

Malek Belgacem

Research Scholar

Institute of Marine Science (CNR - ISMAR)

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RESEARCH INTEREST:

- Observational physical oceanography, biogeochemistry
- Sea-going activities
- Ocean observing systems and instrumentation:
 - ARGO floats
 - Moorings
 - Ocean data processing and quality control
- Long-term multidisciplinary monitoring to assess the WMED response to climate forcing:
 - Dissolved oxygen supply and mechanisms
 - Inorganic nutrient distribution and regional difference.
 - Mixed Layer Depth dynamic in the WMED

General description:

Ph.D. in environmental science, University of Venice, Postdoc at CNR-ISMAR, Italy. Her research activity focuses on observational physical oceanography and biogeochemistry, with a particular emphasis on studying the Western Mediterranean (WMED) region's response to climate forcing. She actively engages in sea-going activities to collect data and uses advanced data processing techniques, to ensure the accuracy and reliability of the measurements.

PROFESSIONAL PREPARATION

Ca' Foscari university – CNR-ISMAR, Doctor of Philosophy in Environmental science Thesis: « Spatial and temporal variability of inorganic nutrients in the Western Mediterranean Sea based on in situ observations over 14 year (2004-2017) » Advised by: Dr. Katrin Schroeder (CNR-ISMAR), Dr. Jacopo Chiggiato (ISMAR-CNR), Professor Bruno Pavoni (Ca' Foscari University).

2017- 2021

The International Centre for Advanced Mediterranean Agronomic Studies **CIHEAM** of Chania (Crete), Master 1 in Geoinformation in

2016-2017

Environmental Management. Advised by: Dr. Chariton Kalaitzidis (CIHEAM-MAICh), Antonios Mazaris (Aristotle University of Thessaloniki).	
National Institute of agronomy (INAT)- University of Carthage – National Institute of Marine Sciences and Technologies (INSTM) Thesis : « Variability of Deep-Water masses in the Central Mediterranean » (May 2014). Advised by: Dr. Mohamed Salah Romdhane, Dr. Cherif Sammari, Dr. Sana ben Ismail.	2012-2014
National Institute of Agronomy (INAT) as engineering school, University of Carthage Engineering postgraduate in Marine Biology and Environmental science. Advised by: Dr. Mohamed Salah Romdhane	2009-2011
Preparatory Institute for Engineering Studies of Bizerte (IPEIB), University of Carthage. Graduate degree in Biology-Geology.	2006- 2008

POSITIONS

- Postdoctoral research fellow at the institute of marine science- CNR-ISMAR(Venice) 14/02/2023- 14/02/2024 (Bando N° 33-2022-VE)
 - *Research project:* ISMAR_SDI development and maintenance of research infrastructures, observational and forecasting systems, developments of an interoperable infrastructure for the management of marine data, scientific dissemination [“ DTA.AD004.311, “H2020 MINKE” CUP B55F20002310006].
 - *Task:* Analysis and interpretation of times series of marine data (physical and biogeochemical), creation, maintenance and update of Jupyter notebooks useful for post-processing and quality control (primary and secondary) of oceanographic data.
- Postdoctoral research fellow at the institute of marine science- CNR-ISMAR(Venice) January 2022- 30/01/2023 (Bando N° 20-2021-VE)
 - *Research project:* H2020 RELIANCE
 - *Task:* Analysis and interpretation of times series of marine data (physical and biogeochemical), update of research objects related to study cases of the research project Reliance.
 - Dynamic of the Levantine basin based on Argo floats and CTD measures
 - Variability of inorganic Nutrient in the Western Mediterranean.
- Research fellow at the institute of marine science- CNR-ISMAR(Venice) January 2021- 30/01/2023 (Bando N° ISMAR.AR.03.2020.VE)
 - *Research project:* PRIN 2017
 - *Task:* Analysis and interpretation of times series of oceanographic data (physical and biogeochemical) collected in the Mediterranean Sea from fixed and mobile platforms.

ACADEMIC EXPERIENCE

- Visiting scholar at Amala Mahadevan's lab: Ocean and environmental processes, WHOI-MIT, Boston, USA, 9-16 September 2022.
- Visiting scholar at GeoHydrodynamics and Environment Research group (GHER), University of Liège, Belgium October and December 2019.
 - Project: climatological distribution of inorganic nutrients using data variational analysis DIVAnd. Tutors: Dr Alexander Barth and Dr. Charles Troupin.
- Visiting scholar at the Spanish Institute of Oceanography (IOE-La Coruna), Spain.
 - Project: inorganic nutrient analytical methods and quality assurance. Tutor: of Dr. Marta Álvarez, May 2018

EXPERTISE

Observation:

Ocean Data management; Hydrological data acquisition; determination of seawater oxygen using Winkler titration; determination of seawater salinity using Autosal, SBE sensor calibration and processing, primary/secondary quality control; LADCP acquisition.

Analysis:

Computation of climatological fields; Time series analysis; Hydrological data analysis; machine learning using Random Forest, advanced statistical analysis; variational analysis and objective mapping; Optimum multiparametric analysis.

TECHNICAL SKILLS

Ocean Data View, SBE Data Processing, WinADCP, MATLAB, R-statistics, Jupyter, Julia language, Python, ArcMap, ArcGis, QGIS, DIVAnd user.

LANGUAGES

Arabic: native speaker.

French: Excellent speaking and written.

English: professional working proficiency certified by TOEFL.ITP certificate at MAICH institute Chania-Crete, Greece, 2016.

Italian: Intermediate level (B2 according to the CEFR) at the Ca' Foscari School for International Education Venice, Italy, 2019.

CONTRACTS

March-December 2015, January-June 2016, engineer at the General Directorate of Fisheries, Ministry of agriculture, Tunisia, working on project "Creating a cross-border club for the promotion of products of Artisanal fisheries" (PS1.1.004_club Blue Artisanal) at the protected area Cap Serrat- Cap Negro- Sidi Mechreg, submitted as part of the program border cooperation Italy-Tunisia 2007-2013.

INTERNSHIP/ TRAINING

- OPITO BASIC OFFSHORE SAFETY INDUCTION& EMERGENCY TRAINING Including HUET and EBS, Centro di formazione offshore (CFO), 19- 21 June 2023.
- BGC Argo DMQC workshop in 23 – 27 January 2023.
- DIVAnd (n-dimensional interpolation) Workshop, the University of Bologna, Italy, Department of Physics and Astronomy, 27-30th January 2020.
- OTGA Training course: Operational Oceanography Held at the UNESCO/IOC Project Office for IODE, Oostende, Belgium – 11- 15 March 2019.
- OTGA Training Course: Ocean Data Management UNESCO/IOC Project Office for IODE, Oostende, Belgium – 3-7 December 2018.
- Doctoral course, Tunis, Tunisia, November 2015, Research Institute for Development (IRD): Doctoral Course "Ecosystem Approach Marine Resources Exploited "(AERME).
- Training course, Tunis, Tunisia, June 2015, National Institute of agronomy (INAT) of the university of Carthage of Tunisia: numerical Marine Ecology: application of R software.
- Training course, Messina, Italy, July 2014, National Research Council, Messina, Italy, Eurofleets (Alliance of European Research Fleets): Multidisciplinary Ship-based training for European Postgraduates and Graduate students of Marine Sciences.
- Training course, Tunisia, December 2013, at National Institute of Marine Sciences and Technologies (INSTM), with the program Improving National Capacities in Observation and Management of Marine Environment in Tunisia. The training was about the application of statistics in Marine Biology.
- Training Course, Tunis, September 2013, at National Institute of Marine sciences and technologies (INSTM), with the program Improving National Capacities in Observation and Management of Marine Environment in Tunisia and Aix Marseille University.
- Training course, Tunis, December 2012, at National Institute of Marine sciences and technologies (INSTM), with the program Improving National Capacities in Observation and Management of Marine Environment in Tunisia and Aix Marseille University.
- Training course, Tunis, October 2012, at National Institute of Marine sciences and technologies (INSTM), with the program Improving National Capacities in Observation and Management of Marine Environment in Tunisia. The training course was about Ocean Data Management.

GRANTS

- Postdoctoral fellowship, CNR-institute of marine science, 2021-present
- PhD fellowship, Italian Ministry of Education MIUR (<https://www.miur.gov.it/>) Consiglio nazionale di ricercar-instituto di scienze marine, 2017-2020.
- EuroMarine individual fellowship grant for Early Career Researchers (ECRs)-2021

FIELDWORK

In order to monitor and follow the exchange of water masses an its variability, Oceanographic cruises are planned to work on some historical transects, known as key areas, important to understand the circulation in the Mediterranean.

- March-April 2023, **JERICO-Eurogoship 2023**, mooring maintenance (Corsica channel, Sicily channel and Catania), dissolved oxygen and salinity were collected at 6 CTD casts.
- October 2022, **JERICO II 2022**, monitoring Sicily channel moorings on board of the Italian R/V Dalla Porta
- April 2022, **JERICO 2022**, monitoring the Western Mediterranean Sea on board of the Italian R/V Dalla Porta.
- February-March 2022, **CALYPSO 2022** (<https://calypsodri.who.edu/>), discovering the routes by which trace substances, phytoplankton, and dissolved gases like oxygen, are transported vertically, as they are also carried horizontally by oceanic currents in the Balearic Sea on board of the R/V Pourquoi Pas?
- September 2021, (21/09/2019-30/09/2010) **JERICO 2021**, monitoring and data collection, in the Western Mediterranean Sea on board of the Italian R/V Dalla Porta.
- September 2019, (21/09/2019-30/09/2010) **JERICO 2019**, monitoring and data collection, in the Western Mediterranean Sea on board of the Italian R/V Dalla Porta.
- September 2018 (19/09/2018-28/09/2018) **ICHNUSSA-JERICO 2018**, monitoring and data collection, in the Western Mediterranean Sea, on board of the Italian R/V Dalla Porta.
- October 2017, Oceanographic Cruise **ICHNUSSA17** (23/10/2017-09/11/2017) in south Tyrrhenian, Corsica Channel, south Sicily and Tunisia-Sicily strait, on board of the Italian R/V Minerva Uno, during which, we collected hydrological, biological and biochemical data: CTD data.
- November 2014, Oceanographic Cruise **ICHNUSSA14** (13/11/2014-01/12/2014) in south Tyrrhenian, Algerian-provincial Basin, Corsica Channel and Ligurian Sea on board of R/V URANIA
- November 2014, Oceanographic Cruise **EMSO-MEDIT_02** (04/11/2014-13/11/2014) in the southeast of Sicily and Sicily strait on R/V URANIA
- July 2014, Oceanographic Cruise **Eurofleet14** (04/07/14-09/07/2014) in the south of the Tyrrhenian Sea, transect between Sicily and Sardinia on R/V URANIA
- October 2013, Oceanographic Cruise **ICHNUSSA** (15/10/13-29/10/13) in the Tyrrhenian Sea, around Sardinia, Algero-provincial Basin and Sicily Channel, on R/V URANIA:
- June 2013, Oceanographic Cruise **VENUS2-ARGO2** (04/06/13-25/06/13) Tyrrhenian Sea, Algero-provincial Basin and on R/V URANIA
- November 2012, Oceanographic Cruise **EUROFLEET12** (08/11/12-26/11/12) in the Sicily channel, Tyrrhenian Sea, and Ligurian sea on R/V URANIA
- September 2012, Oceanographic Cruise **HANNIBAL** (18/09/12-21/09/12) in the Sicily channel, Gulf of Hammamet, Gulf of Gabés, on the Tunisian Research vessel R/V HANNIBAL.

CONFERENCES

- Themes 2019, International conference: Monitoring, modelling and predicting our changing ocean and atmosphere: concepts, methods, applications and opportunities, Venezia, Italy, 27th-29th November 2019 (<https://www.unive.it/pag/34349>).
- 9th MONGOOS Workshop 2020, New ocean observation approaches for a blue Mediterranean Sea: physical and biogeochemical systems, data and model

assimilation, Session 1: Physical and biogeochemical approaches for integrated observing systems – Part 1, virtual, 24th-25th November 2020 (<http://www.mongoos.eu/-/ninth-mongoos-meeting-workshop-november-24-26-2020-virtual>).

- vEGU 2021, <https://doi.org/10.5194/egusphere-egu21-7762>.
- International Ocean Data Conference. We had this hybrid event in Sopot, Poland in February 2022 (14-16 February 2022) <https://oceandataconference.org/programme/>
- AIOL 26th congress 27 June-01 July 2022, talk about using machine learning to predict the effect of the 2020 COVID-19 lockdown on the biogeochemical properties of the Venice lagoon at selected sites
- Themes 2022, International conference: Oceanography and Climatology during the Pandemics: Threads Cut, Weaves to be Re-tied and New Horizons, Venezia, Italy, 17th-18th November 2022 (<https://www.unive.it/pag/34349>).

MENTORING

Graduate school Ca' Foscari University of Venice: Luisa Fernanda Gordillo Lazarte: Temporal and spatial dynamics of the nutricline along a repeated transect in the Western Mediterranean Sea (2018-2019)

TECHNICAL REPORTS

Borghini M., Schroder K., Bryden H.L., Canesso, D., Aracri S., Belgacem M., Durante S., Calogero G., Massuco G., Suaria, G., Petrizzo A. VENUS-2 Cruise Report. (4-25 Giugno 2013). R/V Urania 2013.

PUBLICATION

Belgacem, M., Schroeder, K., Barth, A., Troupin, C., Pavoni, B., and Chiggiato, J.: Climatological distribution of dissolved inorganic nutrients in the Western Mediterranean Sea (1981–2017), *Earth Syst. Sci. Data Discuss.* [preprint], <https://doi.org/10.5194/essd-2021-149>, in review, 2021.

Belgacem, M., Chiggiato, J., Borghini, M., Pavoni, B., Cerrati, G., Acri, F., Cozzi, S., Ribotti, A., Álvarez, M., Lauvset, S. K., and Schroeder, K.: Dissolved inorganic nutrients in the western Mediterranean Sea (2004–2017), *Earth Syst. Sci. Data*, 12, 1985–2011, <https://doi.org/10.5194/essd-12-1985-2020>, 2020.

Belgacem et al., Quality controlled dataset of dissolved inorganic nutrients in the Western Mediterranean Sea (2004 – 2017) from R/V oceanographic cruises. PANGAEA, <https://doi.pangaea.de/10.1594/PANGAEA.904172> (2019).

Belgacem, Malek; Chiggiato, Jacopo; Borghini, Mireno; Pavoni, Bruno; Cerrati, Gabriella; Acri, Francesco; Cozzi, Stefano; Ribotti, Alberto; Álvarez, Marta; Lauvset, Siv K; Schroeder, Katrin (2019): Quality controlled dataset of dissolved inorganic nutrients in the western Mediterranean Sea (2004-2017) from R/V oceanographic cruises. PANGAEA, <https://doi.org/10.1594/PANGAEA.904172>

Schroeder K, Cozzi S, **Belgacem M**, Borghini M, Cantoni C, Durante S, Petrizzo A, Poiana A and Chiggiato J (2020) Along-Path Evolution of Biogeochemical and Carbonate System Properties in the Intermediate Water of the Western Mediterranean. *Front. Mar. Sci.* 7:375. doi: 10.3389/fmars.2020.00375

Belgacem, Malek; Schroeder, Katrin; Barth, Alexander; Troupin, Charles; Pavoni, Bruno; Chiggiato, Jacopo (2021): A climatological product of inorganic nutrient distributions on the Western Mediterranean Sea (BGC-WMED) derived from cruise-based measurements spanning 1981 to 2017. *PANGAEA*, <https://doi.org/10.1594/PANGAEA.930447>

Belgacem, Malek, and Katrin Schroeder. "Quality check CTD profiles against Bottle data." ROHub. Sep 14 ,2022. <https://w3id.org/ro-id/07e76ee3-fe6c-4fb1-903d-3a8c5236e51b>.

Belgacem, Malek. "Snapshot 2021 study case: Lockdown impacts on the Northern Adriatic Sea at selected site: AcquaAlta Platform Water quality." ROHub. Nov 29 ,2021. <https://w3id.org/ro-id/0869e396-3733-4aff-8fb2-94c8937b28aa>.

Grande, Valentina, **Malek Belgacem**, Marko Petelin, Davide Poletto, Giorgio Castellan, Martina Bocci, and Fantina Madricardo. "Visualize marine litter monitoring data in the Venice Lagoon (MAELSTROM Project)." ROHub. Jul 19 ,2022. <https://w3id.org/ro-id/903fc676-99d5-4277-be11-e83883e70fdd>.

Belgacem, Malek, Jacopo Chiggiato, Paolo Montagna, Giorgio Castellan, and Valentina Grande. "Spatial distribution of Cold-Water Corals (CWC) in the Mediterranean Sea - Workflow." ROHub. Jun 06 ,2023. <https://w3id.org/ro-id/cf84e531-56d3-43ee-8362-c340d0addf30>.