UNIVERSITÀ POLITECNICA DELLE MARCHE

# DeoxygenaTion in a waRming climAte: iNsightS from the geologiCal rEcord to uNderstand moDErN Trend (TRANSCENDENT)

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DeoxygenaTion in a waRming climAte:

iNsightS from the geologiCal rEcord to uNderstand moDErN Trend

(**TRANSCENDENT**) Supervisor: Prof. Alessandra Negri

**Full Professor** in Paleontology and Paleoecology

**Member of the Working group on Pleistocene Stratigraphy**
Member of the American Geophysical Union
**Member of International Quaternary Association**

Expert Involved in several research dealing with the study of **Quaternary organic matter rich sediments (sapropels),** interpreting data from all the proxies (from fossils to geochemistry) useful for understanding the origin of those objects whose history is intimately related to the **Quaternary Paleoceanography and Paleoclimate.**

**Most recent projects**

1. 2024-2025 HISTORIAN **HI**gh-resolution **S**edimentary da**T**a f**OR** paleocl**I**m**A**te reco**N**struction *Bando a Cascata RETURN Spoke 8*

2. 2021-2022 «Ammoniti di strada» Contributi annuali - Legge 113/91 - D.D. 1662 del 22-10-2020 - PANN20_00742

3. *2021-24 PNRA Call 2019 "Marine surveys in the Southern Ocean on the Italian vessel Laura Bassi in 2020- 2022"* Scientific responsible Polytechnic University of Marche Unit.

Author of more than **100 peer-reviewed publications** in international journals and book chapters, with an ***h* index= 33**, i10-index= 76 with 3431 citations (from Google Scholar, http://scholar.google.it/citations); ***h* index= 28**, citations 2520 (from Scopus). Orcid profile: https://orcid.org/0000-0002-8133-3936

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## THE RESEARCH GROUP Sedimentology and Paleoecology

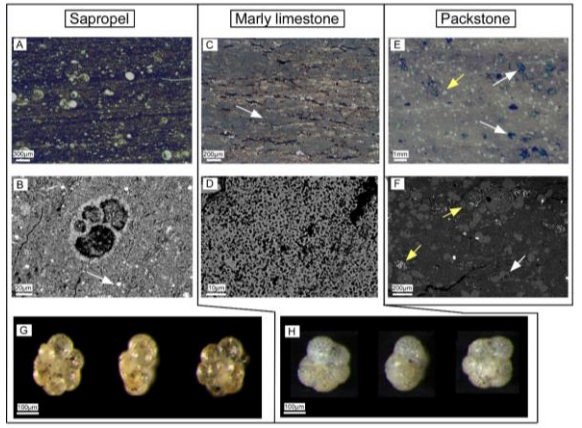
Research efforts of our research team are primarily concerned with sedimentary successions both in terms of textural characteristics and stratigraphic significance and of the presence of unicellular organisms and their consequent (paleo)ecological significance.

Currently, we are focusing on three main research fields:

1) Past Deoxygenation events and their significance as analogue of the modern situation. across the world.
2) Ecology and biodiversity of benthic and planktonic foraminifera.
3) Response of Foraminifera to environmental stress condition (i.e., lack of oxygen, acidification.

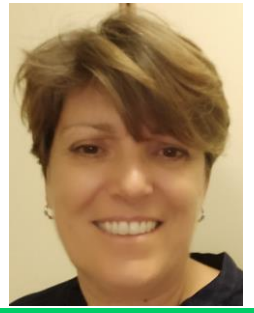
All these field are actively involved in the proposal.

(**Sapropel S6**) in core M25/4-12.

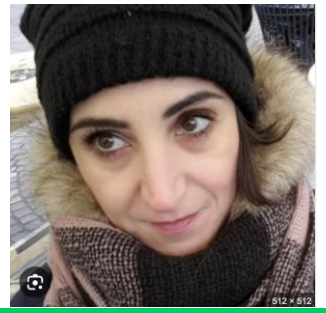



The group has access to laboratory facilities, among them a Mastersiszer Malvern 3000 granulometer, High resolution Microscopy. **Foraminiferal** culture work is carried out in one **cell culture lab.**

The research group has a **multidisciplinary expertise ranging from sedimentology and petrography to micropaleontology (calcareous nannofossils and foraminifera) to actuopaleontology. These proxies are basic tool for understanding and deepen the knowledge of the past.**



Prof. A. Negri



Prof. A. Sabbatini

Dr. F. Caridi

Dr. A. Mancini

Dr. E.Costanzi

Dr. L. Bellentani

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**EFFECT-BASED ASSESSMENT**
**FOR CONTAMINANTS OF EMERGING CONCERN IN MARINE ECOSYSTEMS**

**Supervisor: Prof. Francesco Regoli**

# THE DEPARTMENT OF LIFE AND ENVIRONMENTAL SCIENCES (DiSVA)

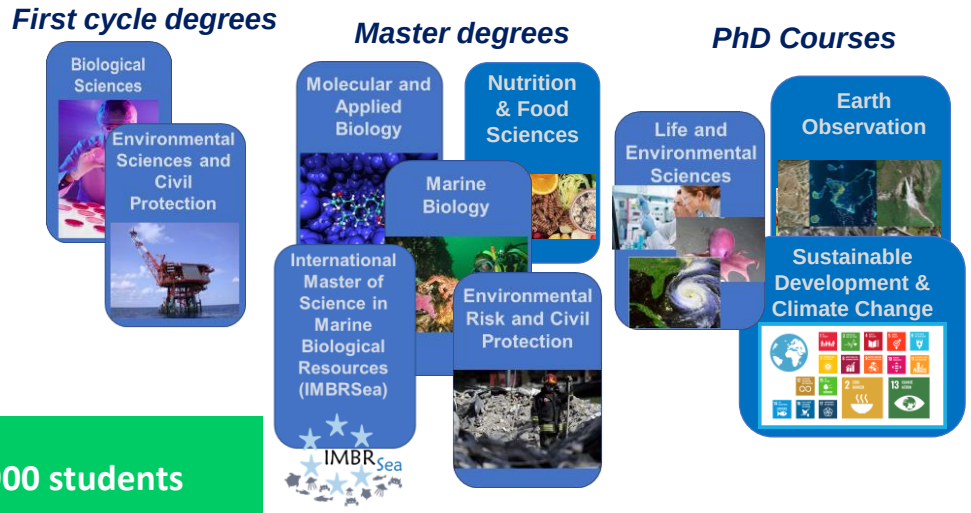
**Department of Excellence**

**100 units of permanent staff (researchers and technicians)**
**80 PhD students and post-docs**

**in 2021-23, > 140 national and international projects for > 11 Mil €**

**in 2023 >220 international publications (>80% in Q1 Journals)**


**Teaching programmes:**
**2 First cycle degrees, 4 Master degrees, 3 PhD Courses**

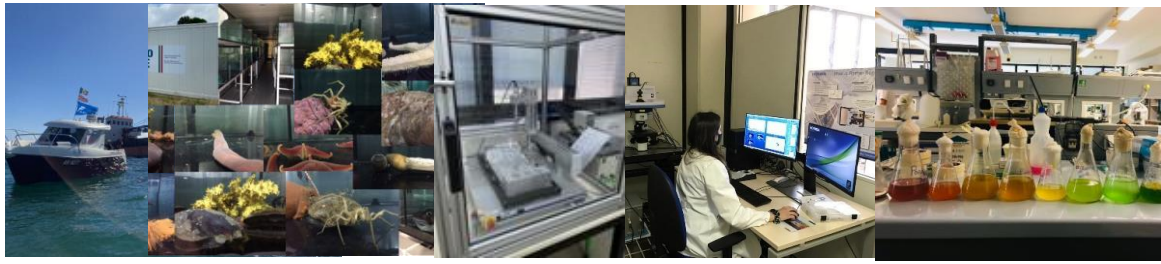



**20 Professors have *h* index between 30 and >80, 15 have between 100 and 400 publications, 1 in Highly Cited Researchers (Clarivate)**

**> 1.900 students**

**Research Infrastructures & Excellence Laboratories**:

- Marche Structural Biology Center (Ma.S.Bi.C.); The Aquarium-Joint Research Unit (JRU) of EMBRC ITALY (EMBRC-IT); Laboratory of Advanced Microscopy Research Instrumentation; Advanced Laboratory of Mass Spectrometry; Computing Data Center-DiSVA-HPC; Covid-19 LABC19; research vessels ACTEA and MYTILUS; Fano Marine Center (FMC), FORTUNAE Oceanographic Buoy.



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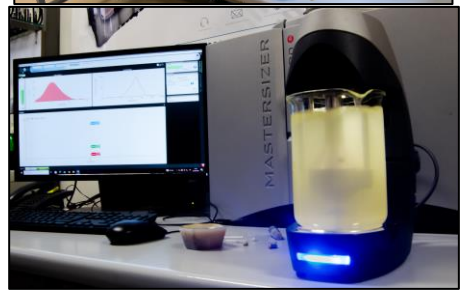
# deoxygena**T**ion in a wa**R**ming clim**A**te:

## i**N**sight**S** from the geologi**C**al r**E**cord to u**N**derstand mo**DE**r**N** **T**rend (TRANSCENDENT)




**Backgroud:** in the geological past the Mediterranean Sea underwent cyclical deoxygenation events, responsible for the annihilation of the eukaryotic life in deep-sea environments. These deoxygenation events are recorded by organic-rich sediments called sapropel, which date back to 15 Ma. Some of these sapropels are deposited during warmer than today intervals, with temperatures in the range of the predicted at the end of this century in the MS, thus offering an ideal real-world data archive to explore deoxygenation dynamics and the ecosystem response to higher temperatures and oxygen-starved conditions.

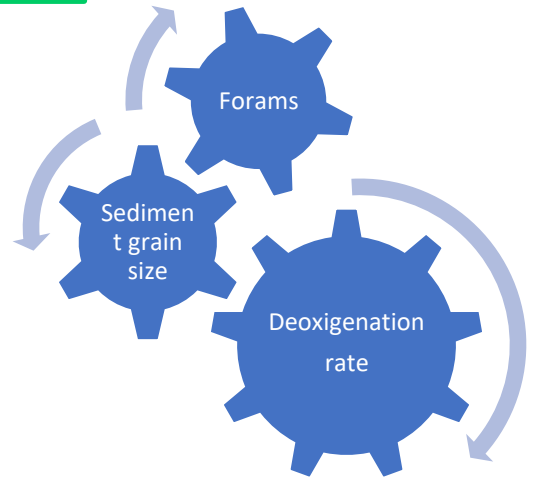
Overall objective: Investigation of oxygen dynamics in the MS, by documenting deoxygenation and (re)ventilation processes during sapropels that deposited in a climate state warmer than today and analogous to the future business-as-usual scenarios.

**HOW?**

1. **Focus on the geological record of warm Pliocene sapropel investigating the sediment composition and grain size + the fossil component.**

2. **Modern foraminiferal culture under different oxygen concentration, temperature and pH to be compared to the past record.**

3. **Identification of physical and biological proxies to identify deoxygenation trend in fossil sequences.**




**The project is expected to have tangible impacts in providing new insight** on the effects of global change on the marine environment and ecosystems, with a specific focus on the mechanisms leading to deoxygenation events.