

# NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management

Wednesday, 27 April 2016

## NEO NEA #20 (January - March, 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

Issue number 20 of NEO NEA marks my three final months as the NEO Director. Little more than 6 years have passed since I took on this position. I am extremely proud of, and impressed by, all achievements that NEO has made during this rather short period of time. This could not have been done without the positive partnership between TEMES, Academy of Athens and Stockholm University. It could not have been done without all engaged and talented scientists involved. It could not have been done without the educational activities, the teachers and the students, nor could it have been done without the outreach activities. Finally, nothing would have been achieved without the great support from, and initiatives taken by, our Station Manager Giorgos Maneas. To all of you: Thank you!

Even though I will miss my task, it is a great pleasure to hand over to Håkan Berg! With Håkan as the new NEO Director I am confident that NEO will continue to be a hub for science and education on the climate and environment of the Mediterranean region. And with Håkans academic background and previous experiences I am sure that NEO will face a much welcomed broadened scope of activities, including even new research fields, such as coastal zone management and marine ecology. You can see some signs of this already in this issue of NEO NEA! You are most welcome Håkan!

Karin

## Activities

### Research

- *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*

The Gialova lagoon is used for fishing and tourism, and freshwater sources are exploited for irrigation. Freshwater uptake from the rivers feeding the lagoon has decreased freshwater inputs while more seawater from Navarino Bay has been entering the lagoon, thus increasing salinity. This increase in salinity may endanger animal species and the fishing industry. With drier conditions expected in the near future due to climatic changes, salinity levels may further increase, motivating a long-term monitor program of salinity and hydrologic changes in the lagoon.



**Figure 1:** Labor work at Gialova lagoon ©

In order to quantify how salinity changes over seasons, following the natural cycle of wet and dry periods, but also in the short-term after intense rainfall or dry spells, Agnes Classon (student in the Master programme in Hydrology, Hydrogeology and Water Resources at Stockholm University), supervised by Stefano Manzoni (a senior lecturer in the department of Physical Geography, SU) and with Giorgos Maneas' help, set up a network of monitoring stations in the Gialova Lagoon. Instruments were installed at four different locations to measure continuously water salinity, temperature, and depth. Wind speed and wind direction, solar radiation, precipitation and air relative humidity will also be monitored to calculate the amount of evaporation from and precipitation inputs to the lagoon.

With this study we hope to gain important information about salinity patterns and hydrologic changes in the lagoon that could be of importance for finding solutions to improve the water quality and maintain a sustainable and productive environment in the lagoon. Moreover we expect to understand the natural processes and the “drivers of change” affecting ecosystem services derived from the lagoon.

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

Contrasting vegetation types, such as trees and grasses, use water from the soil differently. Understanding and quantifying these differences is important to predict how climatic changes and land use are affecting plants and their chance of surviving stressful dry periods. Soil

moisture is the key parameter regulating the use of water by plants and changes in soil moisture through time is the key to understand how this regulation works. Typically, plant use water at high rates when moisture is abundant, but they decrease their water usage as soils become drier. This regulation is necessary to save water in the soil and avoid stressful conditions. According to climate change projections, some areas will face more frequent droughts (Mediterranean countries) while others will be periodically flooded. Moreover, less water will be available during summer due to the rising temperatures. Hence, under future climates, regulation of water use will become even more important.



**Figure 2:** Installing moisture sensors at a golf course within the Costa Nabvarino resort.

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 at a golf course within the Costa Navarino Resort. Each station will register several hydro-climatic factors: soil moisture, rainfall, solar radiation, wind direction & speed and relative humidity, pressure and temperature. These variables will allow calculation 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.

Reyes Martín González (student in the Master programme in Hydrology, Hydrogeology and Water Resources at Stockholm University) is conducting this project as part of her MS thesis, under the supervision of Stefano Manzoni (senior lecturer at SU). Giulia Vico (SLU Uppsala) offered her help and experience in the experimental setup and Giorgos Maneas provided logistical help. We would also like to thank Vasilis Karakousis from TEMES and Nikos Lymperopoulos for allowing us to install sensors in his olive orchard.

- *Cave speleothems and lake sediments*

Between 25-28 January, Katerina Kouli from National and Kapodistrian University of Athens, visited the department of Physical Geography in Stockholm. Katerina Kouli is a senior researcher with expertise in paleoecology, palynology and archeology. The purpose of the visit was to discuss ongoing research collaboration and to develop improved extraction methods for fossil pollen in sediments from Peloponnese. Kouli also held a research seminar entitled: "Plant landscape and land-use in Greece: the pollen record". The visit was arranged by Martina Hättestrand and Elin Norström, Stockholm University.

Georgia Tsartsidou, Archaeologist at Ephorate of Palaeoanthropology and Speleology of Southern Greece visited the department of Physical Geography, Stockholm University, 22 February - 8 March, to study diatoms from Greece.

- *Scientific Publications*

**Holmgren, K**, Gogou, A, Izdebski, A, Sicre, MA, Xoplaki, E, Luterbacher, J, 2016. Mediterranean Holocene climate, environment and human societies, *Quaternary Science Reviews*, 136, 1-4. [doi.org/10.1016/j.quascirev.2015.12.014](https://doi.org/10.1016/j.quascirev.2015.12.014)

Izdebski, A, **Holmgren, K**, Weiberg, E, Stocker, SR, Büntgen, U, Florenzano, A, Gogou, A, Leroy, SAG, Luterbacher, J, Martrat, B, Masi, A, Mercuri, AM, Montagna, P, Sadori, L, Schneider, A, Sicre, MA, Triantaphyllou, M, Xoplaki, E, 2016. Realising consilience: How better communication between archaeologists, historians and natural scientists can transform the study of past climate change in the Mediterranean, *Quaternary Science Reviews*, 136, 5-22. [doi.org/10.1016/j.quascirev.2015.10.038](https://doi.org/10.1016/j.quascirev.2015.10.038).

Weiberg, E, Unkel, I, Kouli, K, **Holmgren, K.**, Avramidis, P, Bonnier, A, Dibble, F, **Finné, M**, Izdebski, A, **Katrantsiotis, C**, Stocker, SR, Andwinge, M, Baika, K, **Boyd, M**, Heymann, C. 2016. The socio-environmental history of the Peloponnese during the Holocene: Towards an integrated understanding of the past, *Quaternary Science Reviews*, 136, 40-65. [doi.org/10.1016/j.quascirev.2015.10.042](https://doi.org/10.1016/j.quascirev.2015.10.042)

Ljungqvist, F.C., **Krusic, P.J.**, Sundqvist, H., Zorita, E., Brattstrom, G., Frank, D., (2016). Northern Hemisphere hydroclimatic variability over the past 12 centuries. *Nature*, vol. 532, pp. 94–98, doi:10.1038/nature17418

**Luterbacher J.**, Werner J.P., Smerdon J.E., Fernández-Donado L., González-Rouco F.J., Barriopedro D., Ljungqvist F.C., Büntgen U., Zorita E., Wagner S., Esper J., McCarroll D., Toreti A., Frank D., Jungclaus J.H., Barriendos M., Bertolin C., Bothe O., Brázdil R., Camuffo D., Dobrovolný P., Gagen M., García-Bustamante E., Ge Q., Gómez-Navarro J.J., Guiot J., Hao Z., Hegerl G.C., **Holmgren K.**, Klimenko V.V, Martín-Chivelet J., Pfister C., Roberts N., Schindler A., Schurer A., Solomina O., von Gunten L., Wahl E., Wanner H., Wetter O., **Xoplaki E.**, Yuan N., Zanchettin D., Zhang H. and **Zerefos C.**, 2016. European summer temperatures since Roman times. *Environmental Research Letters*, 11, 024001, doi: 10.1088/1748-9326/11/1/024001 <http://iopscience.iop.org/article/10.1088/1748-9326/11/2/024001>

Büntgen U., et al., (includes: **Krusic, P.J.**), (2016). Cooling and societal change during the Late Antique Little Ice Age from 536 to around 660 CE. *Nature Geoscience*, 9, 231–236, doi:10.1038/ngeo2652

Wilson, R., et al., (includes: **Krusic, P.J.**), (2016) Last millennium northern hemisphere summer temperatures from tree rings: Part I: The long term context. *Quaternary Science Reviews*, 134, 1-18. doi:10.1016/j.QSR.2015.12.005

## Education

### Courses

- **“Cultural Heritage Materials and Technologies”**  
*Masters’ course, Department of History and Archaeology, University of Peloponnese (March 5-9)*

On March 5-9, 2016 the MSc Cultural Heritage Materials and Technologies CultTech from the Department of History and Archaeology, University of Peloponnese which numbered by 18 post graduates, the program secretary V. Valantou and the program director Assoc. Prof. N. Zacharias, visited the NEO Station.



**Figure 3:** CultTech students in a group photo together with the program secretary V. Valantou and the program director Assoc. Prof. N. Zacharias.

The CultTech students had a total of 3 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 where they had valuable guidance by the NEO Station Manager. 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).



**Figure 4:** Dr. E. Gerasopoulos giving a lecture at NEO.

- **“Physical Geography”**  
*Bachelor and PhD students’ course, Stockholm University (March 18-24)*

The sixth Physical Geography course took place at NEO. Sara Cousins, Ingmar Borgström and Martin Finné were the instructors of the field course and 25 bachelor students together with 4 PhD students from Stockholm University attended the course. Topics that were covered were how different processes like tectonics, erosion, humans, etc shape the landscape and how climate change and land use processes might shape the landscape in the future. During the excursion they visited a number of sites mainly in Messinia. Among them are the Gialova/Navarino Bay area, Artemisia, Verga, Loussios River, Kapsia Cave, Mesochori, Methoni and Finikounda. The students studied different subjects e.g. tectonics, geomorphology, land use changes, erosion and deposition, forest fires, biodiversity and hydrological processes.



**Figure 5:** Lunch break on Palaiokastro



**Figure 6:** Professor Sara Cousins giving a lecture at Artemisia village (Taygetos mountain)

### Dissemination

- **Cafe-NEO**

- Vyzantino café, Patras, February 23**

The first meeting of ‘cafe-NEO’ for 2016, took place at Vyzantino café in Patra. The subject was: ***“The hidden secrets of the underworld! Peloponnesian caves as story tellers of past climate”***. The attendees had the opportunity to learn from NEO Director, Professor Karin Holmgren, and discuss with her how we can gain information on past climate changes by analyzing natural archives such as the stalagmites which grow in caves. The well attended event was co-organized together with the Laboratory of Atmospheric Physics (Physics Department, University of Patras).



**Figure 7:** Café-NEO at Vyzantino café in Patra.

- [\*1<sup>st</sup> Symposium of Tourism in Pylos\*](#)  
[\*Pylos, March 10\*](#)

Giorgos Maneas, gave a popular presentation about NEO activities at the 1<sup>st</sup> Symposium of Tourism which was held in Pylos in March. The Symposium was co-organized by local cooperations - with the support of the municipality of Pylos-Nestoros - and it was addressed to local touristic companies and hotels.

## [\*Upcoming\*](#)

### [Research](#)

- Two students from Stockholm University will visit Messinia in April in order to conduct fieldwork on burned areas found on the slopes of Taygetos Mountains. Sara Cousins is the research leader.

### [Education](#)

- The Botany course as well as the course in General Geochemistry will take place at NEO in late April and early May respectively

### [Dissemination](#)

- The *Café-NEO* meetings, organized by Navarino Environmental Observatory, will take place at several coffee shops in the Peloponnese as well as at University canteens, with a range of topics such as “Why Messinia? From Homer to Spielberg” or “How to educate your kids to respect nature

### [NEO management](#)

- NEO Steering Committee meeting will take in Athens in April 14-15
- A new NEO director Ass. Professor Hakan Berg will be appointed on April 1