

NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management

Thursday, 29 October 2019

NEO NEA #33 (July - September 2019)

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!

You can now follow us on Twitter ([@navarinoNEO](https://twitter.com/navarinoNEO)) and on Instagram ([navarinoneo](https://www.instagram.com/navarinoneo)):

Foreword

The peak summer season has passed and NEO is now entering into the busy autumn season. During the summer, some maintenance work has been carried out, for example with the water quality equipment in the Gialova lagoon, but also on the atmospheric station in Methoni. Our close collaboration with the American College of Greece also continues, and NEO has hosted three bachelor students as interns this summer. We hope to expand the internship opportunities in the future and in particular during the summer season when the station is less used for other activities. If you have interested students, please contact us to discuss such opportunities.

As the field visit season is starting up, NEO has already hosted student groups from the Justus-Liebig University of Giessen, Germany and the Department of Physical Geography, Kiel University, in addition to groups from the American College. It is excellent that NEO increasingly can serve as a host and research hub for students and researchers from across Europe and beyond.

Happy Reading!



Figure 1: Tree rings (photo: P. Schulz, O. Konter, J. Esper)

Activities

Research

- **Instrumentation and Maintenance**

NEO Atmospheric station

Researchers from Stockholm University (Radovan Krejci and Peter Tunved) and the National Observatory of Athens (Vassilis Psiloglou) visited NEO in early July to conduct a full-scale maintenance at NEO atmospheric station at Methoni.

- **Environmental monitoring**

Gialova lagoon- Water Quality Monitoring

The staff of NEO visited twice the *Water Quality Monitoring Stations* in the Gialova lagoon, in order to maintain the sensors and to check the data download process. This monitoring process has been running since 2016 and data from these stations have already been compiled in a discussion paper entitled: *Understanding coastal wetland conditions and futures by closing their hydrologic balance: the case of Gialova lagoon, Greece*, Hydrology and Earth System Sciences Discussions, no. August: 1–28. <https://doi.org/10.5194/hess-2019-382>.



Figure 2: Maintaining the sensors while kayaking in the lagoon.

Groundwater Monitoring

A supplementary monitoring focusing on groundwater at the Gialova Lagoon catchment was initiated this September. The main goal is to observe the quality and estimate quantity variations of the groundwater that ends up in the lagoon and enriches it with mineral and nutrients. The methodology consists of the following parts:

1. Field measurements from 10 wells and boreholes
2. Groundwater samplings

3. Chemical analysis
4. Import data in a GIS
5. Export concentration contribution maps

Nutrient analysis of groundwater samples will be conducted at NEO laboratory, while a water level sounder will be used in the field for measuring depth variations. A first sampling was already conducted in September. Field measurements campaigns will take place once per two months.

Related Internships

Three bachelor students, following the Environmental Studies programme at the American College of Greece (Deree), have spent almost two months at NEO (July and August) focusing on monitoring pressures at Voidokilia and Divari beaches. During their internship, Alex Galal, Philip Duzdabanian and Rana Chafez, conducted counts of cars parked on sensitive ecosystems (used as an index of human pressure), but also a full-scale mapping of wastes found in the sand dunes. As a parallel educational activity, they also participated in a field campaign for groundwater monitoring, and learned how to conduct a nutrient analysis of water samples at the NEO laboratory of NEO.



Figure 3: In situ measurements in a well.



Figure 4: Preparation of samples for chemical analysis.



Figure 5: Car counting in Divari beach.

Dendroclimatology

In September 2019, a group of dendroclimatologists from the Johannes Gutenberg University Mainz in cooperation with the Navarino Environmental Observatory conducted an excursion to Mount Smolikas in the Pindos Mountains in Northern Greece. Here, the 1075-year-old living tree “Adonis” (Konter et al., 2017, *Dendrochronologia*) is surrounded by massive living *Pinus heldreichii* trees as well as abundant relict material, which emphasizes the unique characteristics of the region within the Mediterranean. Already sampled wood material helped to establish a 1277-year-long chronology as substructure for a reconstruction of temperature extremes over the 738-2014 CE period (Klippel et al. 2018, *International Journal of*

Climatology). The aim of this years' field trip was to boost the replication of the older (medieval) part of the chronology by taking 64 additional samples of the relict material from so far untouched slopes in the area.



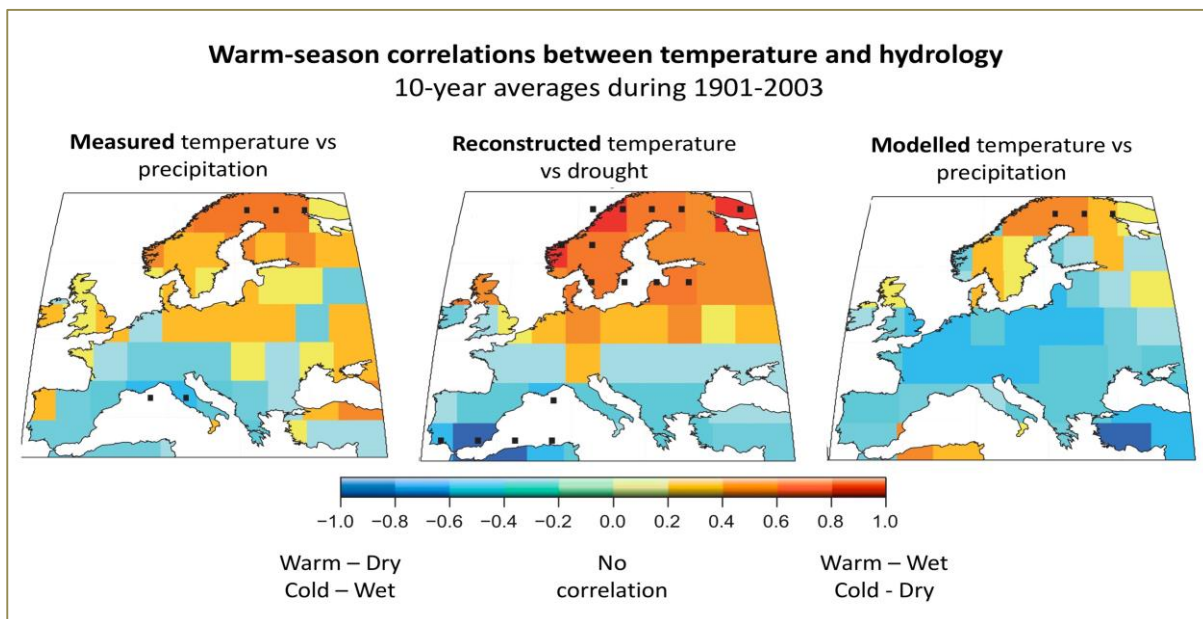
Figure 6: Landscape of Smolikas Mountain in north Greece. (photo: P. Schulz, O. Konter, J.Esper)

Research publications (NEO researchers in bold, presenters underlined>)

- *Peer reviewed journals*

NEO-relevant publications

Charpentier Ljungqvist F, Seim A, **Krusic PJ**, González-Rouco JF, Werner JP, Cook ER, Zorita E, **Luterbacher J**, **Xoplaki E**, **Destouni G**, García-Bustamante E, Melo Aguilar CA, Seftigen K, Wang J, Gagen MH, **Esper J**, Solomina O, Fleitmann D, Büntgen U, European warm-season temperature and hydroclimate since 850 CE, *Environ. Res. Lett.*, 14, 084015, 2019. <https://iopscience.iop.org/article/10.1088/1748-9326/ab2c7e>



This paper studies the relationship between warm-season temperature and hydrology around Europe (see Figure). Studying these relationships (correlations) is important, e.g., for revealing: i) possible increasing risk of droughts, with potentially severe consequences for agriculture and economy; ii) the consistency between instrumental observations and climate model results or proxy-based reconstructions (e.g., from tree rings); iii) whether the correlations are stable or change between short-term and long-term variations.

Results show that, throughout history, southern Europe has tended to become drier and northern Europe more humid in warmer climates. At the same time, current trends in summer drought so far do not fall outside the range of the natural variations of the last twelve centuries. Compared to instrumental observations, climate model results tend to exaggerate negative correlation (blue in Figure) implications of more droughts during warmer climates, especially for the central and eastern Mediterranean parts of Europe.

Education

Field Courses @ NEO

- *“Climate, climate change impacts, Greece”*

BSc and MSc course, Justus-Liebig University of Giessen, Germany (August 29 - September 2)

BSc and MSc students of the Department of Geography and the Master Studies "Mensch - Klima - PaläoUmwelt" of the Justus-Liebig-University of Giessen visited NEO at the end of August 2019. The visit took place in the frame of the project-course "Climate, Climate Change Impacts: Greece" also with the support of the German Academic Exchange Service program PROMOS.



Figure 7: A group photo on the old Meteorological Station at Methoni, studying old measurements.

The group under the guidance of Mr. Giorgos Maneas and Mr. Christos Pantazis visited many sites in the area including Gialova lagoon, Paleokastro and Methoni. The visit to the Ancient Messene was inspiring for the students and the beauty of Polilimnio and at the same time, its vulnerability due to tourism, climate and environmental change impacts increased the students concern. The students had the opportunity to learn and then to identify themselves in the interdisciplinary group discussions the challenges and opportunities that the area is facing and pointed to the need for accurately science informed policy under the already observed and even more under the future projected climate change conditions. The project course provides interdisciplinary knowledge on the climate of Greece and the Eastern Mediterranean, volcanism and impacts on climate and societies, the Mediterranean Sea circulation, palaeoproxies and palaeoclimatology, climate

reconstruction and methodologies, impacts of climate variability and change on ecosystems, hydrology and water resources, atmospheric monitoring, archaeology, plant eco-physiology. The project consists of three interrelated parts, theoretical, methodological and the field excursion. The students prepare a scientific report combining knowledge acquired from the theory and methods and knowledge obtained during the excursion.

- **“Environmental History and Environmental Archives”**

Masters’ course, Department of Physical Geography, Kiel University (September 3-7)

A group of 20 master students from the department of Physical Geography, Kiel University, Germany travelled around the Peloponnese for 2 weeks during August/September 2019. The topics of the excursion ranged from geomorphology, environmental history, karst and coastal environments, to land-use practices in past and present. During September 3-7, the group, headed by Prof. Ingmar Unkel and Prof. Hans-Rudolf Bork, stayed at NEO. The focus of these 4 days in Messinia was on coastal processes, coastal morphology, and the development of coastal landforms over time. In collaboration with Prof. Konstantinos Athanassas from NTUA Athens, the students were introduced to the tectonic processes influencing the coast around Navarino during Quaternary times, creating uplift, beach rocks and terraces. On a tour along the Gialova lagoon, NEO manager Giorgos Maneas explained the development of the lagoon and current approaches on how to manage the human impact on the lagoon. The stay at NEO was the final part of the entire field trip, hence the students took the opportunity of a wrap-up meeting in the NEO seminar room to discuss the experiences and "lessons learned".



Figure 8: A group photo on Romanos beach.

Dissemination

- **“Environmental Studies”**

American College of Greece (July 4-6, August 17-19)

During summer of 2019 a research group of 20 American College of Greece students were accommodated at the NEO facilities under a collaborative scope of research projects centred on key aspects of ecosystems management and monitoring.

NEO management

- ✓ A NEO Steering Committee Skype meeting was held on 16th of September.

Upcoming

Education

- A group of students from Värmdö Gymnasium, Sweden, will visit NEO in middle October as part of their field excursions.

Workshops

- Participants in the LTER-GR (Long Term Ecological Monitoring network) will meet at NEO in December for a two days' workshop.