

NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management

Day, 30 July 2018

NEO NEA #29 (April - June 2018)

NEO stands for Navarino Environmental Observatory. But NEO in Greek (νέο) means news as well and NEA is its plural. So this is our news!

Foreword

As always spring is a hectic but stimulating time at NEO. We were happy to see field courses from Sweden and Greece, the 2nd HAAR Summer school and two master thesis related to Messinia to be conducted and finalized at NEO. Café-NEO events in Kalamata and workshops at NEO station were also part of our activities during this time. NEO researchers published two more publications and presented NEO research in several conferences while NEO management participated at the kick-off meeting of the COASTAL EU project, in Brussels. Adjunct Professor Johan Kuylenstierna is the new NEO director after Dr. Håkan Berg.

Happy Reading!



Figure 1: A swan (*Cygnus olor*) in Gialova lagoon. Further back and to the right, one of the four monitoring stations (photo: Giorgos Maneas)

Activities

Research

- *COASTAL EU project*
Kick-off meeting

The kick-off meeting of the COASTAL EU project took place in Brussels during June 4-8. During the meeting the partners from the different Multi-Actor Labs (MALs) had the chance to meet and work on the activities of the project, to be realised in the six case studies, where one focuses on the South-West Messenia. The focus of the project is to combine local and scientific knowledge in order to identify problems and develop practical and robust business road maps and strategic policy guidelines, aiming to improve land-sea synergy. A durable, online platform with concrete examples and tools for supporting land-sea collaboration will be developed through the project.



Figure 2: A group photo from the kick-off meeting of the COASTAL EU project in Brussels. (photo: Katalin Balazs)

The planning process for the initial case-study workshops for Messenia has now started and they will be held at NEO starting in July 2018. These workshops will gather key stakeholders from the region and harness their knowledge, experiences and expectations as key inputs to the research and policy development.

- ***Maintenance at Methoni station***
Methoni, (19-23 April)

Radovan Krejci from Stockholm University visited NEO and Methoni atmospheric laboratory in order to conduct maintenance work on DMPS (Differential Mobility Particle Sizer) and Soot photometer.

- ***Environmental monitoring***
Gialova lagoon

Bird monitoring, Water Quality Monitoring (April – June 2017)

Bird monitoring in the area was continued during this period on a scheduled monthly basis. Apart for bird species and numbers of birds visiting the lagoon during late spring migration, Giorgos Maneas and Dimitris Bousbouras focused also on identifying nesting areas for species such as the Black-winged Stilt (*Himantopus himantopus*), the Mallard (*Anas platyrhynchos*) and the Mute Swan (*Cygnus olor*) among others.



Figure 3: A family of Black-winged Stilts (*Himantopus himantopus*). (photo: Dimitris Bousbouras).

Water quality monitoring was continued on a daily basis. In addition, Giorgos started to interview local elderly in order to better understand how the alterations in hydrology have affected the area and its Ecosystem Services.

Related Internships

Angeliki Kaplani, a master student following the “Environmental Management and Physical Planning” Master course at Stockholm University, will spend almost two months at NEO working on Ecosystem Services and pressures at Voidokilia bay as part of her internship. Peter Schlyter, Giorgos Maneas and Håkan Berg are her supervisors.

Related Master thesis

- ✓ *“A comparison of the avian soundscapes of organic and conventional olive groves in Messinia, Southwest Greece”.*

**MSc thesis in the Master's Program “Landscape Ecology”,
Stockholm, May 18**

(By David Myers. Supervisor: Håkan Berg)

Abstract

Modern intensive agricultural practices are causing great stress on ecosystems worldwide, with the loss of biodiversity of particular concern. Intensification has increased the use of synthetic agro-chemicals as well as decreased landscape heterogeneity. Organic agriculture is seen as an effective way of counteracting this trend. Biodiversity hotspots such as Messinia in southern Greece are particularly vulnerable to losses of biodiversity and the olive groves which dominate this area are no exception. Due to the rapid nature of current ecological change it has become critical to develop quick, economical and practical methods of environmental monitoring. Soundscape ecology and bioacoustic indices are such methods which offer a way of estimating various aspects of audible species populations. The aim of this study was to assess the differences in avian abundance, species richness and diversity between organic and conventional olive groves. The aim was also to investigate the importance of landscape variables and grove structure on bird populations. Twenty-two sites on 11 organic and 11 conventional olive groves were assessed by installing audio recording devices for three hours around sunrise. This generated wave files which were converted to spectrograms and applied to three bioacoustic indices; the Acoustic Complexity Index (ACI), Acoustic Diversity Index (ADI) and Bioacoustic Index (BIO). The results showed olive groves under organic agriculture had significantly higher values for the ACI and BIO indices, and a higher, but not significant difference for ADI. Organic groves showed a more heterogeneous and complex structure with a mixture of tree species and varying canopy height. Landscape variables were similar between management practice and did not significantly influence the index results. Plot scale variables, especially underlying vegetation height had a significant influence on the ACI and BIO index results. Bioacoustic indices gave conclusive results and were an effective way of environmental monitoring in this study, although their implementation and interpretation still require development. Further study is required to discern the precise characteristics of organic olive cultivation which make it more attractive for bird species, although this study suggests certain key variables that play a role.

- ✓ *“The spatial variability of salinity and water flux estimate in Gialova Lagoon, Greece”*

**MSc thesis in the Master's Program “Hydrology, Hydrogeology and Water Resources”,
Stockholm, June 27**

(By Kim Lundmark. Supervisor: Stefano Manzoni)

Abstract

Lagoons are coastal waterbodies which are sensitive to meteorological and hydrological changes. This study focused on the spatial distribution of salinity in Gialova lagoon, Greece. The area in which the lagoon is located is under pressure from agriculture and tourism in the area. Besides that, the lagoon is an important stop for migratory birds as well as the home for rare species. To investigate how salinity is distributed in the lagoon a salinity gradient was produced. Also, an attempt was made to model the salt and fresh water fluxes in the lagoon using a mass balance approach. The water fluxes are either from fresh water sources or influx of saline water from the sea. Manual electric conductivity measurements were taken during a field campaign to the lagoon. Time series data used in the model was obtained from stations in the lagoon and the surroundings. An investigation in how the lagoon measurement station differ in salinity was also performed

in this study. Results from the gradient map and manual measurements show that the water in the lagoon is the freshest in the North-Eastern parts and the most saline to the South-West. The modelled water fluxes show an inverse relationship from each other. High fresh water fluxes correspond to precipitation events, lower salinity concentration. Whereas high salt water fluxes correspond to high salinity concentration and lowered precipitation. The stations concentrated to the middle lagoon show corresponding values in salinity whereas the station to the South-West differs. The canal surrounding the lagoon shows interactions since measurements show that the water is brackish. A longer time series could provide patterns in water fluxes over time. Trying to find the portions of terrestrial groundwater and surface water, and further investigation of the regional aquifer could provide new information to develop this model. The region is expected to experience water stress which makes further studies and monitoring important.

Research publications (NEO researchers in bold, presenters underlined)

- *Peer reviewed journals*

Berg, H., Maneas, G., Salguero Engström, A. A Comparison between Organic and Conventional Olive Farming in Messenia, Greece. *Horticulturae* 2018, 4, 15. <https://doi.org/10.3390/horticulturae4030015> .

Katrantsiotis C, Kylander M., Smittenberg R., Yamoah K.K.A., **Hättestrand M.**, Avramidis P., Strandberg N.A., **Norström E.**, 2018: Eastern Mediterranean hydroclimate reconstruction over the last 3600 years based on sedimentary n-alkanes, their carbon and hydrogen isotope composition and XRF data from the Gialova Lagoon, SW Greece. *Quaternary Science Reviews*.

- *Conferences*

Krejci Radovan., Tunved Peter, E. Freud, **Gerasopoulos Evangelos**, **Kalivitis Nikos**, **Michalopoulos Nikos**, **Henning Tabea**, **Maneas Giorgos**, **Hansson H.-C.** Atmospheric aerosol observations at Navarino Environmental Observatory (NEO), Greece. 4th ACTRIS-2 General meeting in Napflio, April 17-19, 2018.

Christos Katrantsiotis, Elin Norström, Malin Kylander, Rienk Smittenberg, Kweku K.A. Yamoah, **Martina Hättestrand**, Pavlos Avramidis and **Martin Finné**. Eastern Mediterranean hydroclimate reconstruction over the last 3600 years based on sedimentary n-alkanes, their carbon and hydrogen isotope composition and XRF data from the Gialova Lagoon, SW Greece. International Paleolimnology Association and International Association of Limnogeology Joint Meeting, Stockholm, Sweden, 18-21 June, 2018.

Giorgos Maneas, Karin Holmgren, Håkan Berg, Georgia Destouni, **Evaggelos Gerasopoulos**, **HC Hansson**, **Vasilis Karakousis**, **Radovan Krejci**, **Stefano Manzoni**, **Marina Papatsoni** and **Christos Zerefos**. Assessing Long Term Environmental Impacts: The role of Observatory Science. The case of Navarino Environmental Observatory (NEO), Messinia, Greece. Joint Conference EBC-VII & ISEB-2018, Chania, Crete, Greece, June 25-28, 2018.

Nikolaos P. Nikolaidis, Maria Mimikou, Nikolaos Mihalopoulos, Andreas Panagopoulos, Theodora Petanidou, **Georgios Maneas**, Nikolaos Skoulikidis and Petros Lyberakis. Lter-Greece: The Long-Term Ecosystem Research Network of Greece. Joint Conference EBC-VII & ISEB-2018, Chania, Crete, Greece, June 25-28, 2018.

Education

Summer Schools

- *“Theory and practice of aerosol chemistry and engineering for climate, air quality, emissions and health effects, by means of In-Situ and Remote Sensing Observations ”*
2nd HAAR Summer School, Hellenic Association of Aerosol Research (June 7-13)

The objective of the 2nd HAAR international summer school, which took place at NEO in June, was to train young researchers on state-of-the-art instruments for determining the key properties of atmospheric aerosols, the tools for analyzing and interpreting the data, and the knowledge for putting those in the context of climate change.



Figure 4: Participants at the 2nd HAAR summer school (photo: Katerina Bougiatioti).

Aerosol particles are key components of the atmosphere and thus strong determinants of the climate at local, regional, and global scales. To understand how emissions by a number of natural and anthropogenic sources contribute to the atmospheric aerosol and to climate change there is a need to combine both in-situ and remote sensing observations with model predictions.



Figure 5: Hands on training during the 2nd HAAR summer school at NEO (photo: Katerina Bougiatioti).

The summer school was organized around lectures that covered the basic theory followed by hands-on experience on:

1. in-situ instruments for measuring the concentration, size and chemical composition of atmospheric particles,
2. systems for probing the vertical distribution of the atmospheric aerosol, and
3. new integrative approaches using models and observations for impact assessment.

The lectures and practical applications were provided by a total number of 14 invited leading experts in the above 3 fields (table 1).

Table 1: Invited researchers at the 2nd HAAR summer school at NEO

Name	Affiliation
N. Mihalopoulos, A. Bougiatioti, A. Gkikas	National Observatory of Athens (NOA), Greece
K. Eleftheriadis, M. Manousakas	National Centre for Scientific Research (N.C.S.R.) Demokritos, Greece
A. Nenes	Georgia Institute of technology, USA
S. Pandis	University of Patras, Greece
S. Lykoudis	Hellenic Statistical Authority
M. Pikridas, G. Biskos	Cyprus Institute, Cyprus
H.C. Hansson	Stockholm University, Sweden
Al. Wiedensholer	Institute for Tropospheric Research (IFT), Leipsig, Germany
T. Krinke, O. Bischoff	TSI, Germany

Field Courses @ NEO

- **“Cultural Heritage Materials and Technologies”**

Masters’ course, Department of History and Archaeology, University of Peloponnese (April 22-24)

The MSc Cultural Heritage Materials and Technologies CultTech from the Department of History, Archaeology and Cultural Resources Management, University of the Peloponnese which numbered by 7 post graduates, the program secretary V. Valantou and the program director Prof. N. Zacharias, visited the NEO Station where the students had an introductory talk by the Station Manager about its operation and research aims.



Figure 6: Students, instructors and two very young students © during the Cult-Tech visit to NEO. (photo: Cylia Valantou)

The CultTech students had a total of 2 days' field work and lecturing within the frames of semester B Environmental, Remote and Field Prospection Studies in the nearby advanced cultural and environmental landscape of Gialova and Koryfasio. A visit to Methoni Station took place where they had a lab introduction and practice given by Dr. E. Gerasopoulos from NOA (National Observatory of Athens).

- **“Plant Systematics”**
Master’s course, Stockholm University (April 28 - May 5)

The fourth Masters course "Plant Biodiversity and evolution - a global perspective", took place at NEO in April. Per Ola Karis was the instructor of the field course. During the excursion, the nine students visited a number of different sites mainly in Messinia. Among them, the Gialova/Navarino Bay area, Taygetos mountain, Polylimnio and the surroundings of NEO.

- **“The Gialova experience!”**
The American College of Greece, Navarino Environmental Observatory (May 14-18)

American College of Greece (ACG) students had the unique opportunity to participate in the first-ever interdepartmental academic weeklong workshop and field trip jointly held at the ACG Aghia Paraskevi campus and the Yalova Lagoon in Messinia. Accommodation, laboratory space and insightful guidance were provided by the Navarino Environmental Observatory.



Figure 7: American College of Greece students and teachers and NEO station manager in a group photo. (photo ACG)

This five-day workshop, organized by the ACG Center of Excellence for Sustainability at the Office of Public Affairs and NEO with the support of the B.Sc. in Environmental Studies Program was an immersive and experiential learning opportunity aimed at enhancing education for sustainability. Biology, environmental science, sociology and management came together in order for students to holistically understand and appreciate what we call an ecosystem. Participants gained hands-on experience by engaging in lab and field activities while simultaneously enjoying every social aspect of the workshop.



Figure 8: American College of Greece students and teachers during fieldwork in Gialova lagoon. (photo: ACG)

Dissemination

Workshops @ NEO

- *Climate Science and Quaternary Geology (CQ) Research Unit*
Department of Physical Geography, Stockholm University (April 24-28)

Fifteen members from the CQ research unit made a visit to NEO during April 24-28, 2018. The main purpose was for the team to learn more about the NEO station as a resource for teaching and research, to become familiar with interesting aspects of the nearby environment, to make contacts with Greek scientists, and to stimulate the internal team building.



Figure 9: Members in the CQ research unit in front of the NEO building. (Photo: Simon Larsson, by self-timer ©)

The first full day (April 25), Giorgos made a presentation of NEO in the morning. Then we travelled to see the atmospheric monitoring station at Methoni and continued with a visit to see the springs at Agios Floros, on our way to Kalamata. There, in the evening, we met professor Nikos Zacharias and his colleagues at the Laboratory of Archaeometry, Department of History, Archaeology & Cultural Resources Management, University of the Peloponnese. The two groups presented their research and education activities and we identified several points of common interests. The second day (April 26), we visited the archaeological site of Nestor's Palace in the morning and then we made a hike to Paleokastro and visited the beautiful Voidokila beach in the afternoon. The last full day (April 27) was devoted to a half-day unit workshop followed by time for individual work or outdoor activities. At the workshop, we first focused on brain-storming to identify student projects that can be made within a new course called Project in Physical Geography, for students in Geoscience at the Bachelor's level, and then continued with discussing communication aspects including improvements to our unit's website.



Figure 10: Christos Katrantsiotis and Martina Hättestrand demonstrate their field site at Gialova. The photo shows the coring site in the eastern shore of the Gialova lagoon. An 8 m deep vibrocore was drilled and a multi proxy analysis was carried out on the sediment sequence including sedimentological geochemical, paleontological and pollen analysis. The results provide evidence regarding the paleoenvironment and shoreline changes in this coastal area during the last 6000 years. Photo: Simon Larsson

Events

- ***Cafe-NEO***

“Kalamata - Smart city” and “The Antikythera Mechanism”

Kalamata, April 16 (Baba-Yaga café bar) and May 8 (Vino-banco tapas bar)

Two technology oriented café NEO meetings took place in Kalamata this spring. One describing the early steps of technology in the antiquity and the other discussing the solutions that technology can offer to the modern world.



Figure 11: The café-NEO meeting at Baba-Yaga café bar with invited speaker Dr. Evangelo Gerasopoulos.

At April's café-NEO, Navarino Environmental Observatory hosted the 1st citizen workshop in the pilot city of Kalamata organised by SMURBS (SMart URBan Solutions for air quality, disasters and city growth, a H2020 funded project). More than 40 citizens participated in the event, sharing their needs and smart ideas, over a hot cup of coffee! The coordinator, Dr. E. Gerasopoulos (Research Director, National Observatory of Athens) delineated the main goals of SMURBS and the concept of integrating state-of-the-art Earth Observation methods with smart-city methods highlighting some major findings concerning user needs at the time of the Workshop and urged participants to step up, and offer their own ideas and of course giving emphasis on the local issues and particularities.



Figure 12: Dr. Xenophon Moussas (right), Mr. Nikos Papakostas and Giorgos Maneas (holding an exact copy of the Antikythera Mechanism 😊)

At May's café-NEO, NEO hosted Dr. Xenophon Moussas (Professor of Space Physics, National and Kapodistrian University of Athens), a core member of the international scientific team working on the “Antikythera Mechanism”. The attendees had the opportunity to discuss with Dr. Moussas the secrets of the mechanism, which is also described as the first tablet (*πινακίδιον* in Greek, spelled: *pinakidion*) of the antiquity constructed at sometime between 150 – 100 BC based on the knowledge of Pythagoras and Archimedes. The mechanism was able to predict the place of the sun and the moon, when solar and lunar eclipses were visible, the phases of the moon and even the date of the Olympic games.

Visits @ NEO premises

- ***The Swedish Organization of Sport Promotion***
May 18

The Swedish Organization of Sport Promotion, which is under the auspices of the King of Sweden, visited NEO where Giorgos gave them an introduction about NEO activities followed by discussions on research, education and outreach in the area.

NEO management

Adjunct Professor Johan Kuylenstierna, is the new NEO director since May 15. Johan together with Karin Holmgren (Chairperson of the NEO Steering Committee) visited NEO in May for discussions with NEO station manager and to meet with the other partners of the NEO cooperation.



Figure 13: Meeting at the Biomedical Research Foundation of the Academy of Athens (BRFAA). From left to right: Johan Kuylenstierna (NEO director, Stockholm University), Karin Holmgren (NEO SC chairperson, Swedish University of Agricultural Sciences), Evangelos Gerasopoulos (NEO SC member, National Observatory of Athens) and Kostas Eleftheratos (BRFAA).

Upcoming

EU projects - COASTAL

- 2 sectoral workshops will be held at NEO premises, co-organized by the Greek MAL.

Research

- NEO atmospheric research group visit at NEO. Manuscript writing and extensive maintenance work at Methoni station
- Bird-monitoring in the Gialova lagoon area on a monthly basis.
- Interviews with local elderly on their perception of Gialova's Ecosystem Services.
- Mapping of drills and wells as a first step for the better understanding of underground water resources in the Gialova lagoon area. Part of a master thesis to be realized in collaboration with Polytechnic School of Athens.

Education

- As part of a one semester Natural Science Specialization course a group of students from the upper secondary school, Värmdö Gymnasium, will visit NEO in September.
- Students of the Justus-Liebig University of Giessen (a NEO Associated Member), Germany, will visit NEO in September as part of their-course "Climate, Climate Change Impacts: Greece".

NEO management

The NEO Steering Committee meeting will be held in Athens in September (4-5).