NAVARINO ENVIRONMENTAL OBSERVATORY

NEO Management Friday, 31 October 2014

NEO NEA #14 (July - September, 2014)

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

Greetings from NEO! Another three months have passed in the history of NEO. Apart from activities taking place at the NEO station, in the field and in researchers' offices, Giorgos has visited his employer, Stockholm University, for meetings and skills development. We visited the Tarfala Research Station in the Kebnekaise Mountain, for the exchange of ideas between the two research stations and to learn from each other.

Figure 1: *The NEO management visiting Tarfala research Station. Photo courtesy: Ninis Rosqvist*

Activities

Research

- **Atmospheric aerosol observations at NEO**

Observations of atmospheric aerosol properties at NEO entered 3rd year. Since autumn 2013 the measurements of aerosol number concentration, size distribution, aerosol light absorption and scattering are carried out at Helenic Meteorological Service station at Methoni Available data for first two years show a repeating annual cycle of aerosol properrties with clearly visible late autumn and winter effect of agricultural fires associated with olive harvest, summer stable aerosol properties influenced by long range transport from Adriatic Sea (Po Valley region), Eatern Europe, mainly Ukraine, and western most Turkey (Istanbul area). On a local scale there is a clear diurnal pattern linked to sea breeze circulation which mix long-range transported aerosol with local air pollution. Highest aerosol concentrations are observed during early morning and early evening hours due to effect of local sources, while during the day and night the aerosol properties reflect more of regional background. The aerosol measurements at Methoni will continue as well as work on securing future continuation of the joint work between Stockholm University, Academy of Athens, University in Heraklion and University in Patras under umbrella of NEO.

- **Measuring carbon fluxes associated with subduction along the plate boundary south of the Peloponnese**

This study, which is undertaken by PhD student Barbara Kleine is in its final stages. Based on numerical modelling of carbonation reactions preserved in rocks on Syros, Barbara has shown that carbon fluxes along fault zones are 100-2000 times greater than background carbon fluxes in this area. She is currently estimating absolute values for these fluxes from uniquely preserved ancient fluid flow channels also on Syros. Barbara Kleine will defend her thesis in the spring of 2015.

Figure 2: Ancient fluid flow channels, Syros, Greece

- **Earthquake hazard assessment in the Peloponnese**

Work on determining how often earthquakes occur on major faults in the Peloponnese is ongoing. The group have examined well-exposed faults near Sparta, Kalamata and on the Mani Peninsula, where major earthquakes have occurred recently (1986, Kalamata) and in the historical past (464 BC, Sparta). Their longer term vision with this work is to be able to contribute to earthquake hazard assessments in the Peloponnese area.

- **Cave work in Alepotrypa, July 2014**

In July 2014, Meighan Boyd, Karin Holmgren, Giorgos Maneas, and Giorgos Kosmopoulos joined the summer archaeological excavation season at Alepotrypa Cave under the guidance of Anastasia Papathanasiou and Panagiotis (Takis) Karkanas for field work. This was an opportunity for the speleothem research section to update the rest of the Diros Project team on progress and also discuss methodology and application of the speleothem records to the other research angles of the project. Field work in the cave included water sampling, CO2, humidity, and temperature measurements at sample sites, and the sampling of two additional speleothems. These speleothems appear to include material deposited during the time of human occupation, evidenced by very dark layers completely absent from most other speleothems collected, though this must be confirmed with U-Th dating. The focus of Meighan Boyd over the next months will be on producing more U-Th dates and performing trace element analysis of the speleothems using advanced laser ablation techniques.

Figure 3: Meighan Boyd coming out from a narrow opening in Alepotrypa cave

- **Analysis of werland sediments**

Christos Kantrantsiotis is currently analyzing a 7.5 m long sediment core retrieved from the drained fen of Agios Floros, at the northern banks of the ancient River Pamisos in the Messenian plain, SW Peloponnese. The main goal is to study the Holocene environmental and climate changes in one of the richest agricultural and most densely populated areas of the ancient Greek world. A specific aim is to test the hypothesis of an extended period of drought c. 1250 BC which might have led to the abandonment of the nearby settlement, Ancient Thouria. The diatom-based paleo-environmental record, analysed so far, shows the existence of a former water body which underwent fluctuations from marshy to deep water conditions and open water environments between 5300 and 5700 cal yrs BP. A paper is scheduled to be submitted for publication until the end of this year. The group will continue with pollen analysis of the Agios Floros sediment and on multiproxy-analyses on a sediment core retrieved from Gialova Lagoon. In addition, they will perform recurring visit to continue coring in Gialova lagoon and the surrounding area scheduled for the upcoming spring.

- **The Prophet once again, September 2014**

In Septemeber, NEO researchers Johan Kleman and Ingmar borgström, together with station manager Giorgos Maneas, ascended the Prophet Elias (2407m), the highest point of the Taygetos Mts and Peloponese. The visit is part of an ongoing research project on the long-term tectonic and geomorphologic evolution of the Taygetos Mountains and the Mani Peninsula. Targets for the fieldwork investigation were an ancient high elevation valley immediately north of the summit and the large north-facing glacial cirque (steep valleyhead) which contains numerous moraines built by glaciers that existed 15 – 20.000 years ago.

Figure 4: The view from the summit. To the left lays the Lakonian bay while in the middle is Mani Peninsula. At the Messinian Bay side (right) a perfect shadow pyramid is shaped!

Sleeping in the open at 2.200 m elevation the team also experienced a close-up visit by 8-10 startled wild boars who wondered what strangers did in the night on “their” mountain!

Figure 5: Happy NEO Researchers on the top of Taygetos Mountain.

Education

Courses

- ***“"Climate, Climate Change Impacts: Greece"”***
  Master students’ course, Justus-Liebig University of Giessen (September 26-30)

In the frame of the project-course "Climate, Climate Change Impacts: Greece", BSc, MSc students and postdoctoral researchers of the Department of Geography at the Justus-Liebig University of Giessen, Germany, visited NEO from 26-30 September 2014. This was the second visit of the partner group to NEO and has being established in the Geography studies curriculum. The project course is aiming at providing interdisciplinary knowledge on the climate of Greece and the Eastern Mediterranean, volcanism and impacts on climate and societies, the Mediterranean Sea circulation, palaeoproxies, 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 a field excursion. The students prepare a scientific report combining knowledge acquired from the theory and methods and knowledge obtained during the excursion. The group of geographers visited the sites of Gialova lagoon, Paleokastro and Archaia Messini, the Taygetos Mountain and the Polilimio site under the guidance of Mr. Giorgos Maneas.

Figure 6: Students and teachers from the Justus-Liebig University of Giessen, Germany.

Dissemination

- ***Peer Review Scientific Publications***

Klein J, Ekstedt K, Walter MT, Lyon S, Modeling potential water resource impacts of Mediterranean tourism in a changing climate, Environmental Modeling & Assessment, final paper published online June 2014, http://link.springer.com/article/10.1007/s10666-014-9418-2

Barbara I. Kleine, Alasdair D. L. Skelton, Benjamin Huet and Iain K. Pitcairn (2014). Preservation of Blueschist-facies Minerals along a Shear Zone by CoupledMetasomatism and Fast-flowing CO2-bearing Fluids Journal of Petrology vol 55 no 10 pp 1905-1939, doi:10.1093/petrology/egu045.

- ***Conference proceedings***

Boyd, M. et al, Septemeber 2014: ITRAX XRF and colour intensity analysis on modern and mid-holocene Greek speleothems. Karst Record conference, Melbourne, Australia.

- ***Interviews***
  NEO station, September 23 and 24

Giorgos Maneas gave an interview to Mikael Persson a Swedish journalist (Vagabond) about NEO and its activities in research, education and dissemination of science. One day before, Giorgos met with a Greek freelancer journalist and had the same discussion about NEO.

- ***NEO at Researchers night***
  Pylos, September 26

Researcher's night is a celebration for science and research organized annually in more than 300 cities around Europe. In Greece, it was organized by the National Center for Scientific Research "DEMOKRITOS" in 9 cities, among them Pylos. NEO participated with several posters highlighting our research, video projection and an astronomy event. Moreover, we had a small exhibition with cave field-work equipment.

Figure 7: NEO exhibition setup at Researcher's Night 2014.

- ***Astronomy nights,***
  Costa Navarino, summer 2014

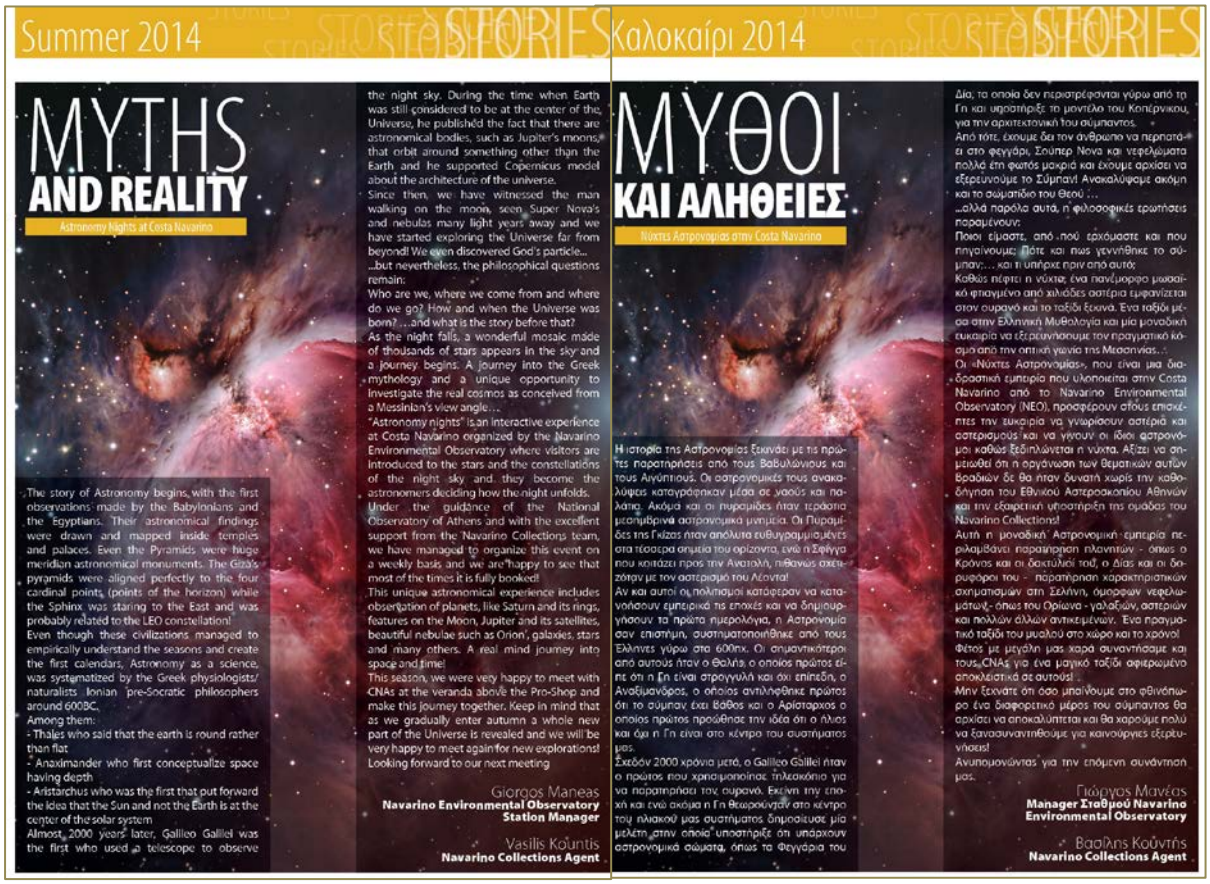
"Astronomy nights" is an interactive experience at Costa Navarino organized by the Navarino Environmental Observatory where visitors are introduced to the stars and the constellations of the night sky and they become the astronomers deciding how the night unfolds.

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 most of the times it is fully booked!

This September, the telescope 'travelled' to Pylos where visitors during Researcher's Night had the opportunity to learn and observe stars and constellations visible from Messinia !

Figure 7: Visitors during Researcher's night were introduced to stars and constellations visible from Messinia.

Moreover, a story entitled 'Myths and reality' about Astronomy was published in the CNA's Magazine 'Stories'



Summer 2014

STORIES

MYTHS AND REALITY

Astronomy Nights at Costa Navarino

The story of Astronomy begins with the first observations made by the Babylonians and the Egyptians. Their astronomical findings were drawn and mapped inside temples and palaces. Even the Pyramids were huge meridian astronomical monuments. The Giza's pyramids were aligned perfectly to the four cardinal points, (points of the horizon) while the Sphinx was staring to the East and was probably related to the LEO constellation!

Even though these civilizations managed to empirically understand the seasons and create the first calendars, Astronomy as a science, was systematized by the Greek physiologists/ naturalists Ionian pre-Socratic philosophers around 600BC.

Among them:

- Thales who said that the earth is round rather than flat
- Anaximander who first conceptualize space having depth
- Aristarchus who was the first that put forward the idea that the Sun and not the Earth is at the center of the solar system

Almost 2000 years later, Galileo Galilei was the first who used a telescope to observe the night sky. During the time when Earth was still considered to be at the center of the, Universe, he published the fact that there are astronomical bodies, such as Jupiter's moons, that orbit around something other than the Earth and he supported Copernicus model about the architecture of the universe.

Since then, we have witnessed the man walking on the moon, seen Super Nova's and nebulas many light years away and we have started exploring the Universe far from beyond! We even discovered God's particle...

...but nevertheless, the philosophical questions remain:

Who are we, where we come from and where do we go? How and when the Universe was born? ... and what is the story before that?

As the night falls, a wonderful mosaic made of thousands of stars appears in the sky and a journey begins. A journey into the Greek mythology and a unique opportunity to investigate the real cosmos as conceived from a Messinian's view angle...

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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 most of the times it is fully booked!

This unique astronomical experience includes observation of planets, like Saturn and its rings, features on the Moon, Jupiter and its satellites, beautiful nebulae such as Orion', galaxies, stars and many others. A real mind journey into space and time!

This season, we were very happy to meet with CNAs at the veranda above the Pro-Shop and make this journey together. Keep in mind that as we gradually enter autumn a whole new part of the Universe is revealed and we will be very happy to meet again for new explorations!

Looking forward to our next meeting

Giorgos Maneas
Navarino Environmental Observatory Station Manager

Vasilis Koúntis
Navarino Collections Agent

Καλοκαίρι 2014

STORIES

ΜΥΘΟΙ ΚΑΙ ΑΛΗΘΕΙΕΣ

Νύχτες Αστρονομίας στην Costa Navarino

Η ιστορία της Αστρονομίας ξεκινάει με τις πρώτες παρατηρήσεις από τους Βαβυλώνιους και τους Αιγύπτιους. Οι αστρονομικές τους ανακαλύψεις καταγράφηκαν μέσα σε ναούς και παλάτια. Ακόμα και οι πυραμίδες ήταν τεράστια μεσημβρινά αστρονομικά μνημεία. Οι Πυραμίδες της Γκίζας ήταν απόλυτα ευθυγραμμισμένες στα τέσσερα σημεία του ορίζοντα, ενώ η Σφίγγα που κοιτάζει προς την Ανατολή, πιθανώς σχετιζόταν με τον αστερισμό του Λέοντα!

Αν και αυτοί οι πολιτισμοί κατόρθωναν να κατανοήσουν εμπειρικά τις εποχές και να δημιουργήσουν τα πρώτα ημερολόγια, η Αστρονομία σαν επιστήμη, συστηματοποιήθηκε από τους Έλληνες γύρω στα 600πχ. Οι σημαντικότεροι από αυτούς ήταν ο Θαλής ο οποίος πρώτος είπε ότι η Γη είναι στρογγυλή και όχι επίπεδη, ο Αναξίμανδρος, ο οποίος αντιλήφθηκε πρώτος ότι το σύμπαν έχει βάθος και ο Αρίσταρχος ο οποίος πρώτος προώθησε την ιδέα ότι ο Ήλιος και όχι η Γη είναι στο κέντρο του συστήματος μας.

Σχεδόν 2000 χρόνια μετά, ο Galileo Galilei ήταν ο πρώτος που χρησιμοποίησε τηλεσκόπιο για να παρατηρήσει τους ουρανούς. Εκείνη την εποχή και ενώ ακόμα η Γη θεωρούνταν στο κέντρο του ηλιακού μας συστήματος δημοσίευσε μία μελέτη „στην οποία" υποστήριξε ότι υπάρχουν αστρονομικά σώματα, όπως τα Φεγγάρια του Δία, τα οποία δεν περιστρέφονται γύρω από τη Γη και υποστήριξε το μοντέλο του Κοπέρνικου, για την αρχιτεκτονική του σύμπαντος.

Από τότε, έχουμε δει τον άνθρωπο να περπατάει στο φεγγάρι, Σούπερ Νόβα και νεφελώματα πολλά έτη φωτός μακριά και έχουμε αρχίσει να εξερευνούμε το Σύμπαν! Ανακαλύψαμε ακόμη και το σωματίδιο του Θεού ...

...αλλά παρόλα αυτά, η φιλοσοφικές ερωτήσεις παραμένουν:

Ποιοι είμαστε, από πού έρχόμαστε και που πηγαίνουμε; Πότε και πως γεννήθηκε το σύμπαν;... και τι υπήρχε πριν από αυτό;

Καθώς πέφτει η νύχτα; ένα πανέμορφο μωσαϊκό φτιαγμένο από χιλιάδες αστέρια εμφανίζεται στον ουρανό και το ταξίδι ξεκινά. Ένα ταξίδι μέσα στην Ελληνική Μυθολογία και μία μοναδική ευκαιρία να εξερευνήσουμε τον πραγματικό κόσμο από την οπτική γωνία της Μεσσηνίας...

Οι «Νύχτες Αστρονομίας», που είναι μια διαδραστική εμπειρία που υλοποιείται στην Costa Navarino από το Navarino Environmental Observatory (NEO), προσφέρουν στους επισκέπτες την ευκαιρία να γνωρίσουν αστέρια και αστερισμούς και να μάθουν οι ίδιοι αστρονόμοι καθώς ξεδιπλώνεται η νύχτα. Αξίζει να σημειωθεί ότι η οργάνωση των θεματικών αυτών βραδιών δε θα ήταν δυνατή χωρίς την καθοδήγηση του Εθνικού Αστεροσκοπείου Αθηνών και την εξαιρετική υποστήριξη της ομάδας του Navarino Collections!

Αυτή η μοναδική Αστρονομική εμπειρία περιλαμβάνει παρατήρηση πλανητών - όπως ο Κρόνος και οι δακτύλιοί του, ο Δίας και οι δορυφόροι του - παρατήρηση χαρακτηριστικών σχηματισμών στη Σελήνη, όμορφων νεφελωμάτων - όπως του Ωρίωνα - γαλαξιών, αστεριών και πολλών άλλων αντικειμένων. Ένα πραγματικό ταξίδι του μυαλού στο χώρο και το χρόνο!

Φέτος με μεγάλη μας χαρά συναντήσαμε και τους CNAς για ένα μαγικό ταξίδι αφιερωμένο αποκλειστικά σε αυτούς!

Μην ξεχνάτε ότι όσο μπαίνουμε στο φθινόπωρο ένα διαφορετικό μέρος του σύμπαντος θα αρχίσει να αποκαλύπτεται και θα χαρούμε πολύ να ξανασυναντηθούμε για καινούργιες εξερευνήσεις!

Ανυπομονώντας για την επόμενη συνάντησή μας.

Γιώργος Μανέας
Manager Σταθμού Navarino Environmental Observatory

Βασίλης Κούντής
Navarino Collections Agent

Figure 7: An article about astronomy and 'Astronomy nights' event held at Costa navarino.

Upcoming

Research

- On the 14 November, Martin Finné will defend his thesis titled: Climate in the eastern Mediterranean during the Holocene and beyond – A Peloponnesian perspective. The nailing ceremony at the Department of Physical Geography and Quaternary Geology will be on October 22.

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 October 4-11 for a second time. The specialization course is aimed at third year students attending the natural science programme with a global perspective, and the course theme is "***Natural disasters form a natural- and social science perspective***". The visit to NEO is highly appreciated, and the week will include visits to geological, biological as well as historical sights of interest. The purpose of the week is to give the students more understanding of how the landscape is shaped through geological processes and what effect these processes have on biological systems.
- A PhD excursion from Stockholm University will take place at the end of October 2014. The students will visit sites of interest in Peloponnese focusing in Geology and Marine Geology. During their stay they will also visit HCMR (Hellenic Centre of Marine Research) premises for a half day seminar.
- The 2nd master course, on "***Water management issues from a social science and management perspective***", will be held at NEO in November 2014.
- The 3rd training course in Air Pollution for undergraduate students from the Physics Department of the University of Patras, Greece will take place in December at NEO. The training course is developed by Assistant Professor Andreas Kazantzidis (Laboratory of Atmospheric Physics, Physics Department, University of Patras, Greece).

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 film, '***Natural archives reveal climate history and more...***' will be shown at the 4th ARCH_RNT Symposium which will be held in Kalamata, at the University of Peloponnese this October 1-3. Giorgos Maneas will also present the Preliminary results from our research related to Palaioenvironmental Reconstruction of SW Peloponnese. The Symposium is organized by the Laboratory of Archaeometry, Department of History, Archaeology and Cultural Resources Management, University of the Peloponnese led by Ass. Professor Nikos Zacharias

NEO management

The next Steering Committee meeting will be held at NEO station on October 13. Among the subjects that will be discussed is the new agreement between the parties for the period 2015-2019.