

# NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management

Friday, 12 August 2016

## NEO NEA #21 (April - June, 2016)

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

*This newsletter covers my first three months as new director for NEO after Karin Holmgren, who has become pro-rector at the Swedish University of Agricultural Sciences. As you can see in the newsletter, activities continues as previous, but we will also look for new research and education initiatives and ways to make these visible to the broader society. Read, for example, the comic strip “Mission Earth” below. At the steering committee meeting in April, Karin Holmgren became the new NEO chairperson after Stefan Nordlund. A concept note for future research at NEO, provided by Johan Kleman, was welcomed by the steering committee and will provide guidance for further discussions during the coming year. We hope future work will be as welcoming and promising as meeting the spring in Greece.*

Håkan and Giorgos



**Figure:** NEO steering committee members, Dr. Johan Kleman and Mr. Achilles Constantacopoulos having relaxed discussions prior to the meeting.

## Activities

### Research

- *NEO's atmospheric laboratory at Methoni*

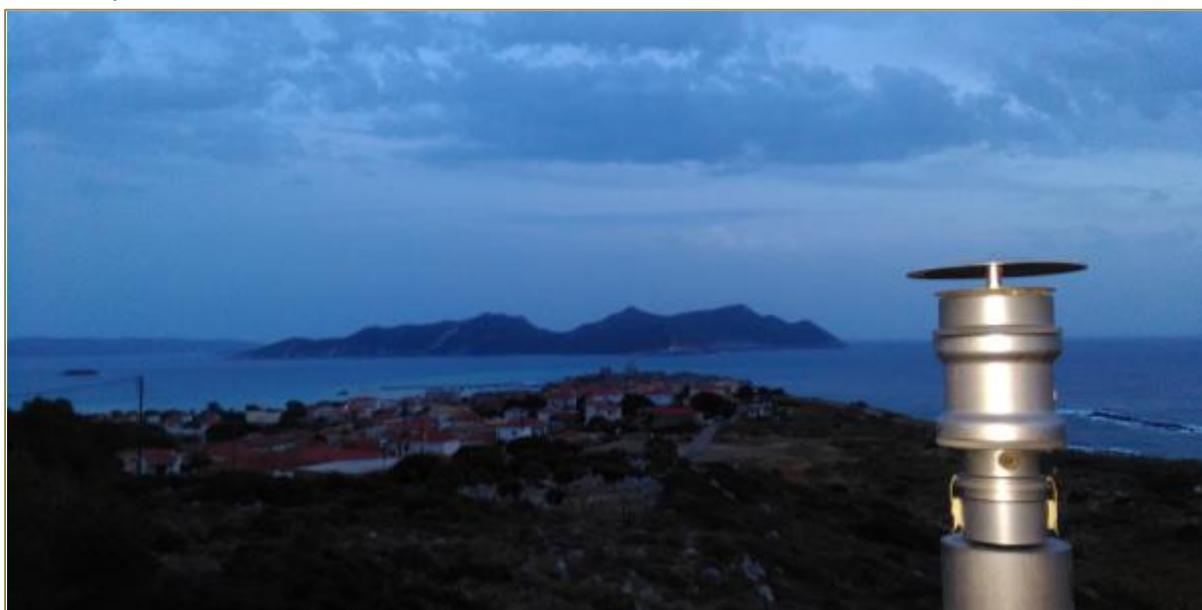
#### *Atmospheric composition at NEO*

During this period a new pyranometer was installed on top of the roof of the NEO station at Methoni by colleagues from NOA (IERSD, Dr. B. Psiloglou), measuring both total and diffuse solar radiation and sunshine duration. A standard meteorological station covering air temperature, relative humidity, air pressure, precipitation and wind speed and direction (on separate 6m mast) was also installed. Data are available on line for NEO researchers at [http://www.meteo.noa.gr/WeatherOnLine/s\\_Methoni/meteo\\_tableEN.html](http://www.meteo.noa.gr/WeatherOnLine/s_Methoni/meteo_tableEN.html) (soon also via NEO's site).



**Figure 1:** NEO's atmospheric laboratory at Methoni

NEO's aerosol sampler is up and running for continuous aerosol sampling and chemical analyses, in collaboration with the Atmospheric Chemistry Laboratory of the National Observatory of Athens and University of Crete.



**Figure 2:** Aerosol sampler at Methoni

The monitoring of atmospheric composition at NEO has now been complemented with two new trace gases analyzers, one for carbon monoxide (CO) and one for ozone (O<sub>3</sub>). The measurement will be provided in real time and online through a dedicated platform currently prepared by the Academy of Athens, that will be hosting similar measurements from several stations in the Easter Mediterranean.

### *Radon's monitor installation*

A detection system for the measurement and the monitoring of the radon level in the soil has been installed at the Methoni's meteorological station. Radon (<sup>222</sup>Rn) is a natural occurring radioactive noble gas with a half-life of 3.8 days. The change of radon gas emanation inside the ground, apart from the soil background and the atmospheric influence, is correlated with the tectonic movements and thus can be used as a precursor of earthquakes. The detector, a gamma rays spectrometer (Multirad-γ, Amplituda®), was placed on the ground at a depth of 90 cm inside a 10 cm diameter PVC tube. The activity concentration of the radon is indirectly determined by its progenies that are gamma ray emitters, while the data will be corrected based on the measurements of the local atmospheric conditions. The radon station is part of a network for the seismological study of the Hellenic Trench, under the supervision of the Geodynamic Institute, National Observatory of Athens.



**Figure 3:** Detection system for the measurement and monitoring of the radon level in the soil, installed at NEO

- *Co-adaptive management of ecosystem services for sustainable use and conservation of the Gialova Lagoon, Messinia, SW Greece.*

### *Water Quality Monitoring in the Gialova Lagoon*

A network of monitoring stations in the Gialova Lagoon has been installed to quantify how salinity changes over the seasons, following the natural cycle of wet and dry periods, but also in the short-term, after intense rainfall or dry spells. Water salinity, temperature, and depth are monitored at three different locations and more stations will be installed in the coming future. Wind speed and wind

direction, solar radiation, precipitation and relative humidity in air are also monitored to calculate the amount of evaporation from and precipitation inputs to the lagoon.



**Figure 4:** Data collection in Gialova lagoon

- *Soil moisture and water use by plants at NEO*

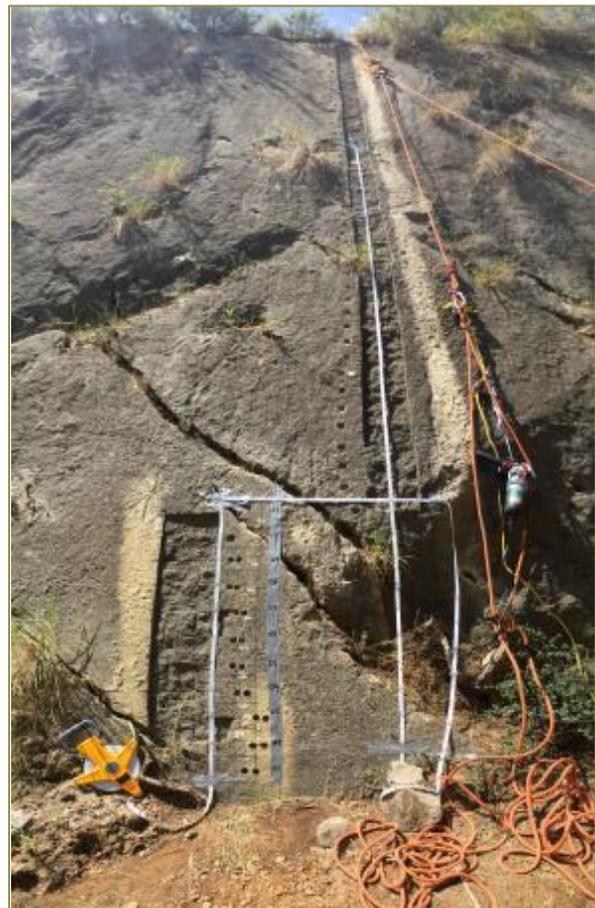
To increase our understanding of water demand in an area strongly determined by climatic factors, two monitoring stations have been set up in the proximity of the Navarino Environmental Observatory (NEO). One has been installed in an irrigated olive orchard while the other has been situated in a golf course within the Costa Navarino Resort. Each station will register several hydro-climatic factors: soil moisture, rainfall, solar radiation, wind direction and speed and relative humidity, pressure and temperature. These variables will allow calculations of plant transpiration rates (i.e., plant water use) in two ways: based on changes in soil moisture storage, and based on atmospheric ‘demand’ for water.



**Figure 5:** Monitoring station in a golf course within the Costa Navarino Resort

- *“Fieldwork on Paleoseismicity”  
Sparta fault, April 21-28*

During 21-28 April, Arjen Stroeven undertook further fieldwork on the Sparta Fault, with Marc Caffee (Purdue University) and Mikael Amlert (climbing expert, Stockholm). The fieldwork targeted sampling of the Sparta Fault for dating paleoseismicity on this potentially dangerous normal fault using the following in situ-produced isotopes,  $^{36}\text{Cl}$ ,  $^{26}\text{Al}$ , and  $^{14}\text{C}$ . The work builds on published dating work using  $^{36}\text{Cl}$  and the licentiate work of Ruben Fritzon, who identified a surprisingly heterogeneous mineralogy of the exposed fault surface and resulting potential contamination of previous dating by meteoric  $^{36}\text{Cl}$ . The multi-isotope approach is designed to unravel this contamination issue, allowing for a more accurate reconstruction of paleoseismicity on this fault (and other limestone normal faults, which are common throughout the eastern Mediterranean).



**Figure 6:** Setting up a sampling transect adjacent to a transect sampled for  $^{36}\text{Cl}$  in 2002 by Lucilla Benedetti and colleagues

This work forms part of a project on geohazards in Peloponnese in collaboration with Alasdair Skelton (IGV), Bradley Goodfellow (IGV and NG), and Uwe Ring (IGV).



**Figure 7:** Mikael Amlert and Marc Caffee sampling the Sparta Fault.

## Education

### Courses

- **“Course on Plant Biodiversity and Evolution”**  
*Master students’ course, Stockholm University (April 23-30)*

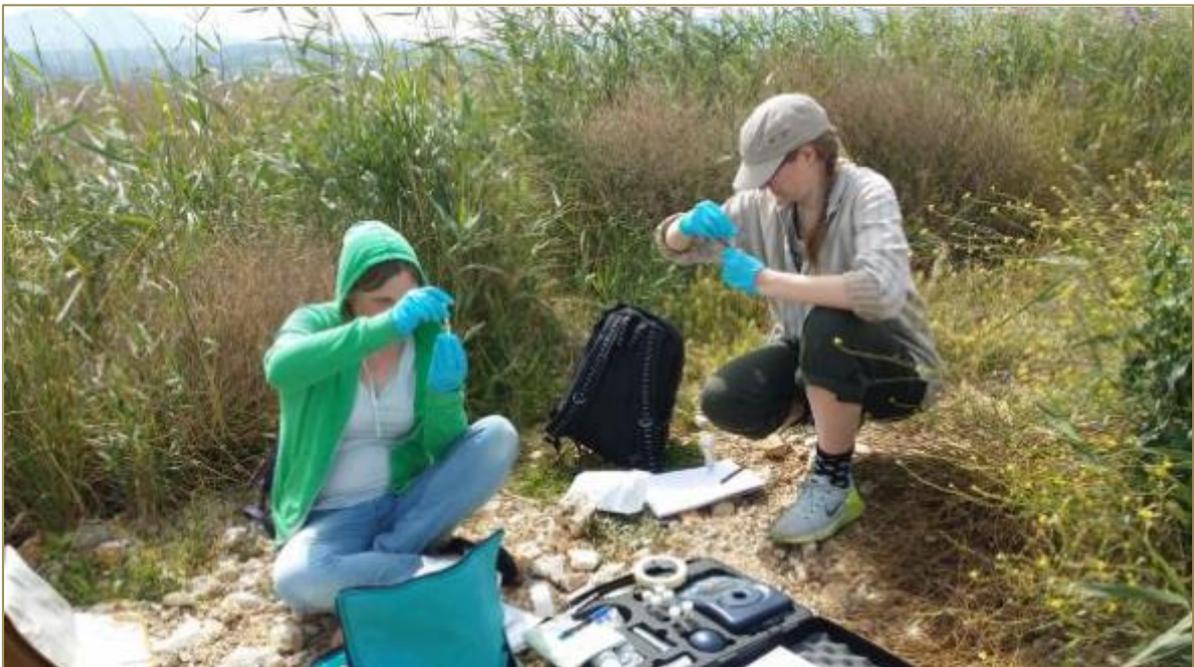
The fourth Masters course "Plant Biodiversity and evolution - a global perspective", took place at NEO in April. Per Ola Karis was the instructor of the field course. During the excursion, the four students visited a number of different sites mainly in Messinia. Among them, the Gialova/Navarino Bay area,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

- **“General Geochemistry course”**  
*Bachelor students’ course, Stockholm University (May 9-12)*

Seven students participated in the field course in Geochemistry at the Navarino Environmental Observatory. The field course focused on redox and nutrient geochemistry and microbial biogeochemistry. The students engaged in two intense days of chemical field measurements in the Giavola Lagoon, focusing on two themes:

1. Water chemistry and nutrient state of the lagoon and its tributary and drainage canals;
2. Biogeochemistry of hypersaline microbial mats on mudflats surrounding the lagoon.

The students worked in two groups and took samples at various locations around the lagoon to determine the concentration of total dissolved ions, and selected major cations and anions (calcium, magnesium, nitrate, phosphate), dissolved oxygen, pH, alkalinity, and temperature in order to assess the contribution of agriculturally derived nutrients, freshwater input, and saltwater inflow from Navarino Bay at various locations of the lagoon. Temperature, salinity, and dissolved oxygen concentrations were used to assess oxygen saturation state and biological oxygen demand. Nutrients were measured using spectrophotometric methods in the laboratory of the observatory and alkalinity was measured by Gran titration.



**Figure 8:** Students conducting field measurements during the Geochemistry course at NEO.

The second part of the work included in situ measurements of dissolved oxygen using oxygen microelectrodes in photosynthetic microbial mat ecosystems that can be found around the edges of the lagoon. High-resolution profiles at 500  $\mu\text{m}$  resolution were taken under various light, temperature, salinity, and water levels in order to demonstrate the physical and biological controls on

photosynthetic oxygen production and microbial respiration and to introduce the concept of coupled biogeochemical cycles. The two days were intense and produced new interesting results worth pursuing for future student research projects.

### Events

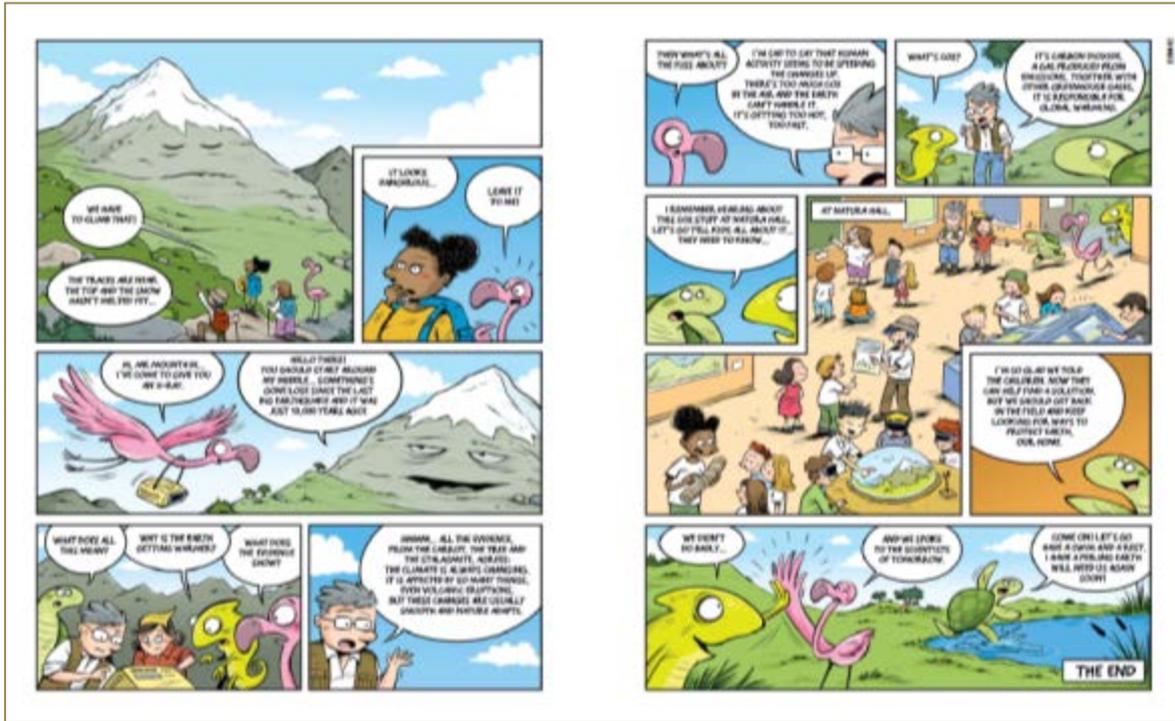
- [HAAR worksop](#)  
[NEO station, May 15 - 16](#)

The Hellenic Association for Aerosol Research (<http://hellenic-aerosol.org/?l=en>) organized a two days event at NEO for its annual meeting. 22 professors, researchers, postdocs and PhD students met and presented their current research activities and results, and exchanged ideas for further collaboration opportunities. The Greek candidacy and preparations for the 2022 International Aerosol Conference were thoroughly discussed, while an initiative for the organization of a collaborative HAAR-NEO Summer School at NEO for 2017 was launched. The scope of the summer school will be on aerosol science and technology and besides NEO and HAAR researchers involvement, there will be numerous internationally recognized scientists invited.



**Figure 9:** Participants at the HAAR workshop at NEO.





- [TV reportage on ERT TV](#)

NEO was advertised in a TV reportage on ERT TV (Greek National channel). The reportage was highlighting Messinia and Costa Navarino.

- [Astronomy nights, Costa Navarino, summer 2015](#)

"Astronomy nights" is an interactive experience at Costa Navarino organized by the Navarino Environmental Observatory where visitors are introduced to the stars and the constellations of the night sky and they become the astronomers deciding how the night unfolds.



Figure 10: Astronomical observations at Costa Navarino

Under the guidance of the National Observatory of Athens and with the excellent support from the Navarino Collections team, we have managed to organize this event on a weekly basis and we are happy to see that it is fully booked!

### NEO management

- **Steering Committee meeting**

*Athens, April 14-15*

At the NEO Steering Committee meeting Håkan Berg was welcomed as the new NEO Director, Stefan Nordlund was thanked for his successful years as the SC chairperson and Karin Holmgren was welcomed as the new chairperson.

Next SC-meeting will be held in Stockholm on 24-25 November, in connection to a NEO workshop aiming at to highlight major research results from our NEO research, and to explore possible synergies and the potential for joint synthesis papers. Another aim is also to discuss opportunities and initiate plans for future research funding and applications, not least within Horizon 2020.

- **Lunch at NEO**

*NEO station, April 17*

In order to thank TEMES staff at Costa Navarino for excellent cooperation since the start of NEO, Karin Holmgren invited them to a lunch at the NEO Research Station.

## **Upcoming**

### Education

- 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".
- 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 October.

### Dissemination

- In July, Giorgos Maneas will represent NEO and give a presentation in a day conference entitled "Climate change and energy" to be held in Athens. The conference is organized by the "Institute of Democracy Konstantinos Karamanlis".
- A new NEO webpage is under construction.