NAVARINO ENVIRONMENTAL OBSERVATORY

2022

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

GEORGIA DESTOUNI
PROFESSOR
STOCKHOLM UNIVERSITY

SARA COUSINS
PROFESSOR
STOCKHOLM UNIVERSITY

CHRISTOS ZEREFOS
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DIRECTOR GENERAL
TEMES S.A.

VASSILIS KARAKOUSIS
ENVIRONMENT & SUSTAINABILITY MANAGER
TEMES S.A.

JOHAN KUYLENSTIERNA (CHAIRPERSON)
ADJUNCT PROFESSOR
STOCKHOLM UNIVERSITY

NEO TEAM

THE AWESOME PEOPLE BEHIND NEO

ZAHRA KALANTARI (DIRECTOR)
ASSOCIATED PROFESSOR
STOCKHOLM UNIVERSITY

GIORGOS MANEAS (STATION MANAGER)
STOCKHOLM UNIVERSITY

CHRISTOS PANTAZIS (ASSISTANT)
NATIONAL OBSERVATORY OF ATHENS

SAMANEH SEIFOLLAHI (RESEARCHER)
STOCKHOLM UNIVERSITY

CARLA FERREIRA (RESEARCHER)
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

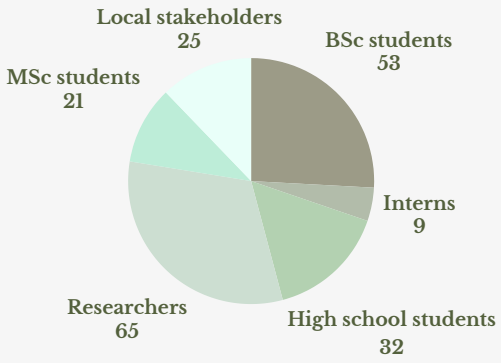
- **Meteorological station** *Precipitation, Temperature, Wind speed/direction, Barometric pressure, Solar radiation*
- **Wetland station (CTD):** *Salinity, Temperature, Depth*
- **Wetland station (Sonde):** *Salinity, Temperature, Depth, pH, DO, Redox*
- **Groundwater station:** *Salinity, Temperature, 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

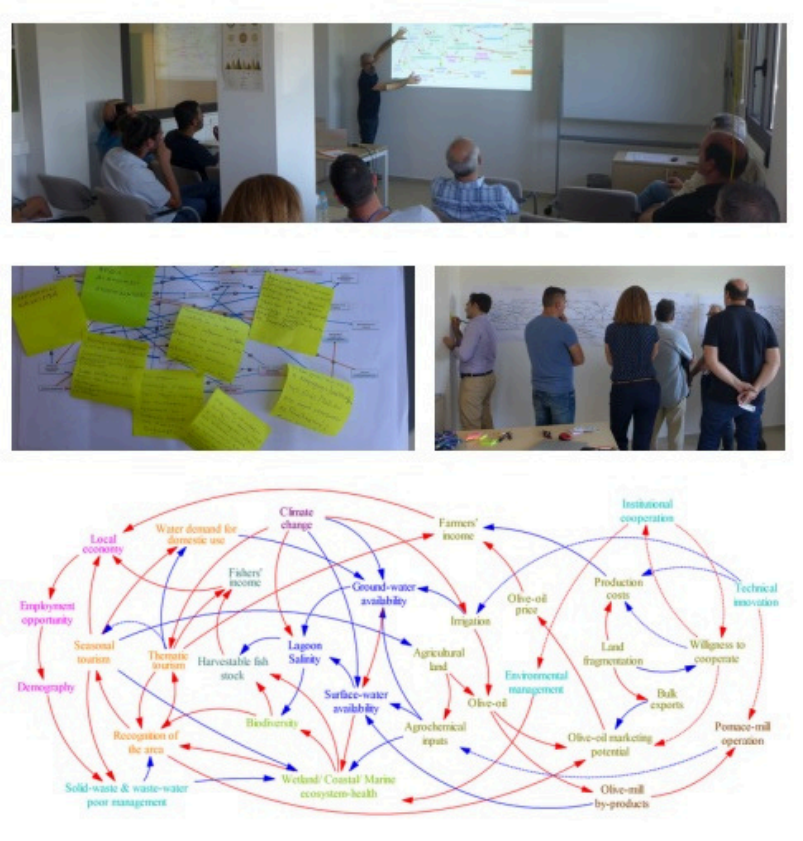
2022 ACTIVITIES AT A GLANCE

During 2022, NEO hosted 226 visitors across 27 visits. In the summer, NEO hosted 9 interns from Stockholm University, the University of Ioannina, and the American College of Greece. Additionally, we had 5 visits from bachelor courses (1 from Stockholm University, 3 from the American College of Greece, and 1 from Giessen University), 4 visits from master courses (3 from the University of Peloponnese and 1 from Stockholm University), and 6 visits from researchers of various institutes and departments. We also welcomed a group of high school students from Värmdö Gymnasium and organized a workshop with local stakeholders.

VISITORS AT NEO



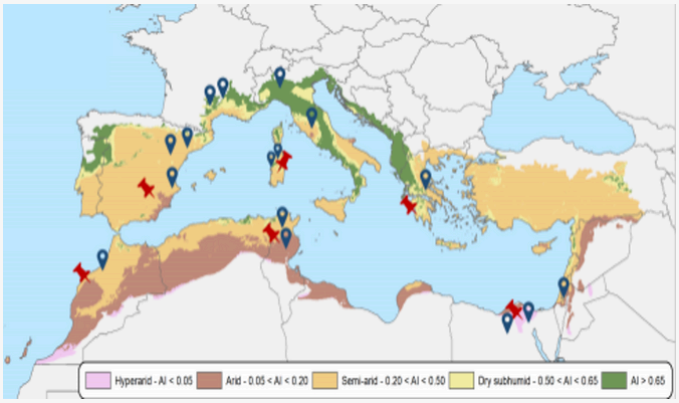
Regarding research projects, the COASTAL EU project, funded by H2020, was completed in October 2022 (COASTAL). For Greece, the focus was on South West Messinia, and the work was jointly coordinated by NEO and the Hellenic Centre for Marine Research (HCMR). During the project, 100 local and regional stakeholders and scientific experts participated in a multi-actor knowledge exchange process, resulting in six cognitive maps (one for each stakeholder group), an integrated causal loop diagram highlighting challenges and opportunities for improving rural-coastal synergies, and a system dynamics (SD) model to explore sustainable transformation and development alternatives for the local society, focusing on agriculture (olive orchards), tourism, and protected areas. At the European level, COASTAL's legacy includes the development of a Knowledge Exchange Platform (KEP) that provides access to knowledge, solutions, and experiences from six rural-coastal regions across Europe.



2022 ACTIVITIES AT A GLANCE

In addition to COASTAL, NEO researchers were actively involved in two new EU projects initiated in 2022. The SALAM-MED project (Sustainable Approaches to Land and Water Management in Mediterranean Drylands), funded by the PRIMA foundation, is implemented in six Mediterranean countries. The Greek case study, coordinated by NEO and the Academy of Athens (AoA), aims to assess agri-ecological farming practices for improving soil quality and water retention toward integrated olive orchard management. This project uses co-creation approaches and involves local stakeholders in experimental activities and meetings. The second EU project, GeoVT, focuses on training new generations in geomorphology, geohazards, and geoheritage through virtual reality (VR) technologies. Funded by ERASMUS+, GeoVT combines VR with theoretical and practical activities to promote creative learning and active participation.

SALAM–MED
sustainable approaches to land and water management in mediterranean drylands



Locally, the GIALOVA project is a collaboration coordinated by NEO that involves researchers, practitioners, and policymakers working together to address challenges related to the management of multi-functional areas such as coastal wetlands. This project 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's goal is to propose scientifically robust solutions for the gradual restoration and co-management of the wetland, considering both environmental and economic factors under different climatic scenarios. Data and suggestions for restoration actions are reported and discussed with societal and policy stakeholders through an iterative process that began in 2020 and will continue until 2023.