



PANhellenic Infrastructure for the study of Atmospheric composition and climate Change -PANACEA

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<https://panacea-ri.gr>

- * **Thematic Area RIS:**
 - * Environment and Sustainable Development
- * **PANACEA (MIS 5021516)**
- * **Coordinator:** University of Crete
- * **Total 14 partners**
- * **Public Expenditure:** 3.999.950 €
- * **Starting date:** 03/09/2018
- * **Ending date:** 02/10/2022
- * **Duration:** 49 months



Co-financed by Greece and the European Union

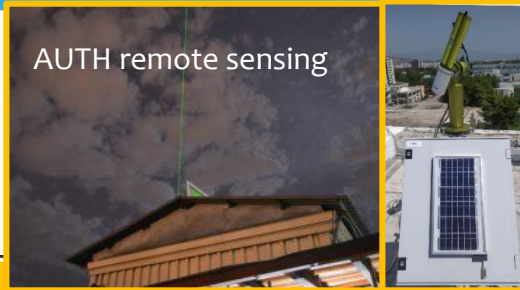
PANACEA = Distributed Research Infrastructure



Helmos –NCSR-D
free tropospheric station



AUTH remote sensing



- ❖ In-situ observations (Finokalia, Athens, Helmos, Antikythera)
- ❖ Remote sensing - Lidar, DOAS (Thessaloniki, Athens, Antikythera, mobile)
- ❖ Reaction chamber (Patras)
- ❖ Mobile laboratories (Athens, Patras)
- ❖ Numerical modelling

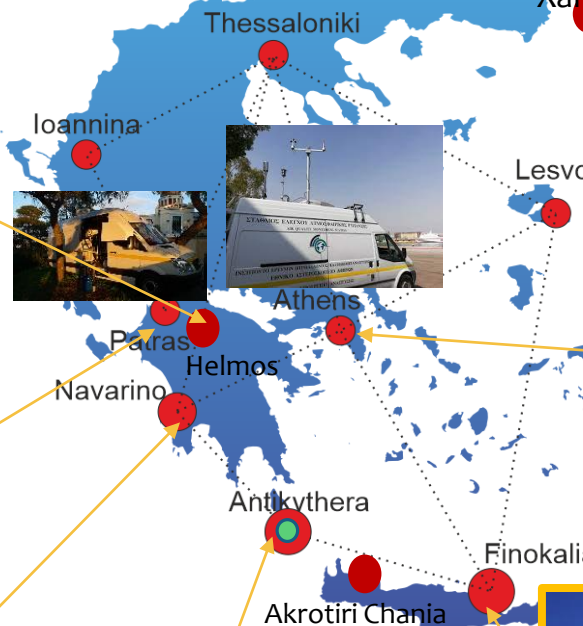


ICE-HT-FORTH



Costa
Navarino
(NEO)- IIBEEA

PANGAEA-NOA
monitoring station
26M€ investment EIB



DEM-Athens –
NCSR-D



suburban
monitoring station

Thissio-Athens –NOA



urban background station

Finokalia- UOC since 1993
Regional background station



NTUA –Athens
elastic Raman
lidar



Aristotle University of Thessaloniki

Democritus University of Thrace

National and Kapodistrian University of Athens

Biomedical Research Foundation-National Academy of Athens

University of the Aegean

National Technical University of Athens

Hellenic Center for Marine Research

University of Crete

Technical University of Crete

University of Patras

Institute of Chemical Engineering-Foundation for Research and Technology

National Observatory of Athens

NCSR-Demokritos

University of Ioannina

PANACEA

Governance inspired from ACTRIS

Coordinator

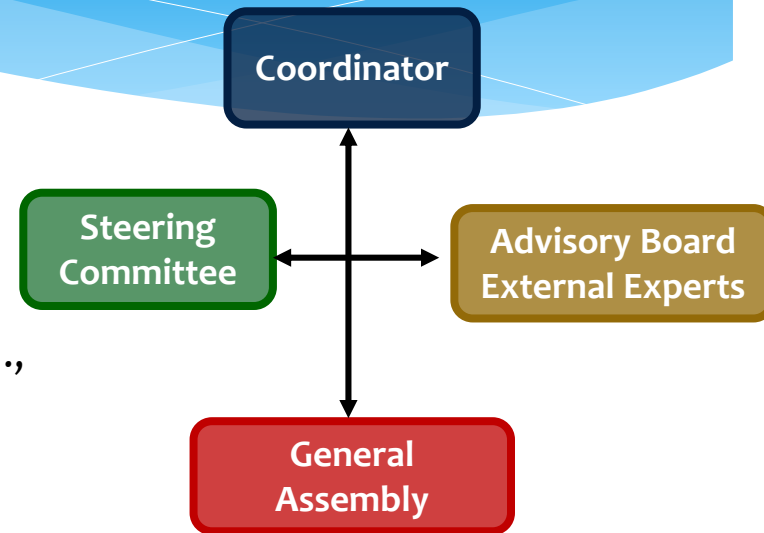
Coordinator: Mihalopoulos Nikos, Deputy Coordinator: Kanakidou Maria, Manager: Tzitzikalaki Evangelia

Steering Committee – SC: **UOC:** Mihalopoulos N., Kanakidou M., **NOA:** Gerasopoulos E., Amiridis V., **ICE-HT:** Pandis S., **NCSR-D:** Eleftheriadis K., **AUTH:** Balis D., **NTUA:** Papayannis A. (meets every month)

General Assembly (GA): Open to all participants (14) - one vote per participant – meets once a year – during the Annual Science Meeting of the Infrastructure

Advisory Board (AB) from external experts:

Prof. Athanasios Nenes (**EPFL**, Swiss), Prof. Paolo Laj (**ACTRIS**, France), Prof. Jos Lelieveld (**MPI** for Chemistry, Germany), Dr. Bojan Bojkov (**EUMETSAT**), Dr. Ulla Wandinger (**Tropos**, Germany)





The need for PANACEA

- * IPCC assessments and EU's Thematic Strategy on Air Pollution have stressed the **large economic and societal impacts of air pollution and climate change**, which have to be urgently and holistically mitigated.
- * There is **need to strengthen the ground-based component of the Earth Observing System** for atmospheric variables relevant to air quality and climate (e.g. aerosols, clouds, greenhouse and reactive trace gases and radiation).



The Goal of PANACEA

Integrate the existing national facilities to create a single high-class innovative distributed research infrastructure

Serve and provide access to academia and the private sector (industry/SMEs)

PANACEA is

the only integrated RI for atmospheric composition and climate change, in the entire East Mediterranean

... Aerosols, Clouds and Trace gases Research (ACTRIS) and the Integrated CO₂ Observation System)

... priorities of the Greek National Strategic Research and Technology Development Program (NSRF) (RIS3).

✓ **Science**

✓ **Services**

✓ **Technological developments**

- * **hub for the next generation** of environmental scientists
- * **attract promising young researchers** for research and industry
- * **bridge science with industry** and entrepreneurship,
- * Reduce **brain drain**

Science: Field campaigns

using fixed and mobile, in-situ and remote sensing infrastructure

Summer 2019 & winter 2020



Summer 2020 & summer 2021



WP8: Air pollution and population exposure (JRA1) health

Characterize aerosol sources and their oxidative potential (ROS).

Spatial and temporal mapping of PM_{2.5} sources and ROS in large urban centers of Greece

<https://panacea-ri.gr/index.php/measurement-pre-campaign-summer-2019-data/>

<https://panacea-ri.gr/mcw2020/>

WP9: Aerosols-clouds interactions (JRA2) climate

Characterize New Particle Formation (NPF) in Greece

Perform an extensive set of NPF observations, covering N/S and W/E regions of Greece

<https://panacea-ri.gr/mcs2020/>

<https://panacea-ri.gr/mcs2021/>



Science field campaigns

WP9: Aerosols-clouds interactions (JRA2) climate

Cloud-Aerosol InteractionS in the Helmos Background Troposphere PANACEA/ACTRIS station (CALISHTO-HELMOS) – a PANACEA-PyroTRACH Campaign

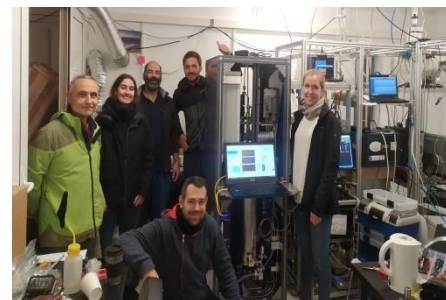
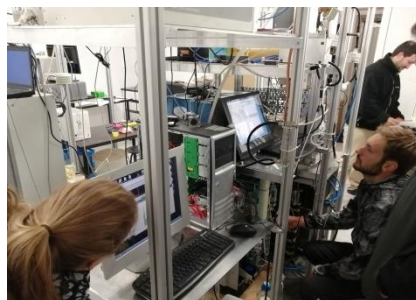
October- November 2021



National
Technical
University
of Athens

Scientific objectives

- Study aerosol-cloud interactions in orographic mixed phase clouds, in the region of East Mediterranean, synergistically using in-situ and remote sensing observations.
- Improve algorithms of remote sensing to retrieve the microphysical properties of clouds (e.g. number concentration of cloud droplets)



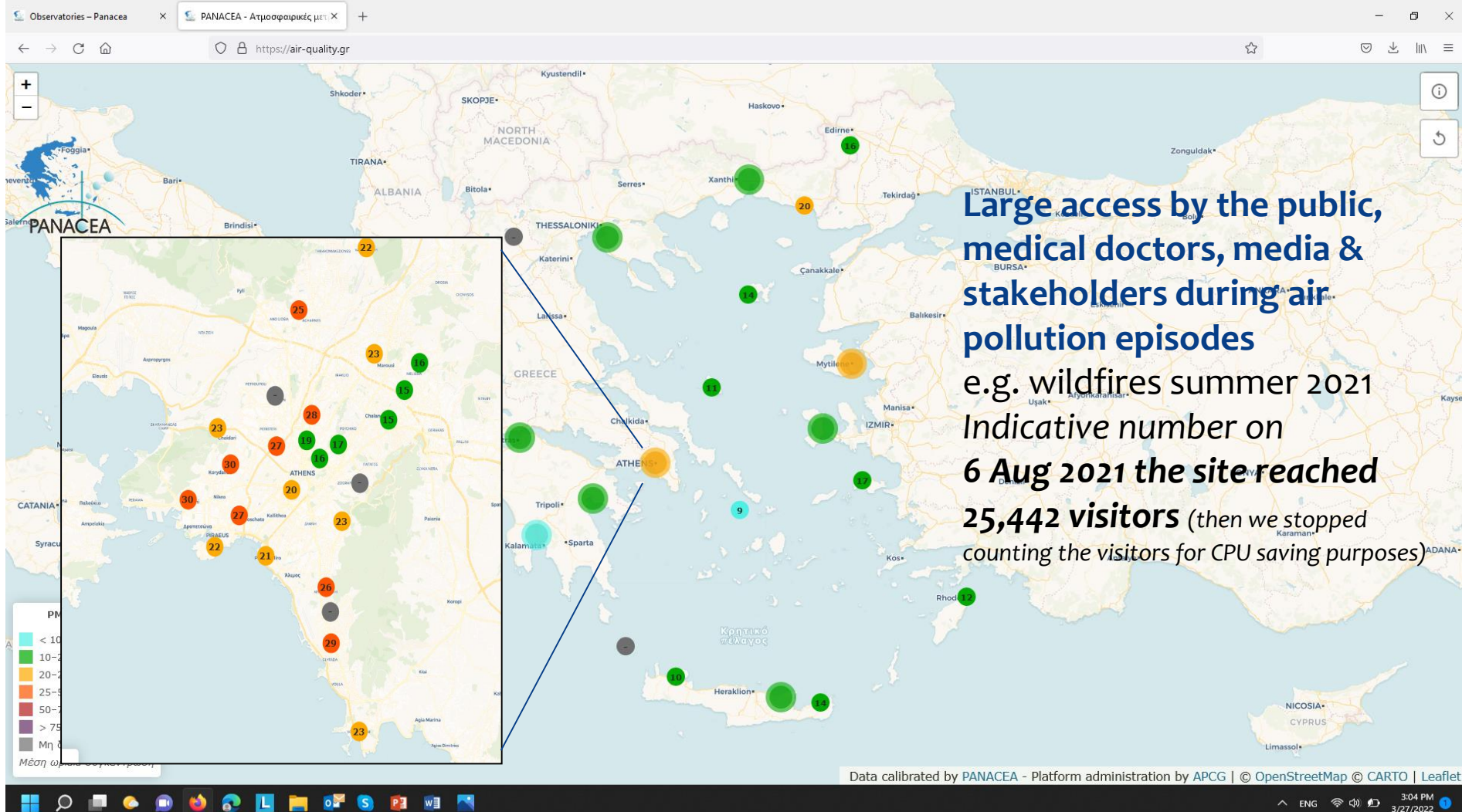
Location 1: at 1.800 m (Kalavrita ski Center)
Location 2: at 2.340 m station HAC²
(ACTRIS/PANACEA/GAW)

Videos: <https://actu.epfl.ch/news/studying-clouds-can-provide-deeper-insight-into-cl/>

PANACEA: PANhellenic Infrastructure for the study of Atmospheric composition and climate Change

Services : Calibrated mini-sensors PM2.5 network

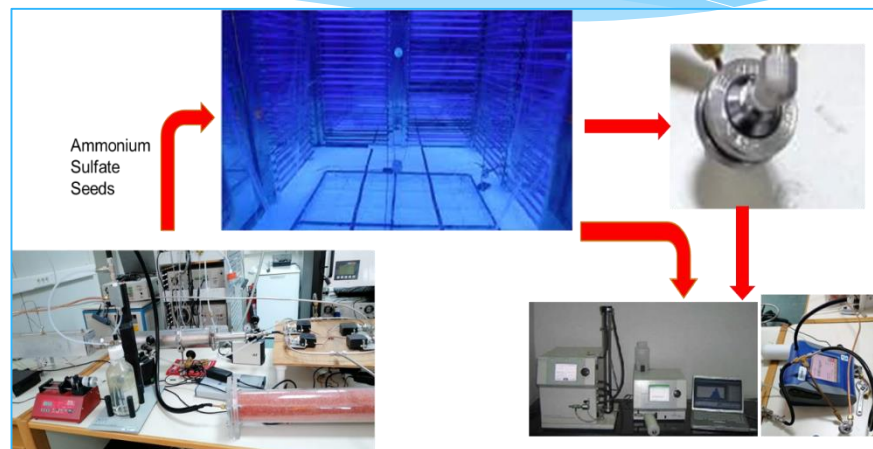
<https://air-quality.gr>



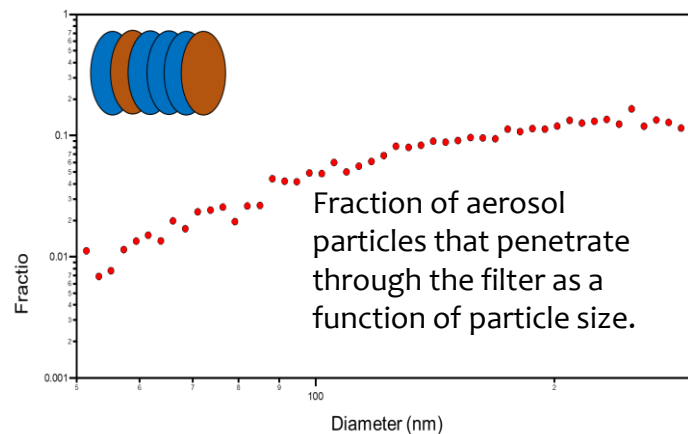
PANACEA support for crisis management: direct information and interaction with public bodies and the industry

Pandemic COVID-19

PANACEA infrastructure has been used to test the suitability of materials to be used for human health protection masks



Collaboration with Plastica Thrakis SA and the University Hospital of Patras.



Collaboration with local industry and SMEs

WALL-E / NOA dual polarization lidar for particle orientation detection



EVE / ESA polarization lidar



*Tsekeri et al. 2021,
AMT*



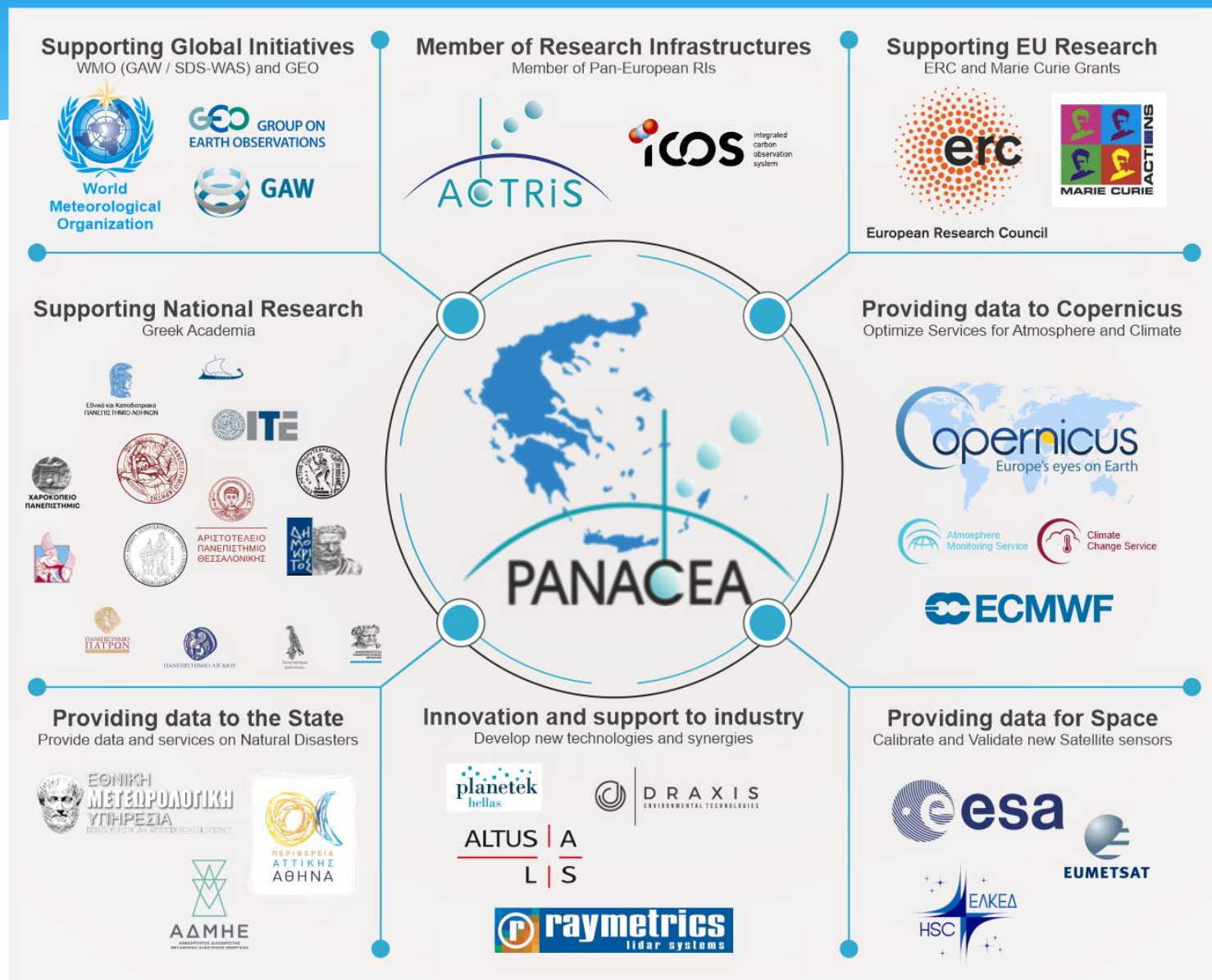
Paschou et al. AMTD 2021

Performance Indicators (until end 2021) compared to the target for the entire project



Indicator	Description	Target	Performed	performance
5801	peer- reviewed publications (articles & conference proceedings)	44	172	+300%
C024	new positions	48 new staff 904PM	72 new staff 1071 PM	+16%
C025	Permanent staff	42 scientists 32.5PM	34 PM	+5%

PANACEA ecosystem



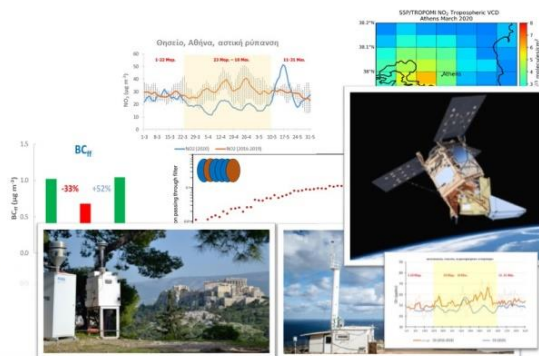
Ευχαριστώ για τη προσοχή σας

Thank you very much for your attention





Dissemination- Media



ΕΠΑνεΚ 2014-2020
ΕΠΙΧΕΙΡΗΣΙΑΚΟ ΠΡΟΓΡΑΜΜΑ
ΑΝΤΑΓΩΝΙΣΤΙΚΟΤΗΤΑ • ΕΠΙΧΕΙΡΗΜΑΤΙΚΟΤΗΤΑ • ΚΑΙΝΟΤΟΜΙΑ



Με τη συγχρηματοδότηση της Ελλάδας και της Ευρωπαϊκής Ένωσης



Η ατμοσφαιρική ρύπανση κάνει πιο επικίνδυνη την COVID-19

16.440

πρώωροι θάνατοι το 2019 στην Ελλάδα και 400.000 στην Ευρώπη συσχετίζονται με τις αυξημένες συγκεντρώσεις ρύπων

15%

τιν θανάτων από COVID-19 διεθνώς και 19% στην Ευρώπη συνδέονται με τη ρύπανση του αέρα

67 μέρες

ξεπεράστηκαν τα όρια συγκεντρώσεων μικροσωματιδίων στη Θεσσαλονίκη το 2019



Η ΚΑΘΗΜΕΡΙΝΗ

<https://panacea-ri.gr/index.php/press/?lang=en>