

# NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management

Friday, 21 May 2021

## NEO NEA #36 (October 2020 - April 2021)

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

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### Foreword

The fall and spring period at NEO station is typically full of visiting students and researchers, as this has been the most popular season for field courses and workshops so far. Nevertheless, under current corona pandemic situation, most of the visits have either been postponed to take place during autumn 2021 or turned into virtual visits. An exception to the above was the field campaign in Gialova wetland, which took place in March 2021 as part of the Gialova project, following the necessary protocols for such activities.



**Figure 1:** Spring sunset at Ionian Sea, just outside NEO's atmospheric station at Methoni.

## Activities

### Environmental Observations

#### *NEO Atmospheric station*

A milestone for the NEO atmospheric research group was the publication of a scientific article entitled: “*The atmospheric aerosol over western Greece - Six years of aerosol observations at the Navarino Environmental Observatory*”<sup>1</sup>. To address the air quality problems as a consequence of high population density in the study area, the paper evaluates the long-term observations (6 years) of key atmospheric aerosol features in the area, identifies long-distance transported aerosol sources and explains the aerosol variability observed considering the influence from local sources in space and time.



**Figure 2:** Maintenance work on the Differential Mobility Particle Size analyzer by Christos Pantazis.

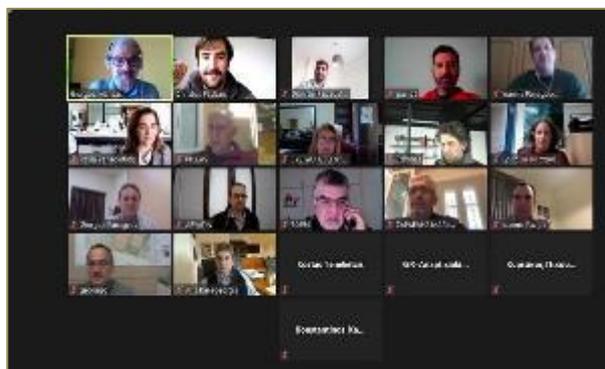
### Research projects

#### *COASTAL EU project*

Under the umbrella of the COASTAL<sup>2</sup> EU project, NEO in collaboration with HCMR (Hellenic Centre of Marine Research) hosted the second Multi-Actor Laboratory (MAL) workshop with local and regional stakeholder participants from Messinia, on March 1, 2021 (Figure 3).

The workshop brought together representatives from key economic sectors of the region and had a two-fold aim: (a) To present the operational System Dynamics (SD) models for the Messinia case study, and ask the MAL participants to validate the structure and the behaviour of the model, and (b) to identify within the

MAL the business opportunities and the policy recommendations which could support the transition to a “*Sustainable Messinia*”, a stakeholder-drawn vision which was co-created during the first MAL meeting on June 26, 2019. The meeting outcomes will be further analysed by the researchers involved using the developed SD models and will be presented to stakeholders for further validation in future meetings.



**Figure 3:** Participants at the second Multi-Actor Laboratory (MAL) workshop which was held online on March 1, 2021.

<sup>1</sup> Hansson, H.-C., Tunved, P., Krejci, R., Freud, E., Kalivitis, N., Hennig, T., Manes, G., Gerasopoulos, E. 2021. The Atmospheric Aerosol over Western Greece-Six Years of Aerosol Observations at the Navarino Environmental Observatory. Atmosphere (MDPI). 12(4), 445. <https://doi.org/10.3390/atmos12040445>

<sup>2</sup> <https://h2020-coastal.eu/>

### *The Gialova-project*

Under the Gialova project, NEO team has focused on **upgrading the monitoring network within and around the Gialova wetland**, with the support and expertise of a specialized company. The work started on March, and gradually the updated NEO monitoring network will cover the wetland and the surrounding catchment area, and will provide robust, continuous and open data and measurements on water quality. When completed, the monitoring network will consist of two meteorological stations (measuring precipitation, temperature, wind speed and direction, and solar radiation), four stations in transitional waters (monitoring conductivity, temperature, depth, dissolved oxygen, redox potential, pH) and four groundwater stations (monitoring conductivity, temperature, depth). Apart from the installation of the automatic stations monitoring network, researchers from NEO and HCMR initiated a series of **new sampling campaigns**, aiming to collect sediment and water samples for further laboratorial analysis.



**Figure 4:** Top pictures: Installation of a new meteorological station with the support of the technical staff of Scient-Act. Middle pictures: Installation of new multi-parameter instrument at the wetlands of Gialova, with the support of colleagues from the Hellenic Centre of Marine Research. Bottom picture: Sampling of material for benthic analysis.

The generated data, will be used to support future decision-making processes to improve hydrological, environmental and ecological conditions, as well as to enhance various ecosystem services on the Gialova wetland landscape. Such data will also support future research projects and students' thesis conducted at NEO.

## Research publications (NEO researchers in bold)

- Ferreira, C., Kalantari, Z.,** Pereira, P., (2021). Liveable cities: Current environmental challenges and paths to urban sustainability. *Journal of Environmental Management*, 227, 111458. DOI:10.1016/j.jenvman.2020.111458 <https://www.sciencedirect.com/science/article/pii/S03014797>.
- Hansson, H.-C.; Tunved, P.; Krejci, R.;** Freud, E.; **Kalivitis, N.; Hennig, T.; Maneas, G.; Gerasopoulos, E.** (2021). The Atmospheric Aerosol over Western Greece-Six Years of Aerosol Observations at the Navarino Environmental Observatory. *Atmosphere* 2021, 12, 445. <https://doi.org/10.3390/atmos12040445>.
- Kreplin, H.N., **Ferreira, C.S.S., Destouni, G.,** Keesstra, S.D., Salvati, L., **Kalantari, Z.** (2021). Arctic wetland system dynamics under warming. *WIREs Water*, in press. DOI: 10.1002/wat2.1526.
- Maneas G,** Bousbouras D, Norrby V and **Berg H** (2020). Status and Distribution of Waterbirds in a Natura 2000 Area: The Case of Gialova Lagoon, Messinia, Greece. *Front. Ecol. Evol.* 8:501548. <https://www.frontiersin.org/articles/10.3389/fevo.2020.501548/full>.
- Maniatakou, S., Berg, H., Maneas, G.,** and Daw, T. M. (2020). Unravelling diverse values of ecosystem services: a socio-cultural valuation using Q methodology in Messenia, Greece. *Sustainability* 12:10320. doi: 10.3390/su122410320. <https://www.mdpi.com/2071-1050/12/24/10320/htm>.
- Solomon, M.K., **Ferreira, C.S.S.,** Eremija, S., Tošić, R., Lazović, N., Češljarić, G. (2021). Long-term fire effects on vegetation and topsoil properties in beech forests of Manjaca Mountain (Western of Bosnia and Herzegovina). *International Journal of Wildland Fire*. <https://doi.org/10.1071/WF20111> and doi:10.1071/WF20111\_AC.
- Stengård, E., Räsänen, A., **Ferreira, C.S.S., Kalantari, Z.** (2020). Inventory and Connectivity Assessment of Wetlands in Northern Landscapes with a Depression-Based DEM Method. *Water* 2020, 12, 3355. DOI:10.3390/w12123355. <https://www.mdpi.com/2073-4441/12/12/3355>.
- Telak, L.J., Pereira, P., **Ferreira, C.S.S.,** Filipovic, V., Filipovic, L., Bogunovic, I. (2020). Short-Term Impact of Tillage on Soil and the Hydrological Response within a Fig (*Ficus Carica*) Orchard in Croatia. *Water*, 12, 3295. DOI:10.3390/w12113295. <https://www.mdpi.com/2073-4441/12/11/3295>.

## NEO participation at EGU General Assembly 2021

- Bogunovic I., Telak L.J., Dugan I., **Ferreira, C.S.S.,** Pereira P. Tillage-induced management impact on soil properties and initial soil erosion in degraded calcareous soils in Mediterranean fig orchard. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-1309>.
- Boulet A.K., Alarcão C., **Ferreira C.,** Veiga A., Campos L., Ferreira A., Hessel R. Introduction of legume cover crops practice in intensive grain corn crop system to mitigate soil threats in the Mediterranean region. Virtual European Geoscience Union General Assembly (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-6199>.
- Dudnikova T., Minkina T., Vasilyeva G., Bauer T., Barakhov A., Sushkova S., Pinskii D., Mazarji M., **Ferreira C.S.S.** Comparative sorption of benzo[a]pyrene by soil and carbonaceous adsorbents. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-15977>.
- Ferreira, C.S.S., Seifollahi-Aghmiuni, S., Destouni, G.,** Solomon, M.K., Ghajarnia, N., Ferreira, A.J.D., **Kalantari, Z.** Status, processes, and drivers of soil degradation in the Mediterranean region. Virtual European Geoscience Union General Assembly (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-10093>.
- Ghajarnia, N., **Kalantari, Z., Destouni, G.** Is large-scale terrestrial hydrological cycling well represented in Earth System Models? Virtual European Geoscience Union (vEGU), April 2021. <https://doi.org/10.5194/egusphere-egu21-5332>
- Isaka S., Hendrychová M., Campos I., Bastos A.K., Pelayo O.G., Caetano A., Abrantes N., Martins M., Jongen M., **Ferreira C.S.S.,** Verheijen F. Can biochar restore soil quality in a degraded forest and vineyard soil in a one-year percolation lysimeter study, in Portugal? Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-10400>.
- Klíč R., **Ferreira C.S.S.,** Ferreira A., Kravka M. Comparison of water-stable aggregates on different soil types and land-uses in a Portuguese Mediterranean catchment. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-1787>.
- Maneas G.,** Kastanidi E., Panagopoulos Y., **Berg H., Manzoni S.,** De Kok JL, Viaene P. Systems-Dynamic modelling for salinity restoration in wetlands. The case of SW Messinia, Greece. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-16165>.
- Pinto, L.V., **Ferreira, C.S.S.,** Pereira, P. Environmental and socio-economic factors influencing the use of urban parks in Coimbra (Portugal). Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-1042>.

Seifollahi-Aghmiuni, S., Kalantari, Z., and Destouni, G. Use of co-created causal loop diagrams and fuzzy-cognitive scenario analysis for water quality management. Virtual European Geoscience Union (vEGU), April 2021. <https://doi.org/10.5194/egusphere-egu21-5210>.

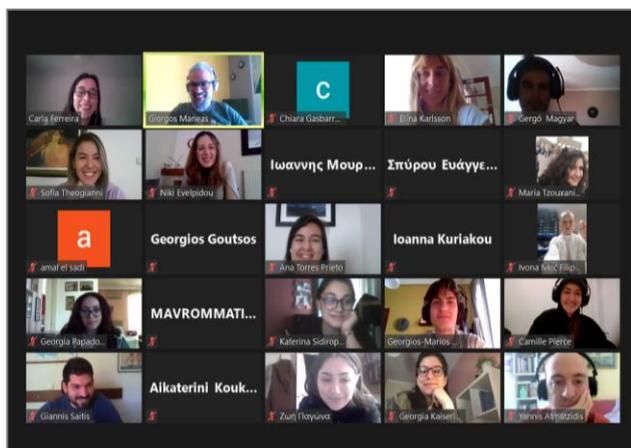
Solomun M.K., Ferreira, C.S.S., Ristić R., Kalantari Z., Rahmati O. Nature-based solution for ecosystem restoration in Southern Europe. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-3908>.

Walsh R.P.D., Ferreira C.S.S., Blake W. H., Higon S., Ferreira A.J.D. Multi-fractional sediment fingerprinting in monitoring sediment sources in a peri-urban Portuguese catchment. Virtual European Geoscience Union (vEGU), April 2021, <https://doi.org/10.5194/egusphere-egu21-16224>.

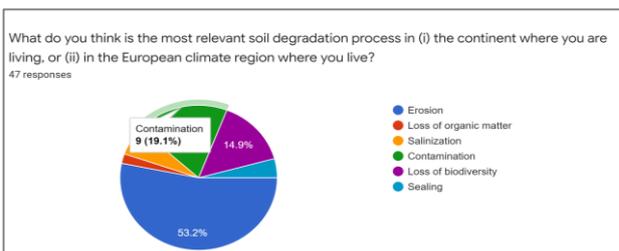
## Education

### *CIVIS PhD network in SOLID EARTH SYSTEM DYNAMICS*

NEO team has prepared a **virtual fieldtrip to Navarino Bay** which was carried out on 21<sup>st</sup> April 2021, under a series of online virtual field trips on Geomorphology and Quaternary Geology. The course was developed under the CIVIS framework, as a collaboration between the National and Kapodistrian University of Athens, Aix Marseille University, Stockholm University - Navarino Environmental Observatory (NEO) and Universidad Autónoma de Madrid. The course was already included in the NEO dissemination strategy (put into action in 2021), and it also aimed at further communication of NEO and its activities and research, in addition to educational purposes.



The online course was open to **Bachelor, Master and PhD students** with a background on geology, geomorphology, natural and environmental sciences, and was followed by almost 80 students from Europe and America.



**Figure 5:** Left picture: NEO team (Carla Ferreira and Giorgos Maneas) e-welcoming the students at the “Virtual field trip to Navarino Bay”. Right picture: An example of an online poll answered by students during the course.

During the Navarino field trip the students had the opportunity to learn about the geomorphological processes which have led to the formation of the area, but also discuss about water management, land degradation, ecosystem restoration, and the impacts of socio-economic developments in lights of the ongoing and projected hydro-climate and societal changes.

## Outreach

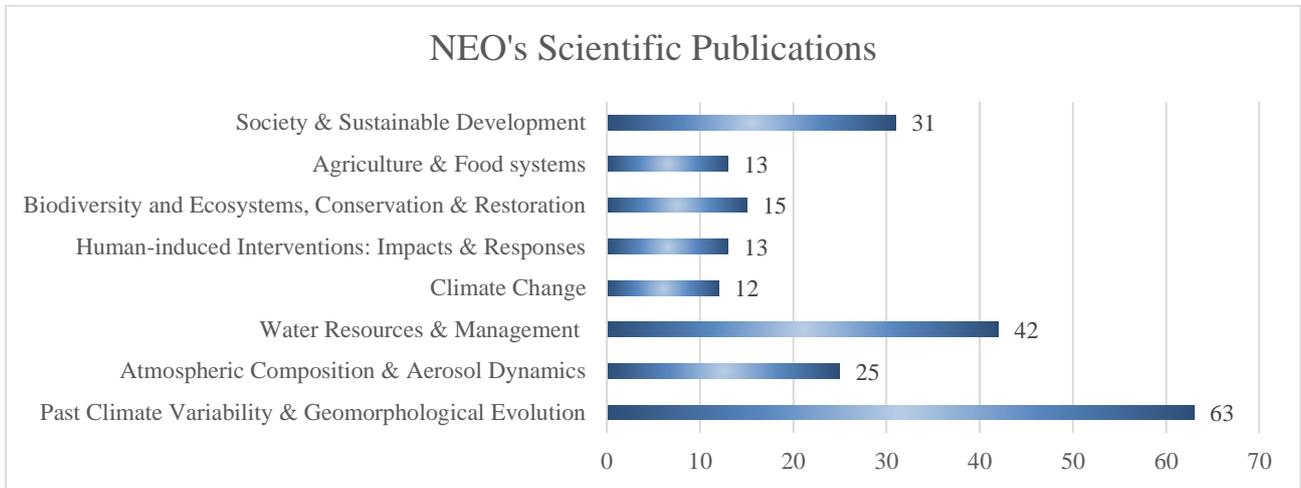
### *Filming*

As part of the NEO dissemination strategy, the repository with video archives from past NEO activities is gradually updated with new material filmed with drone, as well as interviews with stakeholders. The new material will be used for the production of an introductory film to better present NEO, its activities and future visions, and support the involvement of various target groups in NEO. More information is regularly posted on our social media accounts on Facebook and Twitter!

### *NEO website*

NEO website is under significant and continuous development. A new way for the dissemination of NEO research is now available at <https://www.navarinoneo.se/> (under ‘Research’). The current clustering of NEO’s scientific research has been inspired by the defined themes on Missions and Research and Innovation

prioritized in Horizon Europe, which was adapted to fit NEO research topics. That provides new insights on the extent of NEO research and better linkages to current publication themes (Figure 6). The work is now focusing on the development of a new online service, such as the provision of open access data from the NEO's Gialova Lagoon Monitoring Network (GLMN). For more information please stay tuned to our social media accounts on Facebook and Twitter!



**Figure 6:** Clustering NEO's scientific publications according to the specified research topics inspired by Missions and Research and Innovation prioritized in Horizon Europe.