NAVARINO ENVIRONMENTAL OBSERVATORY

2023

ANNUAL REPORT

AN INTERNATIONAL PARTNERSHIP BETWEEN THE ACADEMIC COMMUNITY AND THE PRIVATE SECTOR

Stockholm University

ACADEMY OF ATHENS

BRFAA
BIOMEDICAL RESEARCH FOUNDATION ACADEMY OF ATHENS

TEMES
DEVELOPERS OF COSTA NAVARINO

ABOUT NAVARINO ENVIRONMENTAL OBSERVATORY (NEO)

NEO field station

NEO is a Mediterranean hub for research and education where science, business, society and policy makers join in a pioneer cooperation to create a more sustainable future under a changing climate.

NEO started its operation in 2009 with support from Stockholm University (SU), the Atmospheric Environment Division of the Biomedical Research Foundation of the Academy of Athens (BRFAA) and Tourism Enterprises in Messina (TEMES SA),
The field station in Messinia, Greece, is open to students and scientists, with an interest for the Mediterranean region, and is increasingly used as a meeting place for scientists, business companies and policy makers to discuss the complex issues of environmental management and sustainable development.

NETWORKS & ALLIANCES

NEO counts 9 associated members (research institutions from Greece, Sweden, Germany and the USA), it is a member of ***ACTRIS***, the European Research Infrastructure for the observation of Aerosol, Clouds and Trace Gases, ***PANACEA*** , the PANhellenic infrastructure for Atmospheric Composition and climatE change), ***GWEN***, a Global Wetland Ecohydrology Network, and ***LTER-Greece***, the Greek Long-term Ecosystem Research Network which is a collaborative network of scientists and their stakeholders engaged in long-term, site-based ecological, social and economic research in Greece.

OUR GOALS AND OBJECTIVES

- **Study climate change**, its impacts and interconnection with human societies and ecosystems.
- Identify **water, land, and food security** issues in the Mediterranean region in relation to socioeconomic development.
- **Bring together** scientists, business and policy makers to discuss the complex issues of environmental management and sustainable development.
- **Develop solutions and business-policy roadmaps** under ongoing climate and anthropogenic changes and evaluate their feasibility in Greece and in the Mediterranean region.
- **Follow and address missions and priorities** defined by the European Commission to tackle global challenges through research and collaboration activities and business partnership.

NEO STEERING COMMITTEE

THE AWESOME PEOPLE DRIVING NEO

CATARINA RYDIN
PROFESSOR
STOCKHOLM UNIVERSITY

SARA COUSINS
PROFESSOR
STOCKHOLM UNIVERSITY

CHRISTOS ZEREFOS
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RESEARCH DIRECTOR
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TEMES S.A.

VASSILIS KARAKOUSIS
ENVIRONMENT & SUSTAINABILITY MANAGER
TEMES S.A.

STEFAN NORDLUND (CHAIRPERSON)
PROFESSOR
STOCKHOLM UNIVERSITY

NEO TEAM

THE AWESOME PEOPLE BEHIND NEO

GIORGOS MANEAS (STATION MANAGER)
STOCKHOLM UNIVERSITY

CHRISTOS PANTAZIS (ASSISTANT)
NATIONAL OBSERVATORY OF ATHENS

MARTINA HÄTTESTRAND (DIRECTOR)
PROFESSOR
STOCKHOLM UNIVERSITY

RESEARCH INFRASTRUCTURE & DATA

ATMOSPHERIC STATION

NEO has established an atmospheric station (Methoni, Greece) since 2011, to track climate change signals and air pollution.

The atmospheric station serves as one of the 3 sites selected in Greece to concentrate national and international efforts in the study of atmospheric composition, and it is ***part of the "PANhellenic infrastructure for Atmospheric Composition and climatE change*** (PANACEA)" (http://panacea-ri.gr/), which was launched in September 2018.

The NEO RI is actively linked with relevant European Infrastructures (ACTRIS/ESFRI and ICOS/ERIC) that target aerosol, clouds, trace gases and the carbon observation, and aims at developing a coordinated system for monitoring of atmospheric composition, solar radiation variations, climate change and related natural hazards in Greece, merging all existing facilities and upgrading its infrastructure

WATER QUALITY STATIONS

Since 2016, NEO has established a network of automated water quality monitoring stations within the Gialova Lagoon wetland. The network was updated in 2020 with the installation of more advanced sensors and the monitoring of new sites at the surrounding groundwater resources.
The data collection is supplemented with field campaigns (water, sediment, fish samples) and observations (waterbirds) to assess the overall environmental status of the wetland.

Station description

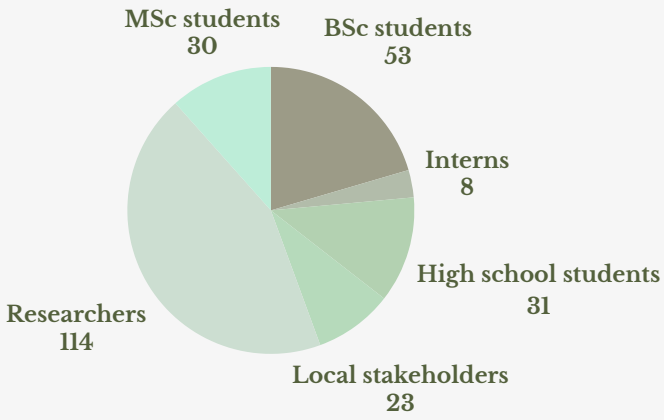
- **Meteorological station** *Precipitation, Temperature, Wind speed/direction, Barometric pressure, Solar radiation*
- **Wetland station (CTD):** *Salinity, Temperature, Depth*
- **Wetland station (Sonde):** *Salinity, Temperature, Depth, pH, DO, Redox*
- **Groundwater station:** *Salinity, Temperature, Depth*
- **Water samples for nutrient analysis** (monthly, started on April)
- **Sediment samples for benthic analysis** (April, October)

Location/Station	B	WL	ML	NW	SW
Distance from sea/lagoon canal (m)	0	400	900	1950	1850
Distance from Tyflomitis ditch (m)	2650	2700	1750	700	750
Sensor depth (mm)	200	200	200	200	200
Installation date	Apr 1	Aug 27	Jul 23	May 6	Aug 27

2023 ACTIVITIES AT A GLANCE

During 2023, NEO hosted five educational courses (two from Sweden, two from Germany, and one from Greece), an international summer school, and six interns from Greek educational institutes (University of Patras, University of Crete, and the American College of Greece), while a master thesis and a PhD dissertation from Stockholm University (SU), both focusing on Gialova Lagoon, were completed. Furthermore, two scientific workshops took place at NEO. One in collaboration with the Geology Laboratory of the École Normale Supérieure of Paris (ENS), aiming at fostering connections, sharing knowledge and data, and one with researchers and professors from Stockholm University (SU), aiming to introduce NEO to a variety of SU departments.

VISITORS AT NEO



NEO researchers continued their work in two EU projects which were initiated in 2022. SALAM-MED (Sustainable Approaches to Land and water Management in Mediterranean Drylands, 2022-2025) is a project funded by PRIMA foundation. It builds upon an interdisciplinary network of 15 partners from 8 Mediterranean countries and promotes co-innovation through 6 living labs located in Mediterranean hotspots of soil and water degradation. The Greek case study is coordinated by NEO and AoA (Academy of Athens), and the aim of the team is to assess agri-ecological farming practices for improving soil quality and water retention towards an Integrated Olive Orchard Management. The experimental part of the Greek team consists of 2 different experiments, aiming to improve soil and water management in olive-orchards (https://www.navarinoneo.com/salam-med). The work is based on co-creation approaches and is implemented together with local stakeholders who are actively involved in experimental activities and meetings.

2023 ACTIVITIES AT A GLANCE

The focus of the second EU project, GeoVT (2021-2023), is on the training of new generations on geomorphology, geohazards and geoheritage through Virtual Reality Technologies. GeoVT is funded by ERASMUS+, and it is novel approach that combines virtual reality (VR) with theory, practice, and activities that promote creative learning and active participation. The intellectual material of the project is open access and it includes virtual fieldtrips to different case studies, e-classes, education escape rooms, but also authoring tools for the development of custom-made VR interactive presentations (https://www.geovt.eu/RESULTS).

At a local scale, the GIALOVA project is a collaboration coordinated by NEO, which involves researchers, practitioners and policy makers working together to tackle challenges related to management of multi-functional areas, such as coastal wetlands, and serves as an example for similar areas in Greece and across the Mediterranean region. Since 2021, the team has been monitoring waterbirds, fish and benthic organisms within the Gialova Lagoon wetland as well as water quality parameters. The project was completed in 2023, and the data, along with suggestions for restoration actions, will be reported and discussed with societal and policy stakeholders, towards the gradual restoration and co-management of the wetland, having regard to both environmental and economic factors, under different climatic scenarios.