotto, C., Brusilovsky, Y.V., Bonatti, E., Sholukhov, K.N., Cuffaro, M., Veklich, I.A., **Ligi, M.**, Dobrolybov, V.N. Geological and Geophysical Studies of the Charlie Gibbs Fracture Zone (North Atlantic). *Dokl. Earth Sc.* **497**, 191–194, 2021.
- 19 Skolotnev, S.G., Sanfilippo, A., Peyve, A.A., Nestola, Y., Sokolov, S.Yu., Petracchini, L., Dobrolybova, K.O., Basch, V., Pertsev, A.N., Ferrando, C., Ivanenko, A.N., Sani, C., Razumovskii, A.A., Muccini, F., Bich, A.S., Palmiotto, C., Brusilovsky, Y.V., Bonatti, E., Sholukhov, K.N., Cuffaro, M., Veklich, I.A., Dobrolybov, V.N., **Ligi, M.** Seafloor Spreading and Tectonics at the Charlie Gibbs Transform System (52-53°N, Mid Atlantic Ridge): Preliminary Results from R/V AN Strakhov Expedition S50. *Ofioliti* **46**, 83–101, 2021.
- 20 Li P., Q.-K. Xia, L. Dallai, E. Bonatti, D. Brunelli, A. Cipriani, **M. Ligi**. High H<sub>2</sub>O Content in Pyroxenes of Residual Mantle Peridotites at a Mid Atlantic Ridge Segment. *Scientific Reports*, 10: 579,1-11, 2020.
- 21 Gallotti, G., S. Passaro, A. Armigliato, F. Zaniboni, G. Pagnoni, L. Wang, M. Sacchi, S. Tinti, **M. Ligi**, G. Ventura. Potential mass movements on the Palinuro volcanic chain (southern Tyrrhenian Sea, Italy) and consequent tsunami generation. *Journal of Volcanology and Geothermal Research*, 404:107025, 1-13, 2020.
- 22 Sani, C., A. Sanfilippo, C. Ferrando, A. A. Peyve, S. G. Skolotnev, F. Muccini, A. Zanetti, V. Basch, C. Palmiotto, E. Bonatti, **M. Ligi**. Ultra-depleted melt refertilization of mantle peridotites in a large intra-transform domain (Doldrums Fracture Zone; 7-8°N, Mid Atlantic Ridge). *Lithos*, **374-375**:105698, 1-14, 2020.
- 23 Brunelli D., A. Sanfilippo, E. Bonatti, S. Skolotnev, J. Escartin, **M. Ligi**, G. Ballabio, A. Cipriani. Origin of oceanic ferrodiorites by injection of nelsonitic melts in gabbros at the Vema Lithospheric Section, Mid Atlantic Ridge. *Lithos*, 368-369, 1-16, 2020.
- 24 Gasperini L., M. Lazar, A. Mazzini, M. Lupi, A. Haddad, C. Hensen, M. Schmidt, A. Caracusi, M. Ligi, A. Polonia. Neotectonics of the Sea of Galilee (northeast Israel): implication for geodynamics and seismicity along the Dead Sea Fault system. *Scientific Reports*, 10,1-17, 2020
- 25 Zitellini N., C.R. Ranero, M.F. Loreto, **M. Ligi**, M. Pastore, F. D’Oriano, V. Sallares, I. Grevemeyer, S. Moeller, M. Prada. Recent inversion of the Tyrrhenian Basin. *Geology*, 48(2), 123-127, 2020.
- 26 Skolotnev S.G., A. Sanfilippo, A.A. Peyve, F. Muccini, Yu.S. Sokolov, C. Sani, K.O. Dobrolybova, C. Ferrando, N.P. Chamov, C. Palmiotto, A.N. Pertsev, E. Bonatti, M. Cuffaro, A.C. Gryaznova, , K.N. Sholukhov, A.S. Bich, **M. Ligi**. Large-scale structure of the Doldrums multi-fault transform system (7-8°N Equatorial Atlantic): Results from the 45<sup>th</sup> Expedition of the R/V A. N. Strakhov. *Ofioliti*, **45(1)**, 25-41, 2020.
- 27 Giglio F., S. Romano, S. Albertazzi, F. Chiarini, M. Ravaioli, **M. Ligi**, L. Capotondi. Sediment dynamics of the Neretva Channel (Croatia Coast) inferred by chemical and physical proxies. *Applied Sciences*, **10(3)**:807,1-18, 2020.
- 28 Billi A., M. Cuffaro, L. Beranzoli, S. Bigi, A. Bosman, C. G. Caruso, A. Conti, A. Corbo, A. Costanza, G. D’Anna, M. De Caro, C. Doglioni, D. Embriaco, G. Fertitta, F. Frugoni, L. Gasperini, F. Italiano, G. Lazzaro, **M. Ligi**, E. Martorelli, S. Monna, C. Montuori, A. Nigrelli, G. Passafiume, L. Petracchini, P. Petricca, A. Polonia, G. Proietti, L. Ruggiero, T. Sgroi, M.C. Tartarello. The SEISMOFAULTS project: First surveys and preliminary results for the Ionian Sea area, southern Italy. *Annals of Geophysics*, **63**, SE326, 1-26, 2020.
- 29 Loreto M.F., D. Düşünür-Doğan, S. Üner, Y. İşcan-Alp, N. Oçakoğlu, L. Cocchi, F. Muccini, P. Giordano, **M. Ligi**. Fault-controlled deep hydrothermal flow in a back-arc tectonic setting, SE Tyrrhenian Sea. *Scientific Reports*, 9:17724, 2019.
- 30 Roveri M., R. Gennari, **M. Ligi**, S. Lugli, V. Manzi, M. Reghizzi. The synthetic seismic expression of the Messinian salinity crisis from onshore records: implications for shallow- to deep-water correlations. *Basin Research*, **31**, <https://doi.org/10.1111/bre.12361>, 2019.

- 31 Cuffaro M., A. Billi, S. Bigi, A. Bosman, C. G. Caruso, A. Conti, A. Corbo, A. Costanza, G. D'Anna, C. Doglioni, P. Esestime, G. Fertitta, L. Gasperini, F. Italiano, G. Lazzaro, **M. Ligi**, M. Longo, E. Martorelli, L. Petracchini, P. Petricca, A. Polonia, and T. Sgroi. The Bortoluzzi Mud Volcano (Ionian Sea, Italy) and its potential for tracking the seismic cycle of active faults. *Solid Earth*, **10**, 741-763, <https://doi.org/10.5194/se-10-741-2019>, 2019.
- 32 **Ligi M.**, G. Bortoluzzi, F. Giglio, F. Del Bianco, V. Ferrante, L. Gasperini, M. Ravaioli. The seafloor geomorphology of Boka Kotorska Bay. *Measurements*, **125**, 2018.
- 33 **Ligi M.**, E. Bonatti, W. Bosworth, Y. Cai, A. Cipriani, C. Palmiotto, S. Ronca and M. Seyler, Birth of an Ocean in the Red Sea: Oceanic-type Basaltic Melt Intrusions Precede Continental Rupture. *Gondwana Research*, **54**, 150-160, <https://doi.org/10.1016/j.gr.2017.11.002>, 2018.
- 34 Savelli C. and **M. Ligi**. An updated reconstruction of basaltic crust emplacement in Tyrrhenian sea, Italy. *Scientific Reports*, **7**: 18024, 2017.
- 35 Mitchell N.C., **Ligi, M.**, Feldens, P. and Hubscher, C. Deformation of a young salt giant: regional topography of the Red Sea Miocene evaporites, *Basin Research* **29**, 352-369, doi: 10.1111/bre.12153, 2017.
- 36 Conti A., Bigi, S., Cuffaro, M., Doglioni, C., Scrocca, D., Muccini, F., Cocchi, L., **Ligi, M.**, Bortoluzzi, G. Transfer zones in an oblique back-arc basin setting: insights from the Latium-Campania segmented margin (Tyrrhenian Sea). *Tectonics* **36**,78-107, 2017.
- 37 Bortoluzzi G., Polonia, A., Torelli, L., Artoni, A., Carlini, M., Carone, S., Carrara, G., Cuffaro, M., Del Bianco, F., D'Oriano, F., Ferrante, V., Gasperini, L., Ivaldi, R., Laterra, A., **Ligi, M.**, Locritani, M., Muccini, F., Mussoni, P., Priore, F., Riminucci, F., Romano, S., Stanghellini, G. Styles and rates of deformation in the frontal accretionary wedge of the Calabrian Arc (Ionian Sea): controls exerted by the structure of the lower African plate. *Ital. J. Geosci.* **136**,1–23 43, 2017.
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## 7. Research Expeditions

- ASV-45** (*R/V Akademik S. Vavilov*): Geology and Geophysics of Charlie Gibbs and Bight fracture zones, Mid-Atlantic Ridge, funded by MUR-PRIN2017– CNR - GIN - Russian Academy of Sciences, Atlantic Ocean, Co-**Chief Scientist**: September-October, 2021.
- GeoHARRAT2017** – Field trip on the Khaybar, Al Birk and Thiama Asir lava field, Saudi Arabia. Funded by Saudi Geological Survey, Co-**Chief Scientist**, March 2014.
- GeoHARRAT2016**– Field trip on the Uwayrid and Khaybar lava field, Saudi Arabia. Funded by Saudi Geological Survey, Co-**Chief Scientist**, March 2014.
- LSD2014** (*R/V Urania*): Geophysical and Geological studies in the Adriatic Sea, funded by Exxon Oil, September, 2014.
- GEOCAL** (*R/V Urania*): Geophysical and Geological studies around Capo Vaticano, Southern Tyrrhenian Sea, funded by CNR-DTA, April, 2014.
- GeoHARRAT2014** – Field trip on the Lanayyir lava field, Saudi Arabia. Funded by Saudi Geological Survey, Co-**Chief Scientist**, March 2014.
- INVAS2012** (*R/V Urania*): Geophysical and Geological studies in the Adriatic Sea, funded by CNR-DTA, June, 2012.
- TIR10** (*R/V Urania*): Geophysical and Geological studies in the Southern Tyrrhenian Sea, funded by DTA-CNR, **Chief Scientist**: October, 2010.
- MAGIC09** (*R/V Urania*): Geophysical and Geological studies in the Ionian Sea, funded by ISMAR-CNR, **Chief Scientist**: April-May, 2009.
- GARGANO08** (*R/V Urania*): Geophysical and Geological studies in the Southern Adriatic Sea, funded by ISMAR-CNR, June, 2008.
- CALAMARE08** (*R/V Urania*): Geophysical and Geological studies in the Southern Ionian Sea, funded by ISMAR-CNR, April-May, 2008.

- PANA07** (*R/V Urania*): Geophysical and Geological studies of Panarea Island offshore, funded by ISMAR-CNR, August, 2007.
- STR06** (*R/V Urania*): Geophysical and Geological studies of Stromboli Island onshore-offshore, funded by ISMAR-CNR, November-December, 2007.
- AB06** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Andrew Bain fracture zone, SW Indian Ridge, funded by National Italian Antarctic Project (PNRA) – CNR - GIN - Russian Academy of Sciences, South-Western Indian Ocean, **Chief Scientist**: February-March, 2006.
- RS05** (*R/V Urania*): Geophysical, Geological and Oceanographic Surveys in the Northern Red Sea, funded by EUROMARGINS/CNR, Northern Red Sea, **Chief Scientist**: December-January, 2005.
- VOLTAIRE** (*R/V Urania*): Geophysical and Geological Survey offshore Cabo de S.Vincente (Portugal). International expedition, funded by EU, November-December, 2002.
- MARMARA2001** (*R/V Urania*): Geophysical and Geological Survey in the Marmara Sea. International expedition, funded by NFS and CNR, May-June, 2001.
- VEMA00** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Vema fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, **Chief Scientist**: April-July, 2000.
- AZ99** (*R/V Urania*): Geophysical and Geological Survey offshore Azores Islands (Portugal). International expedition, funded by EU-EASSS, **Chief Scientist**: June-August, 1999.
- VEMA98** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Vema fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, **Chief Scientist**: January-April, 1998.
- BIGSETS** (*R/V Urania*): Geophysical and Geological Survey offshore Cabo de S.Vincente (Portugal). International expedition, funded by EU, November, 1998.
- R/V Urania* – Crociera CA96/AP96 – Rilievo sismico multicanale in Mare Ionio tra Puglia e Calabria e tra Puglia e Albania. Periodo 23/07/1996-16/08/1996.
- CA96/AP96** (*R/V Urania*): Geophysical and Geological Survey in the Southern Adriatic. Funded by CNR, July-August, 1996.
- PRIMAR96** (*R/V Gelendzik*): Geology and Geophysics of the Romanche fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, May-June, 1996.
- CM95** (*R/V Urania*): Geophysical and Geological Survey in the Northern Adriatic. Funded by CNR, August-September, 1995.
- JR09A** (*RRS James Clark Ross*): Geology and Geophysics of the Bouvet Triple Junction, Southern Atlantic. International Cruise, funded by BAS Cambridge, January-February, 1995.
- ADS94** (*R/V Urania*): Geophysical and Geological Survey in the Southern Adriatic. Funded by CNR, July, 1994.
- BOUVET94** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Bouvet Triple Junction, Southern Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, March-May, 1994.
- PRIMAR94** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Romanche fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, February-March, 1994.
- PRIMAR93** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Romanche fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, March-May, 1993.

**ETNA93** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Etna volcano offshore, Jonian Sea. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, March, 1993.

**GP92** (*R/V Urania*): Geophysical and Geological Survey offshore Gargano (Southern Adriatic). Funded by CNR, October, 1992.

**ALB92** (*R/V Urania*): Geophysical and Geological Survey offshore Albania (Southern Adriatic). Funded by CNR, November, 1992.

**VEMA92** (*R/V OGS Explora*): Geology and Geophysics of the Vema fracture zone, Equatorial Atlantic. International Cruise, funded by CNR, July-August, 1992.

**PRIMAR92** (*R/V Nikolaj Akademik Strakhov*): Geology and Geophysics of the Romanche fracture zone, Equatorial Atlantic. International Cruise, funded by CNR and GIN - Russian Academy of Sciences, November, 1991-January, 1992.

## 8. Supervision of Graduate Students

### PhD

Khalifa University of Science and Technology, Abu Dhabi, United Arab Emirates: “*Rifting dynamics and margin architecture in Northern Red Sea, Egypt*”, PhD thesis of Moamen Ali Mohamed, Doctorate in Petroleum Geosciences. 2021-2024.

University of Bologna: “*Origine ed evoluzione dei segmenti di dorsale oceanica intratrasforme: Studio geologico e geofisico del dominio trasforme St Paul (Atlantico Equatoriale)*”, PhD thesis of Camilla Palmiotto, Doctorate in Earth Sciences. XXVI° Ciclo, 2010-2013.

University of Bologna: “*La transizione da un rift continentale ad un rift oceanico nel Mar Rosso settentrionale*”, PhD thesis of Francesco Redini, Doctorate in Earth Sciences, XVIII° Ciclo, 2002-2005.

University of Bologna: “*Geologia e Geofisica dei segmenti obliqui di dorsale (AAR) al limite della placca antartica a sud della giunzione tripla di Bouvet (Atlantico Meridionale)*”, PhD thesis of Antonino Calafato, Doctorate in Earth Sciences, XVI° Ciclo, 2000-2003.

### MSc

University of Rome, “La Sapienza”: “*Origine ed evoluzione dei segmenti di dorsale oceanica intratrasforme: Studio geologico e geofisico del dominio trasforme St Paul (Atlantico Equatoriale)*”, MSc thesis of Camilla Palmiotto, Master in Geological Prospection and Carthography, 2008-2009.

University of Rome, “La Sapienza”: “*Studio Geofisico della trasforme Andrew Bain: Oceano Sudovest Indiano*”, MSc thesis of Valerio Pasini, Master in Geodynamics, Geophysics and Volcanology, 2008-2009.

Universita' degli Studi di Bologna: “*Analisi ed elaborazione di linee sismiche 2D nel permesso Torrente Parma*”, MSc thesis of Sonia Arrigoni, Master in Applied Geological Sciences, 2008-2009.

University of Modena: “*Elaborazione geofisica ed interpretazione geologica di un profilo sismico crostale (CROP) nel Canale di Sicilia (Mediterraneo centrale)*”, MSc thesis of Aura Salocchi, Master in Geological Sciences, 2007-2008.


University of Rome, “La Sapienza”: “*Struttura di una Faglia Trasforme Oceanica: analisi integrata di dati di sismica a riflessione multicanale e gravimetrici lungo la Zona di Frattura Vema (Atlantico equatoriale)*”. MSc thesis of Valentina Ferrante, Master in Geological Sciences, 2001-2002.

University of Bologna: “*Indagini di Geologia Marina lungo la Zona di Frattura St. Paul (Atlantico Equatoriale) attraverso un'analisi combinata di dati batimetrici, magnetometrici e profili sismici multicanale*” MSc thesis of Alessandro Blasi, Master in Geological Sciences, 1999-2000.



- University of Bologna: “*Definizione del dominio trasforme multiplo della zona di frattura Romanche (Atlantico Equatoriale): elaborazione ed interpretazione di dati gravimetrici e sismici a riflessione*”. MSc thesis of Mirko Sita, Master in Geological Sciences, 1998-1999.
- University of Bologna: “*Ruolo del Banco del Guadalquivir nell’evoluzione dell’orogene Betico-Rifano da una rielaborazione dei dati sismici della campagna AR-92*”. MSc thesis of Antonino Calafato, Master in Geological Sciences, 1997-1998.
- University of Bologna: “*Sviluppo di algoritmi di rimozione delle multiple per prospezioni sismiche marine in acque profonde*”. MSc thesis of Gregorio Farolfi, Master in Physical Sciences, 1997-1998.
- University of Firenze: “*Elaborazione ed interpretazione di profili sismici a riflessione multicanale lungo la prosecuzione orientale della faglia trasforme Romanche (Atlantico Equatoriale)*”. MSc thesis of Simona Ciuffi, Master in Geological Sciences, 1996-1997.
- University of Basilicata: “*Elaborazione ed interpretazione di dati sismici multicanale al largo dell’Isola di Cefalonia (Grecia NO)*”. MSc thesis of Filomena Loreto, Master in Geological Sciences, 1996-1997.
- University of Bologna: “*Elaborazione ed interpretazione di profili sismici a riflessione multicanale nel Bacino di Gela (Canale di Sicilia)*”. MSc thesis of Giancarlo Di Simone, Master in Geological Sciences, 1995-1996.
- University of Rome, “La Sapienza”: “*Studio geologico-strutturale dell’avanpaese Apulo sommerso mediante elaborazione di dati di sismica a riflessione*”. MSc thesis of Romano Cosi, Master in Geological Sciences, 1995-1996.
- University of Bologna: “*Sviluppo di un programma avanzato di Ray Tracing per applicazioni di sismica a riflessione*”. MSc thesis of Adriano Bratti, Master in Physical Sciences, 1992-1993.
- University of Bologna: “*Sistemi deposizionali e tettonica Quaternaria del margine Tirrenico Orientale: acquisizione, elaborazione e interpretazione di profili sismici a riflessione*”. MSc thesis of Luca Gasperini, Master in Geological Sciences, 1990-1991.

Bologna, September 5<sup>th</sup>, 2023



Dr. Marco Ligi