

Integration of Atmospheric Observing Platforms under the umbrella of a National Research Infrastructure



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The need

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Climate change is governed to a large extent by atmospheric processes, in particular the interaction between radiation and atmospheric components (e.g. aerosols, clouds, greenhouse, and trace gases). Some of these components also contribute significantly to air quality degradation inducing adverse health impacts.

The IPCC Fourth Assessment Report and EU's Thematic Strategy on Air Pollution have both stressed the need to **strengthen the ground-based component of the Earth Observing System** for a number of key atmospheric variables.



The gap

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Even if the expertise and a lot of the components exist, such an **integrated Research Infrastructure (RI)** for specialized atmospheric observations is **presently lacking in Greece**.



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Stands for

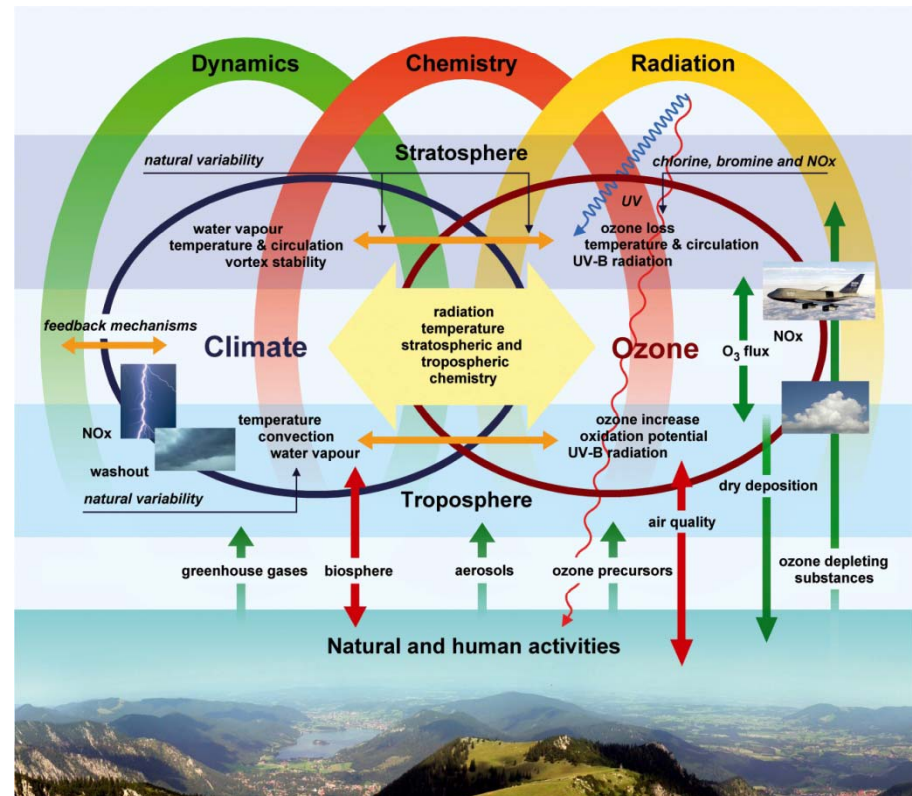
PANhellenic infrastructure for Atmospheric Composition
and climatE chAnge

Definition

A solution or remedy for all difficulties or diseases
pana|cea
/ˌpanəˈsi:ə/

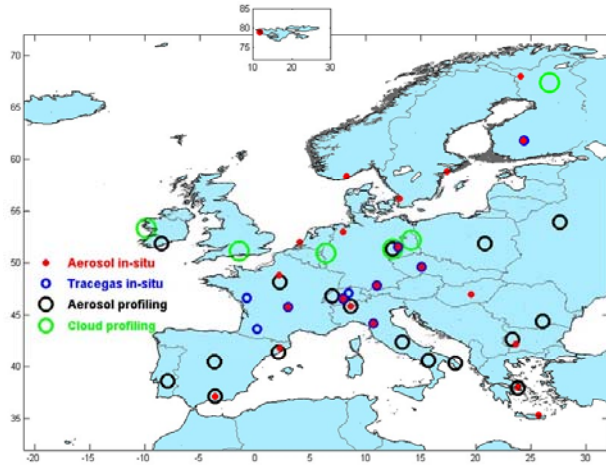
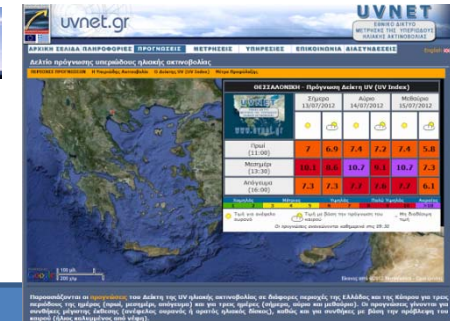
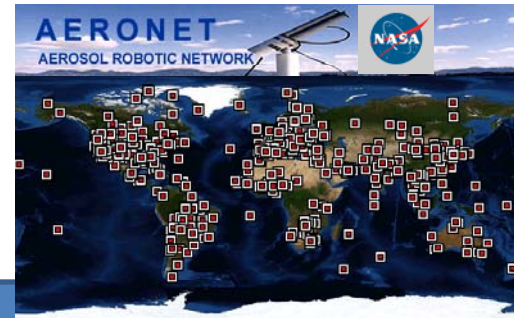
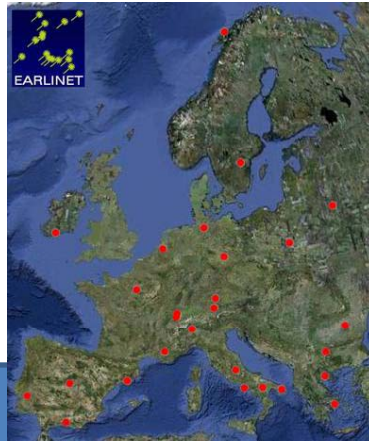
Call

National Roadmap for Research Infrastructure



The integration

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**Core ACTRIS stations
inclusion in
ESFRI roadmap**



Aerosols, Clouds, and Trace gases Research InfraStructure Network

The partnership

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Already 16 partners in the first stage

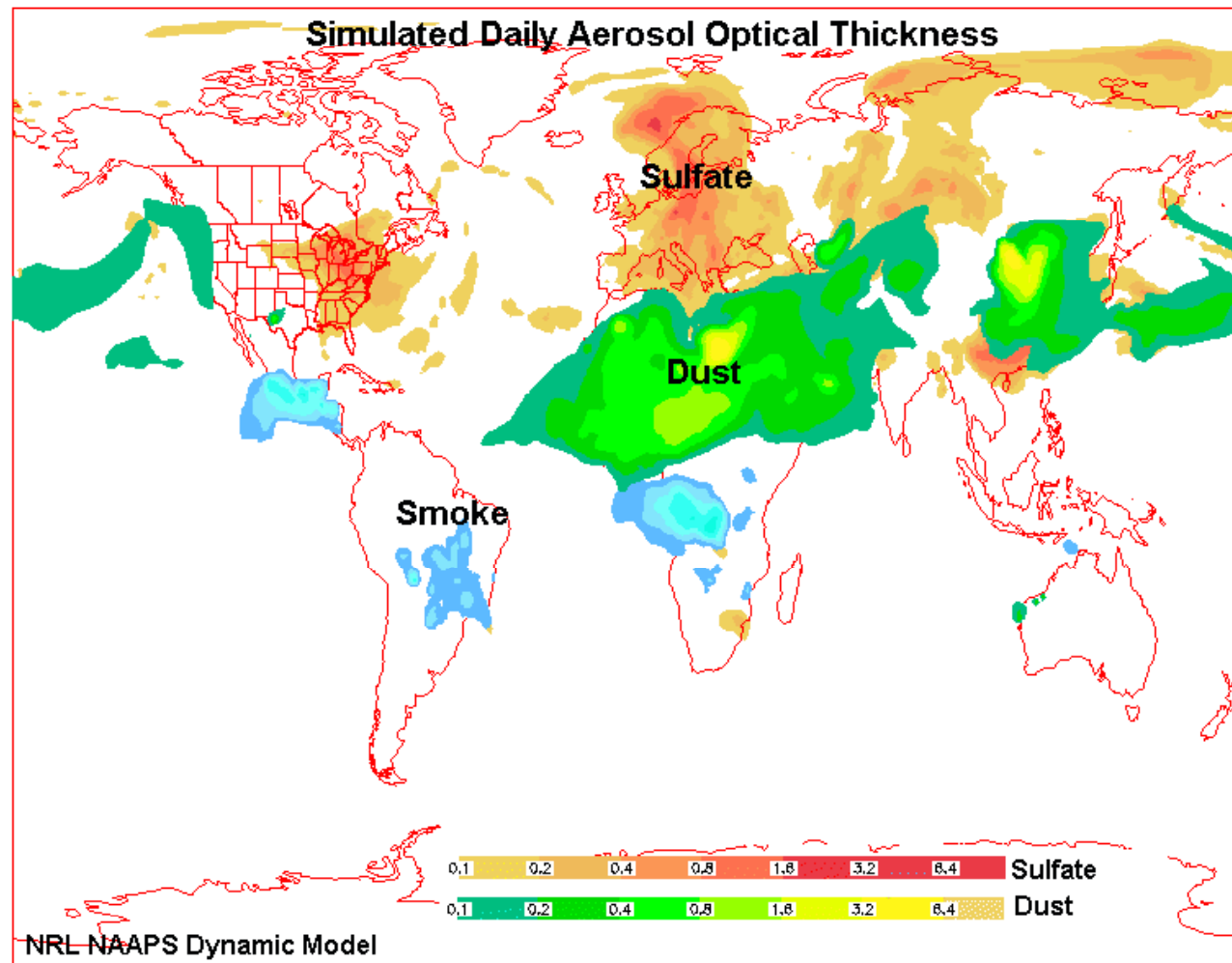
National Observatory of Athens, Foundation for Research and Technology-Hellas, NCSR 'Demokritos', National Technical University of Athens, Aristotle University of Thessaloniki, National Kapodistrian University of Athens, University of Aegean, University of Crete, University of Ioannina, Biomedical Research Foundation, Academy of Athens, Hellenic Centre of Marine Research, Technical University of Crete, University of Patras, Navarino Environmental Observatory, Democritus University of Thrace, Hellenic National Meteorological Society

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... in a Local and Regional Context

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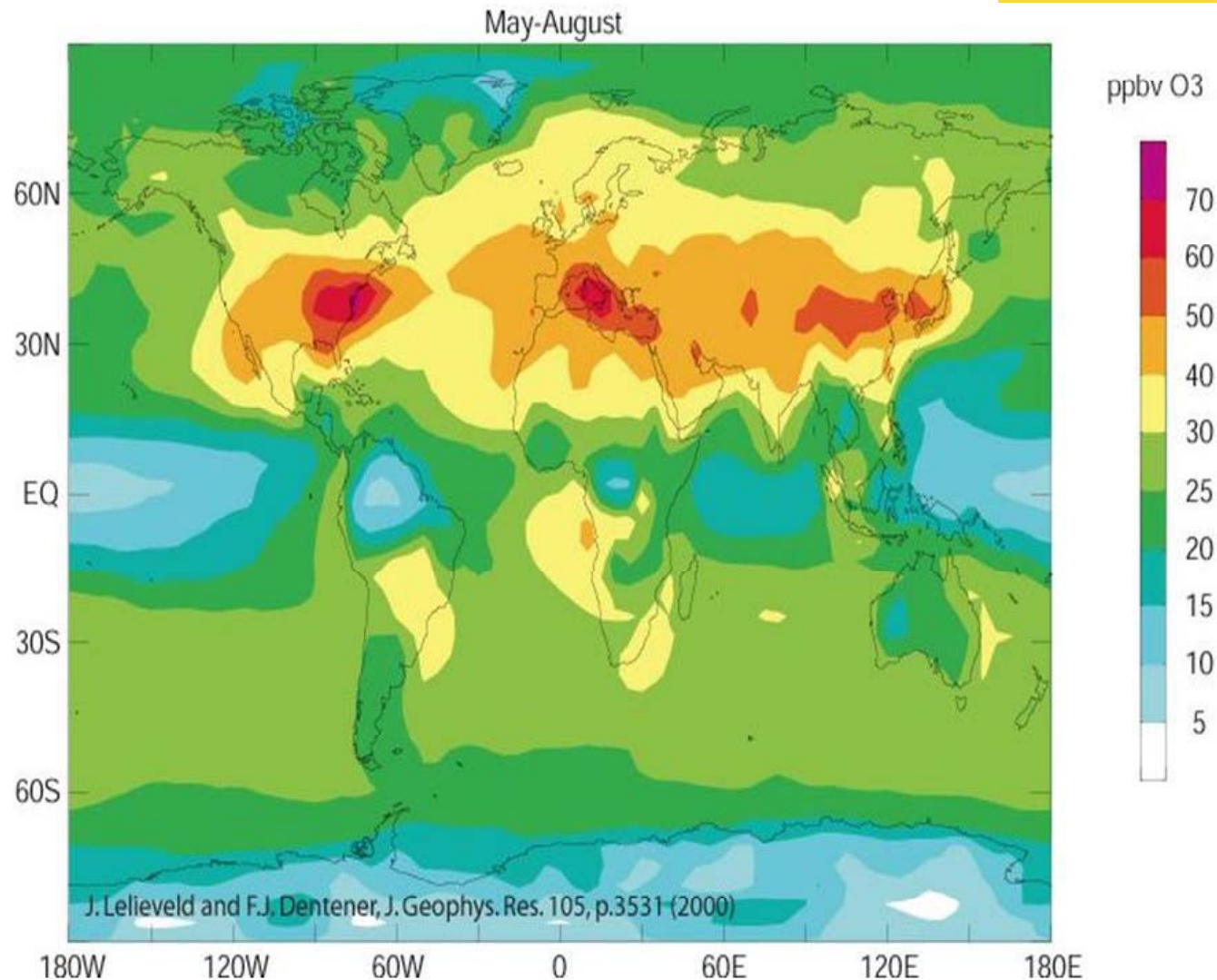
The Mediterranean
Hotspot



... in a Local and Regional Context

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The Mediterranean
Hotspot



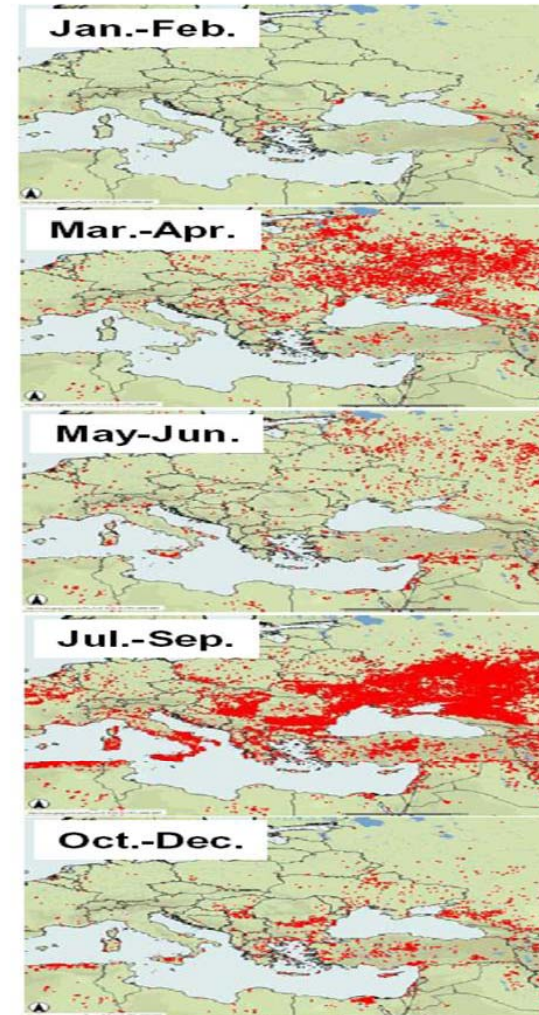
and surrounded by discrete sources ...

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Seasonal variation of biomass burning sources around E. Mediterranean



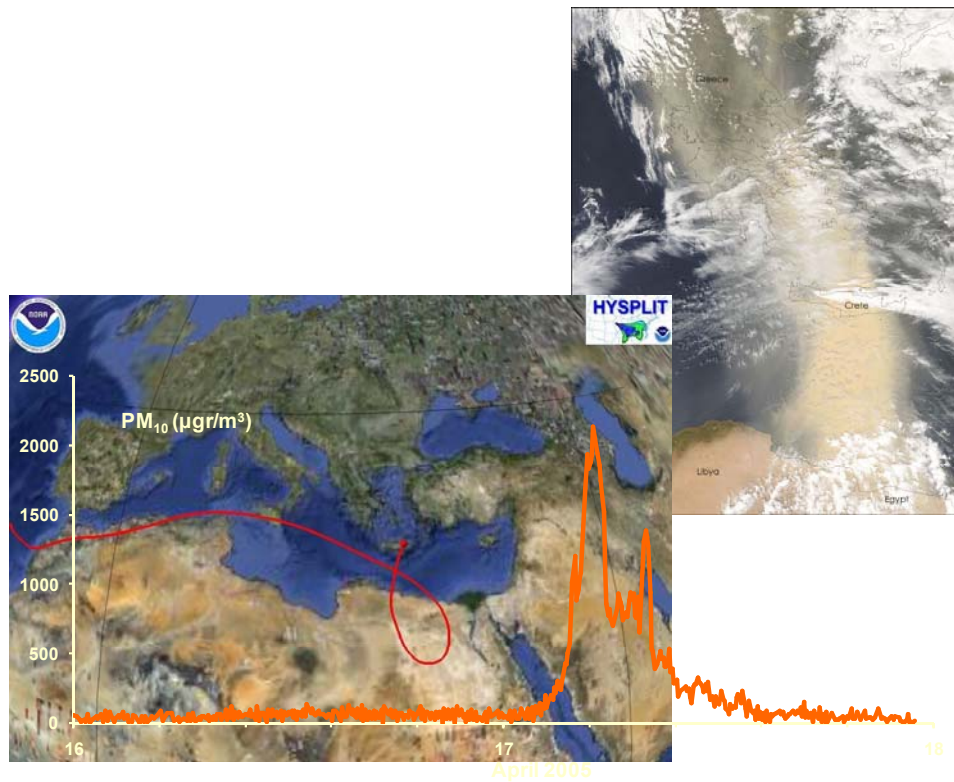
Biomass burning aerosol



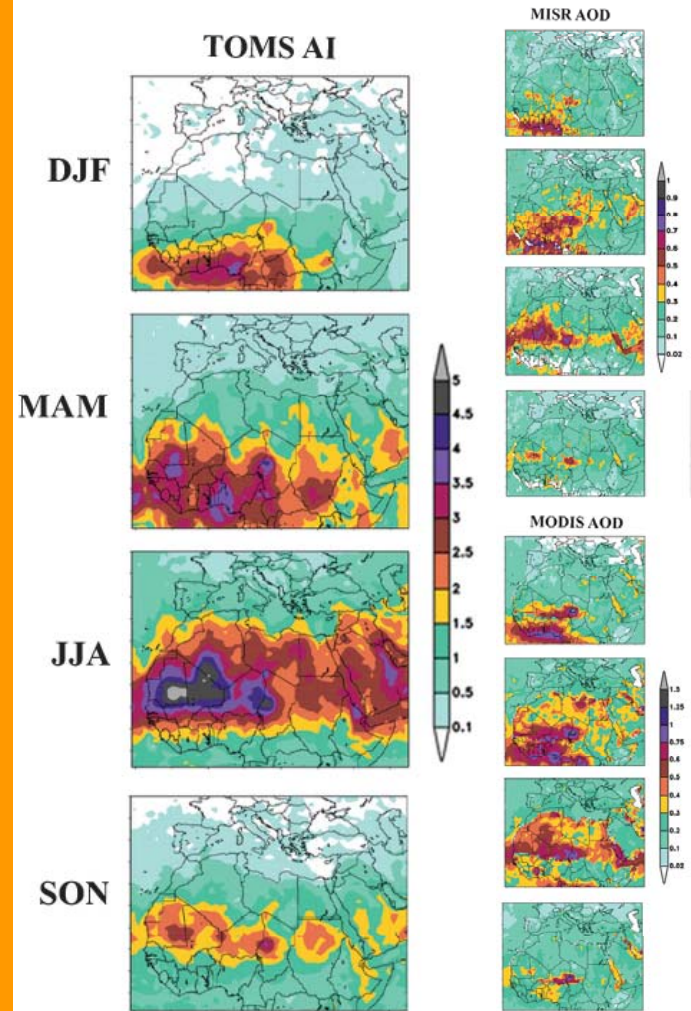
and surrounded by discrete sources ...

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Seasonal variation of dust sources around E. Mediterranean

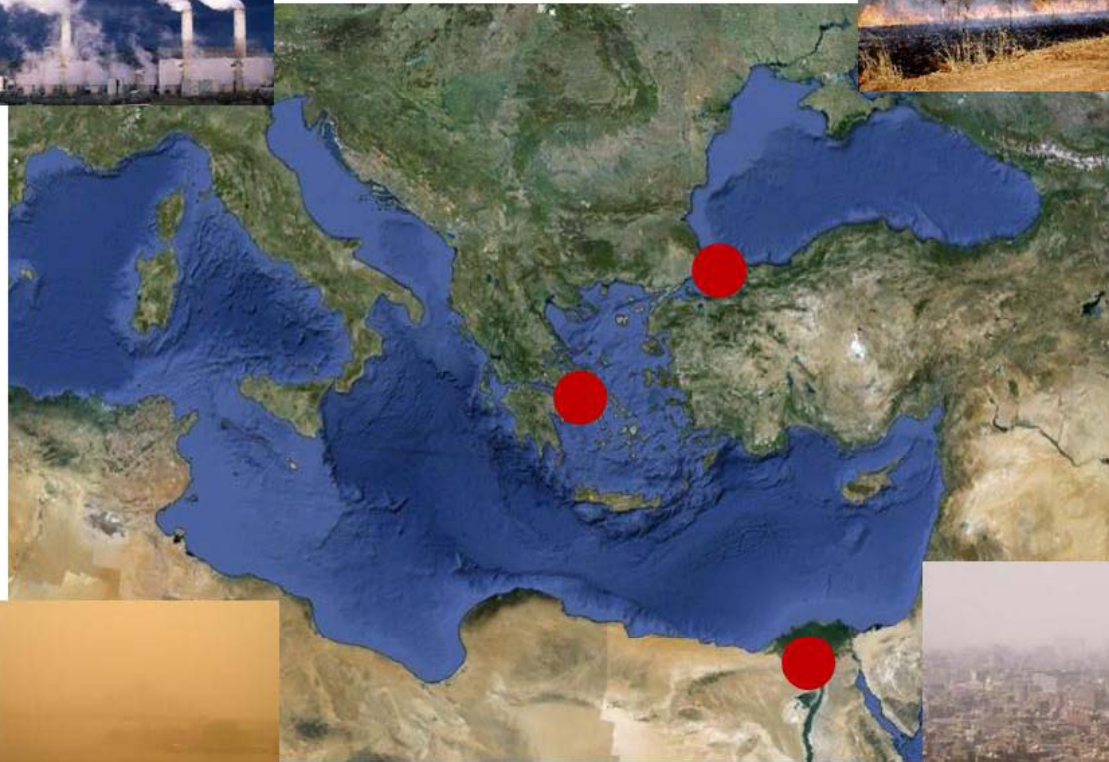


Dust aerosol



... natural and anthropogenic ...

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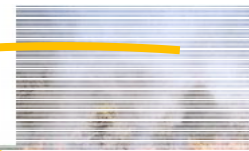
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... ideal for PANACEA

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Pollutants Receptor



Chemical Cooker

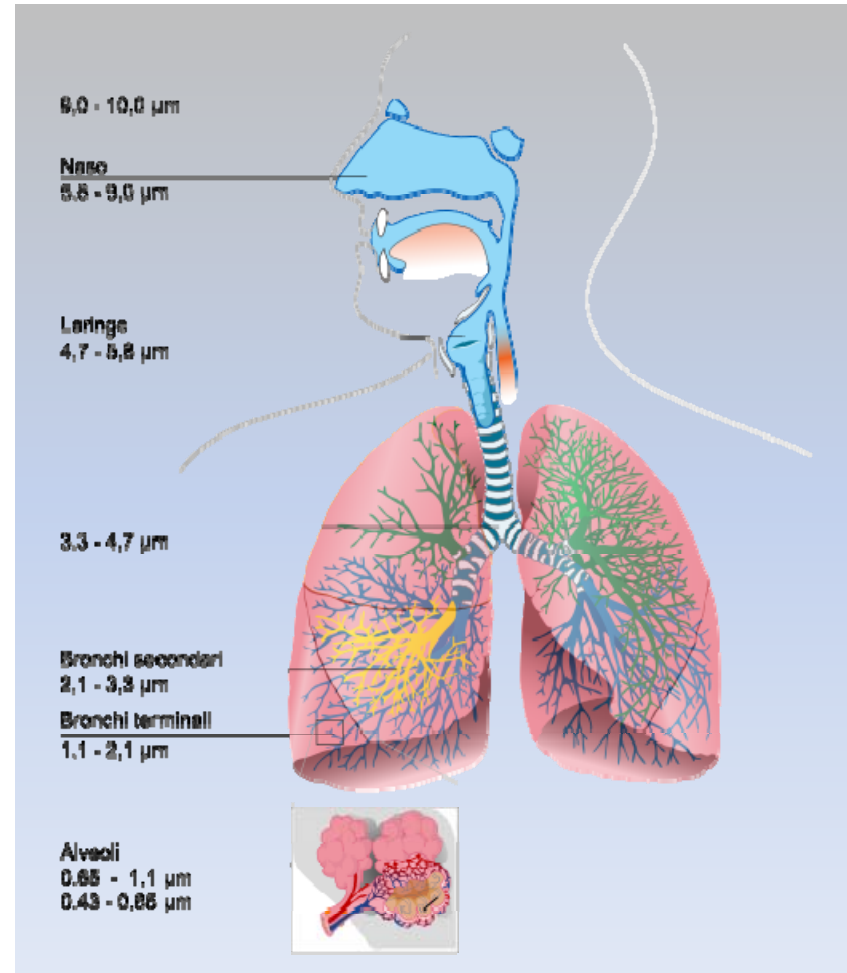
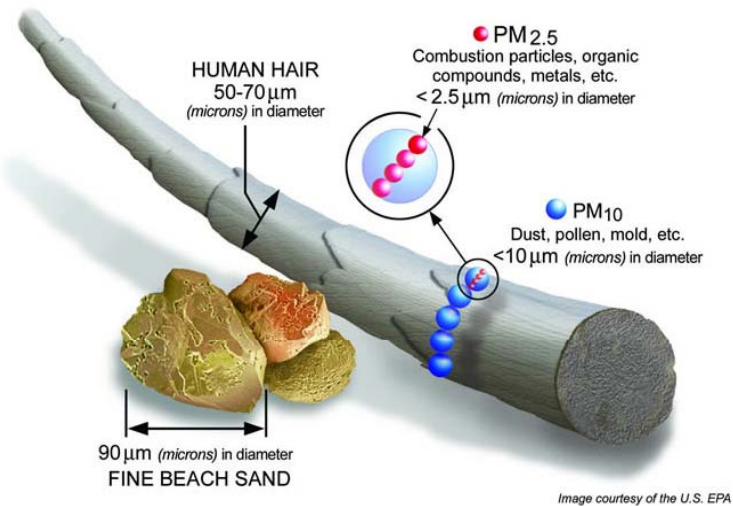


Natural Laboratory



The challenge of addressing societal threats

Air Quality and Health Hazards – PM₁₀



... in a radically changing scenery

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Economic crisis

Smog events over Athens during winter
2013-2014: Pollution measurements and
chemical characterization

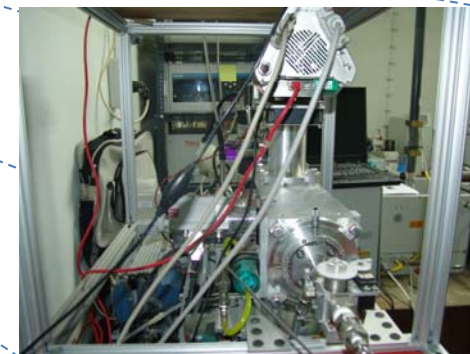
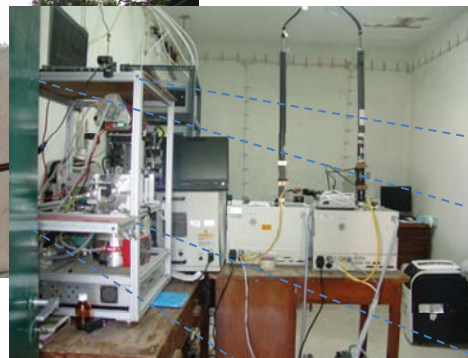


... mobility, flexibility and smart specialization

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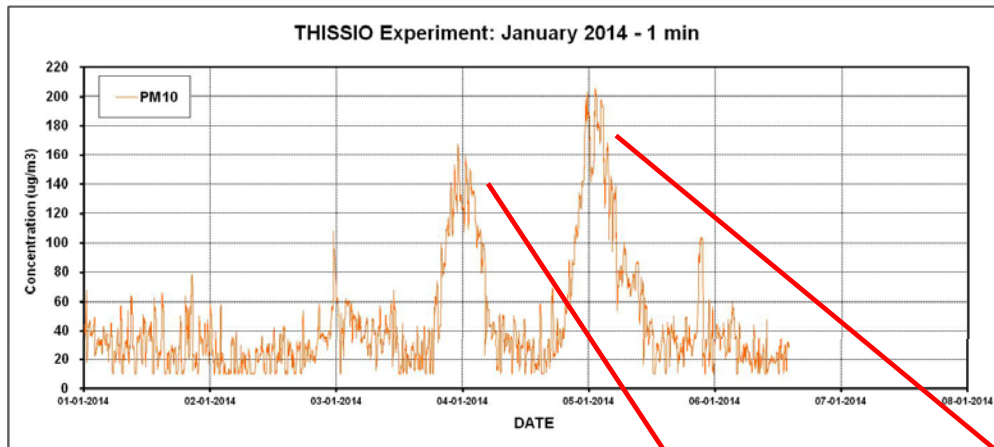
Experimental
set up

Premises of the National Observatory of Athens,
Thissio-Athens center

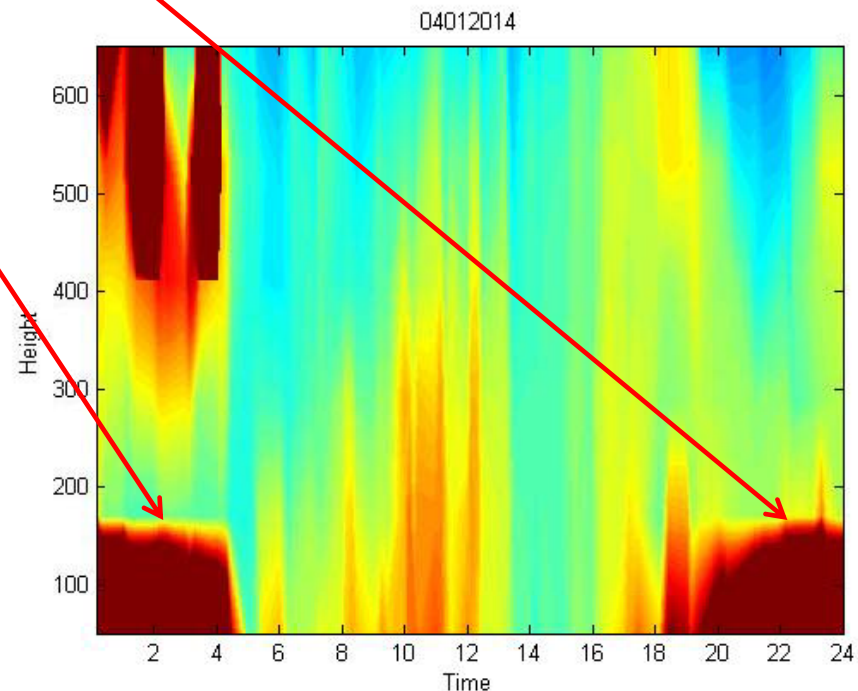


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to scrutinize from meteo implications ...

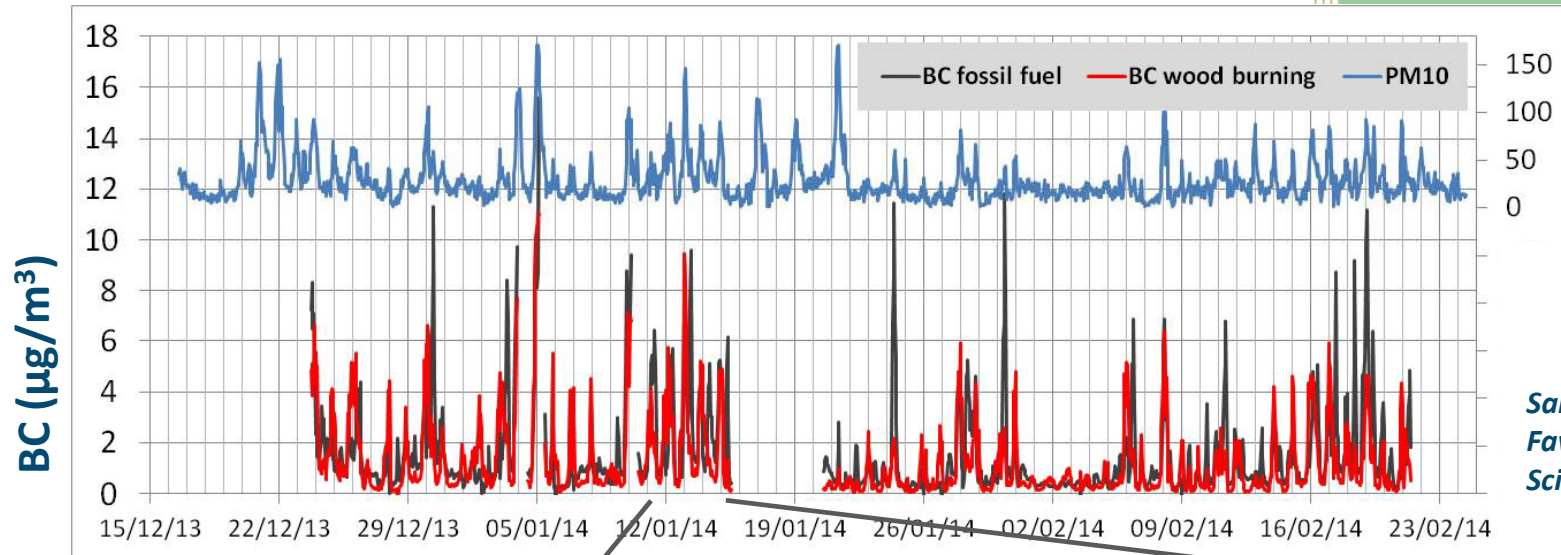


- Particles are trapped within the first hundreds of meters from the ground, resulting to high concentrations



... to detailed source apportionment

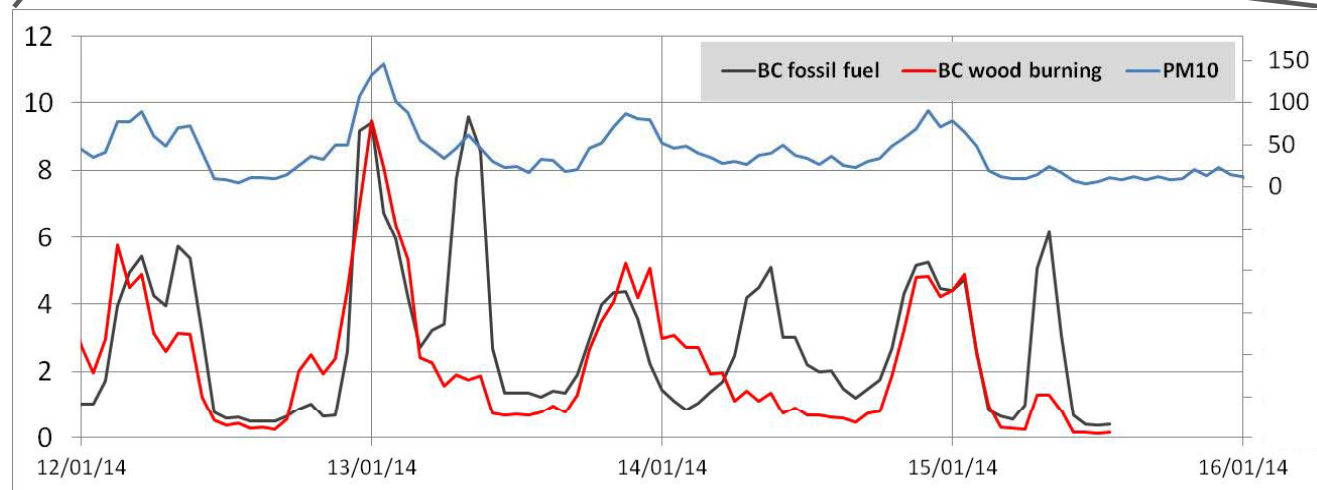
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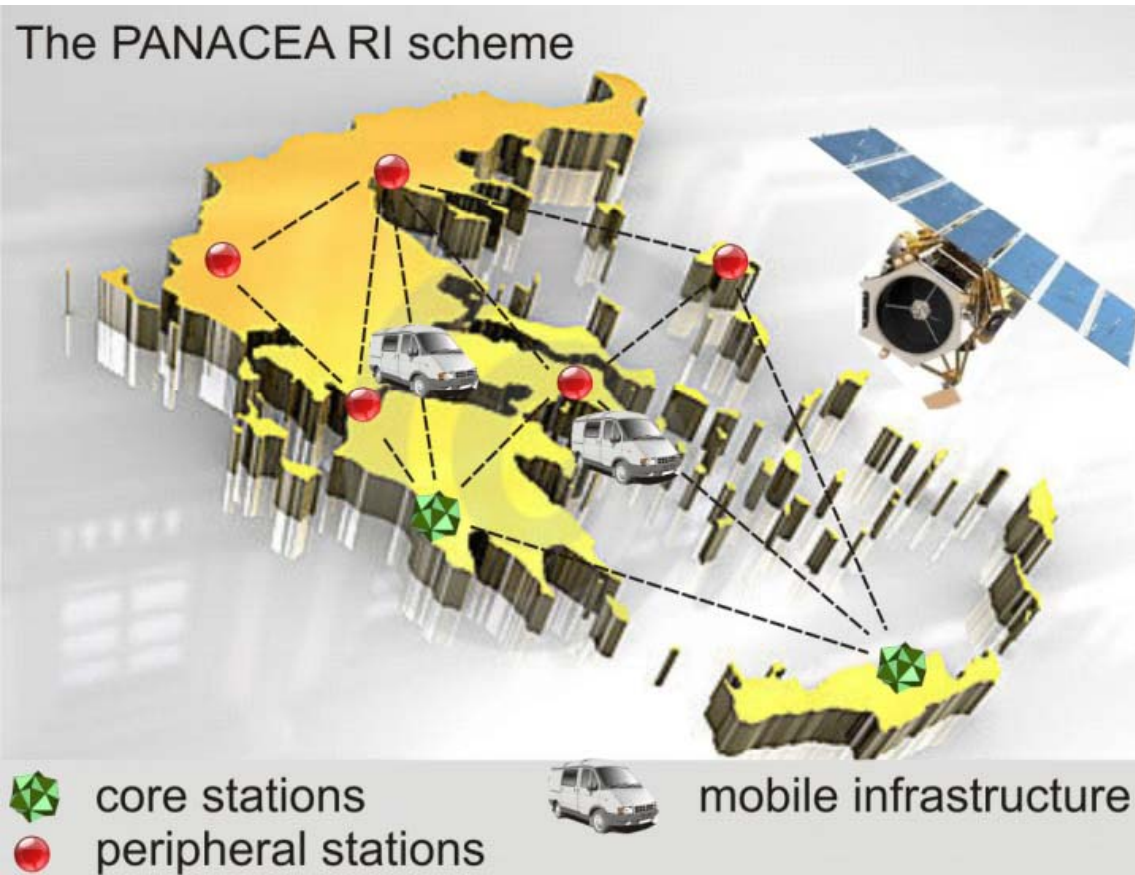
PM₁₀ (µg/m³)

Decomposition of BC according to
Sandradewi et al. 2008 (EST)
Favez et al., 2010 (ACP)
Sciare et al., 2011 (JGR)

- Elevated BC concentrations
- BC emissions from smog prove to be equal to all other sources (central heating, transport)



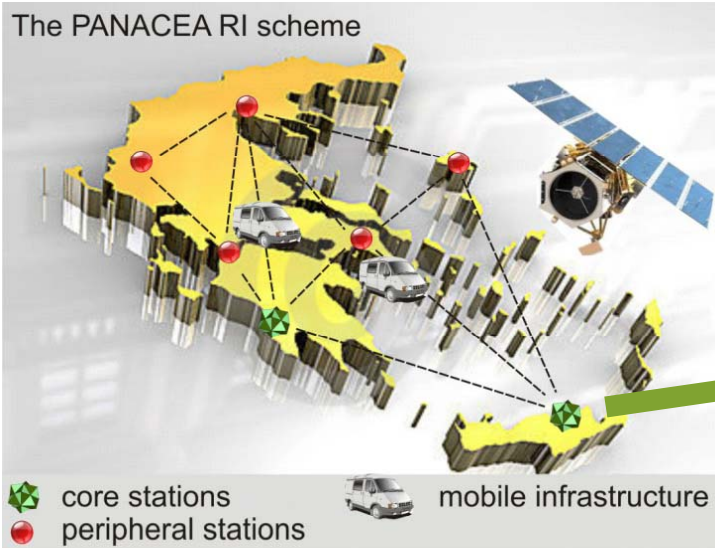
The scheme



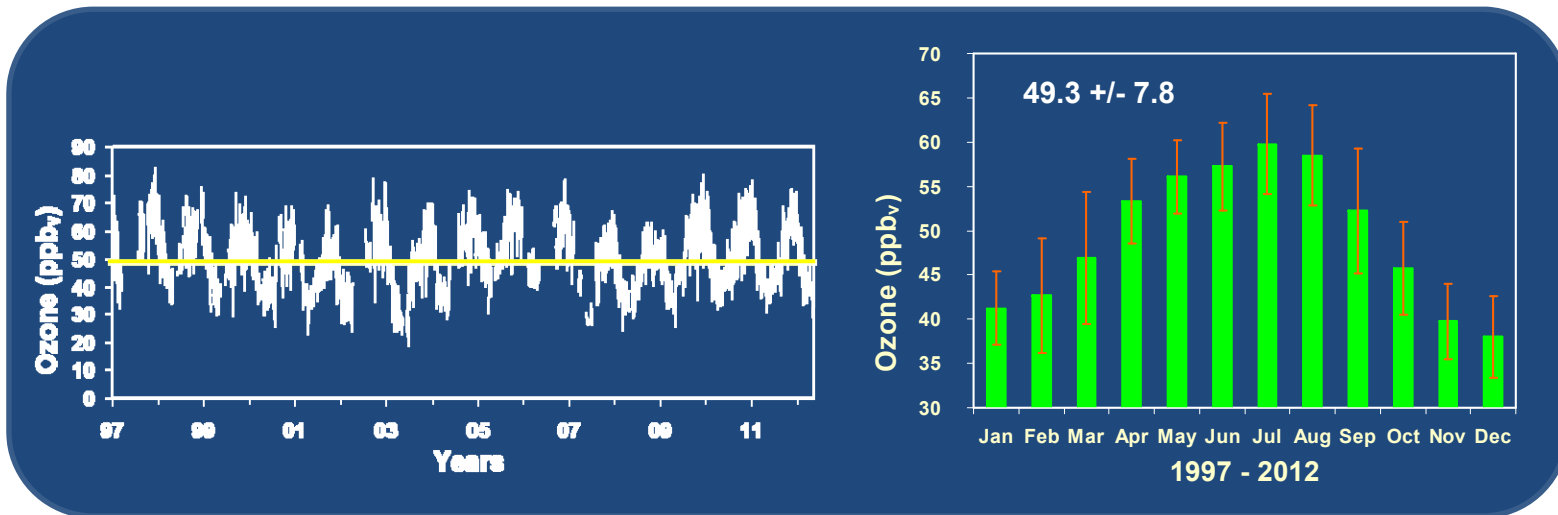
Finokalia station

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The PANACEA RI scheme



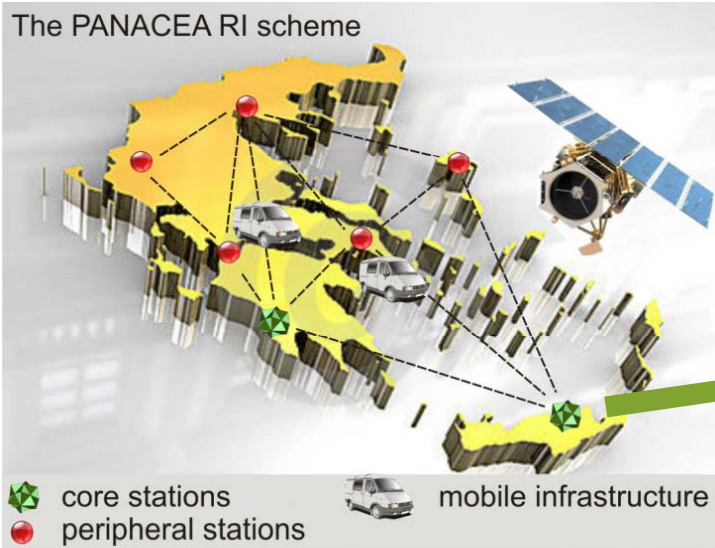
Already 20 years of operation



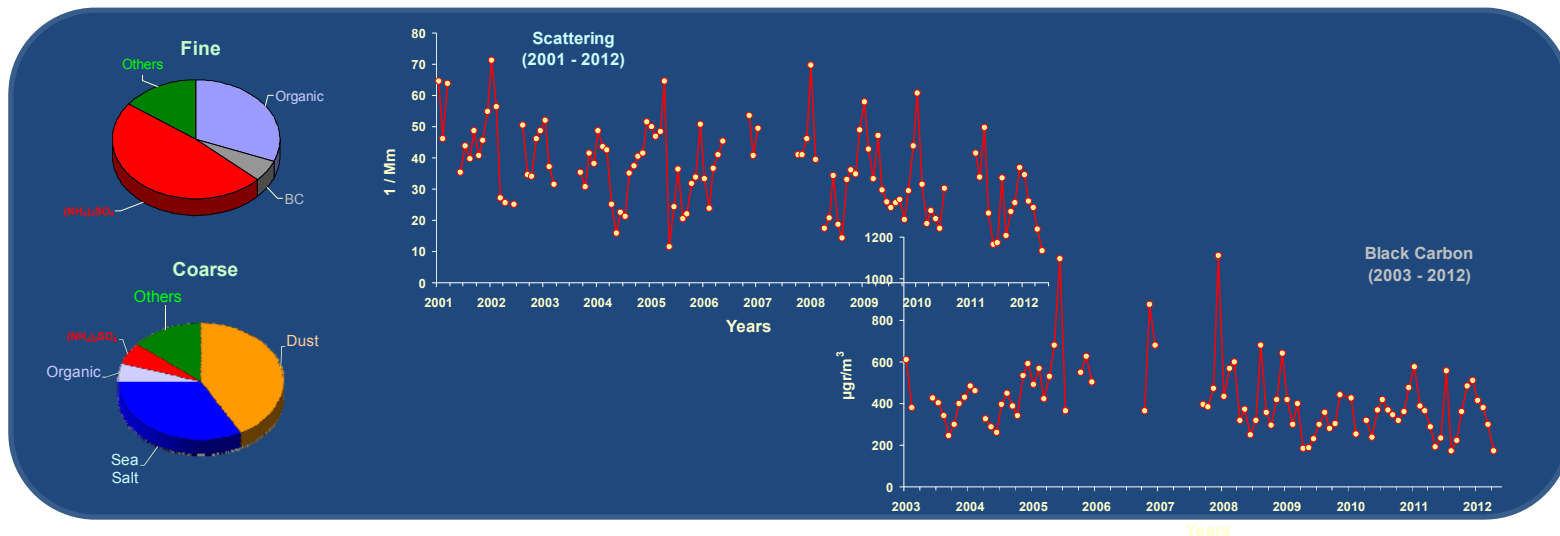
Finokalia station

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The PANACEA RI scheme



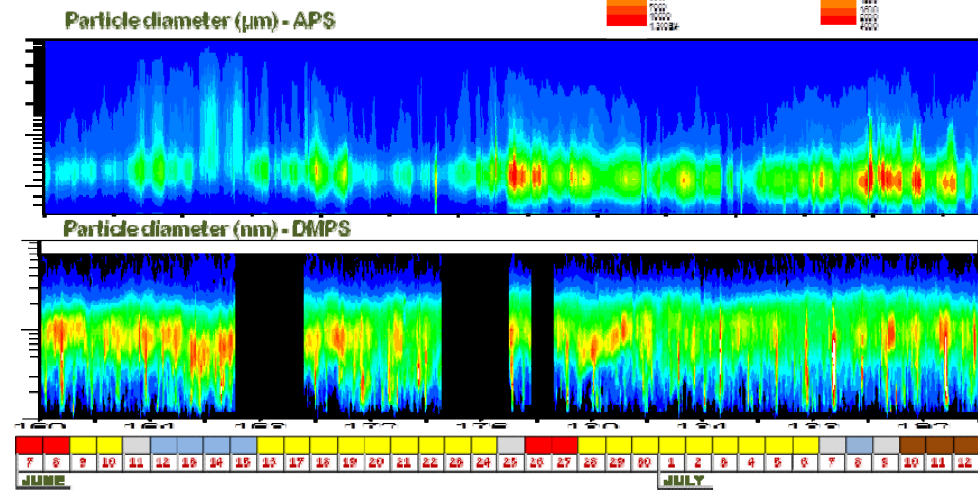
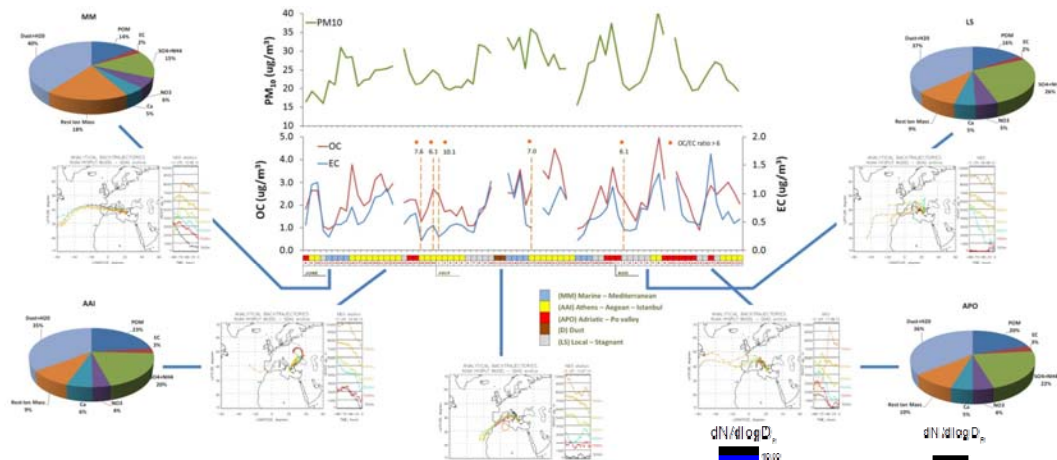
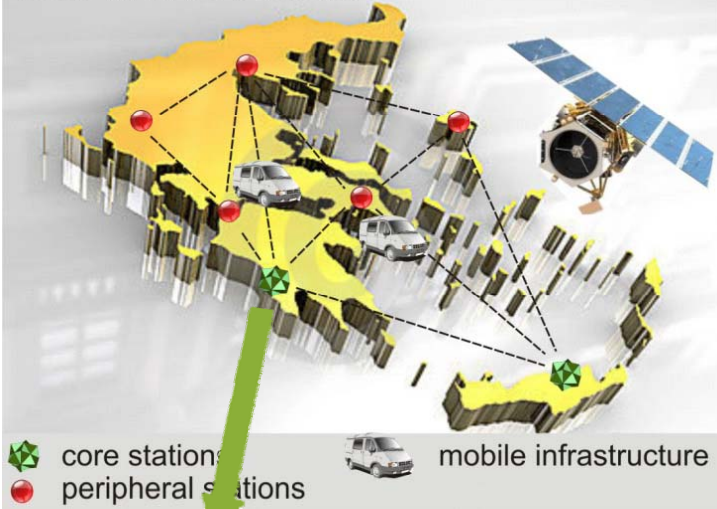
Already 20 years of operation



Navarino Environmental Observatory

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The PANACEA RI scheme



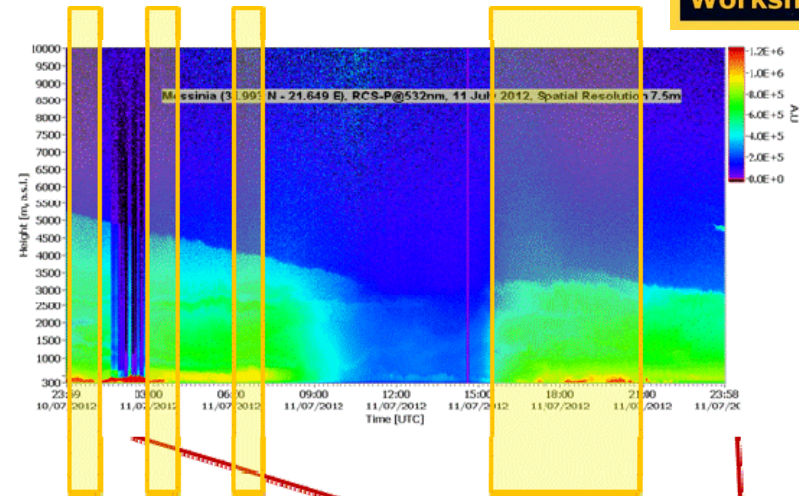
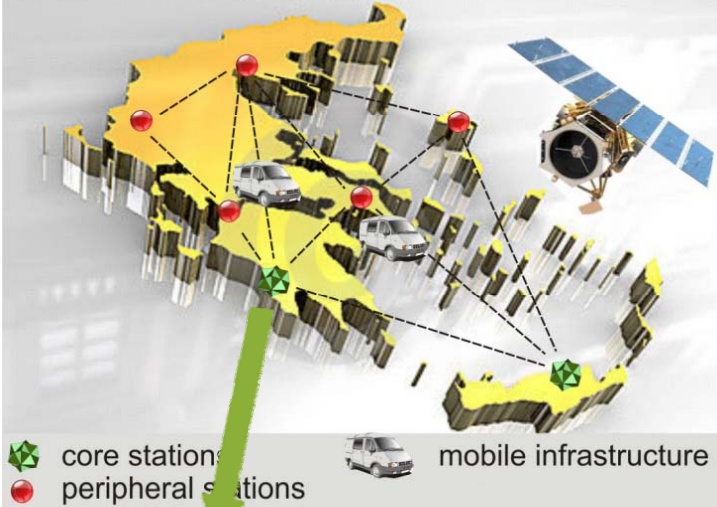
Since 2010



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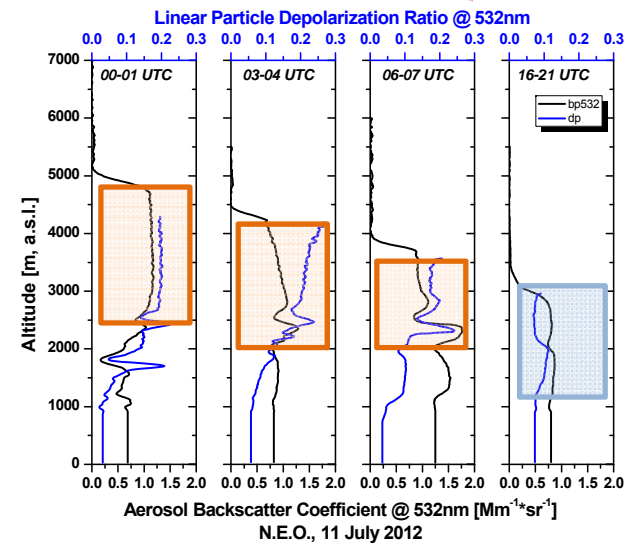
The PANACEA RI scheme



Since 2010



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Mobile infrastructure

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FORTH Patras



BRFAA



IERSD-NOA



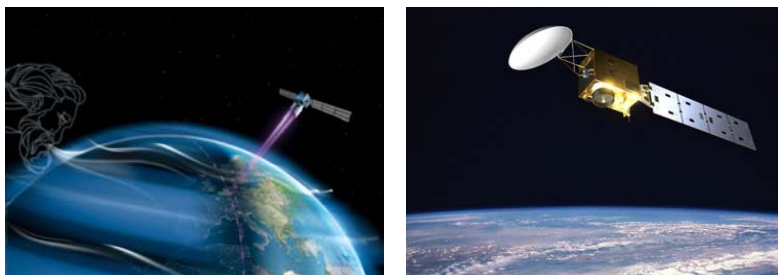
ESA-NOA



Satellite data synergies

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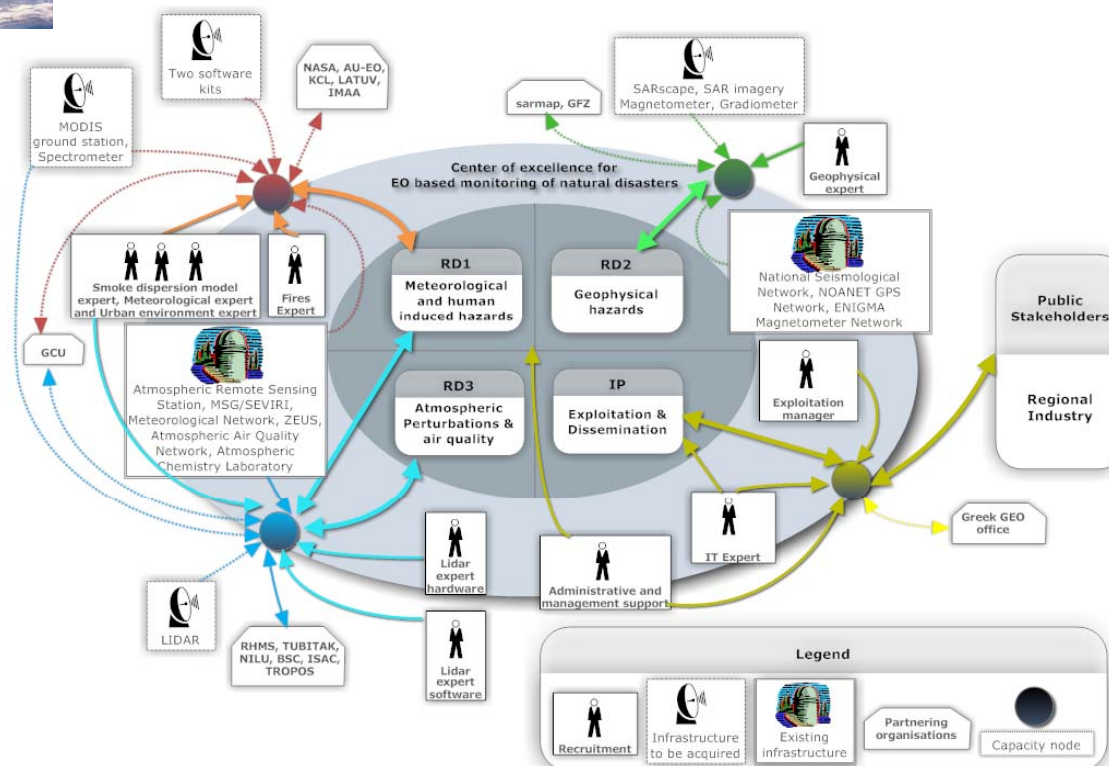
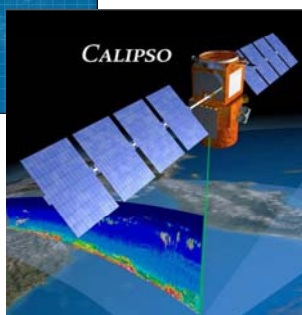
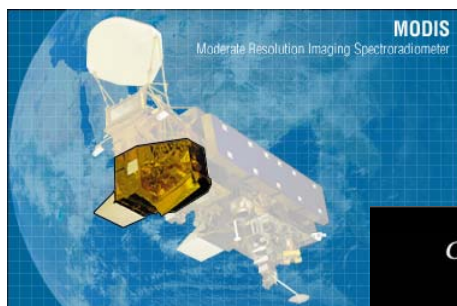
NOA - ESA Mirror Site of
Collaborative Ground Segment



Future Earth Explorers ADM-Aeolus & EarthCARE

BEYOND Building a Centre of Excellence for Earth
Ubservation based monitoring of **N**atural **D**isasters,
which will situate NOA as a Provider of products and
services mainly for south-eastern Europe

NASA: Passive sensors like MODIS and
VIIRS Active sensors: CALIPSO



**Integration of Atmospheric Observing
Platforms under the umbrella of a
National Research Infrastructure**

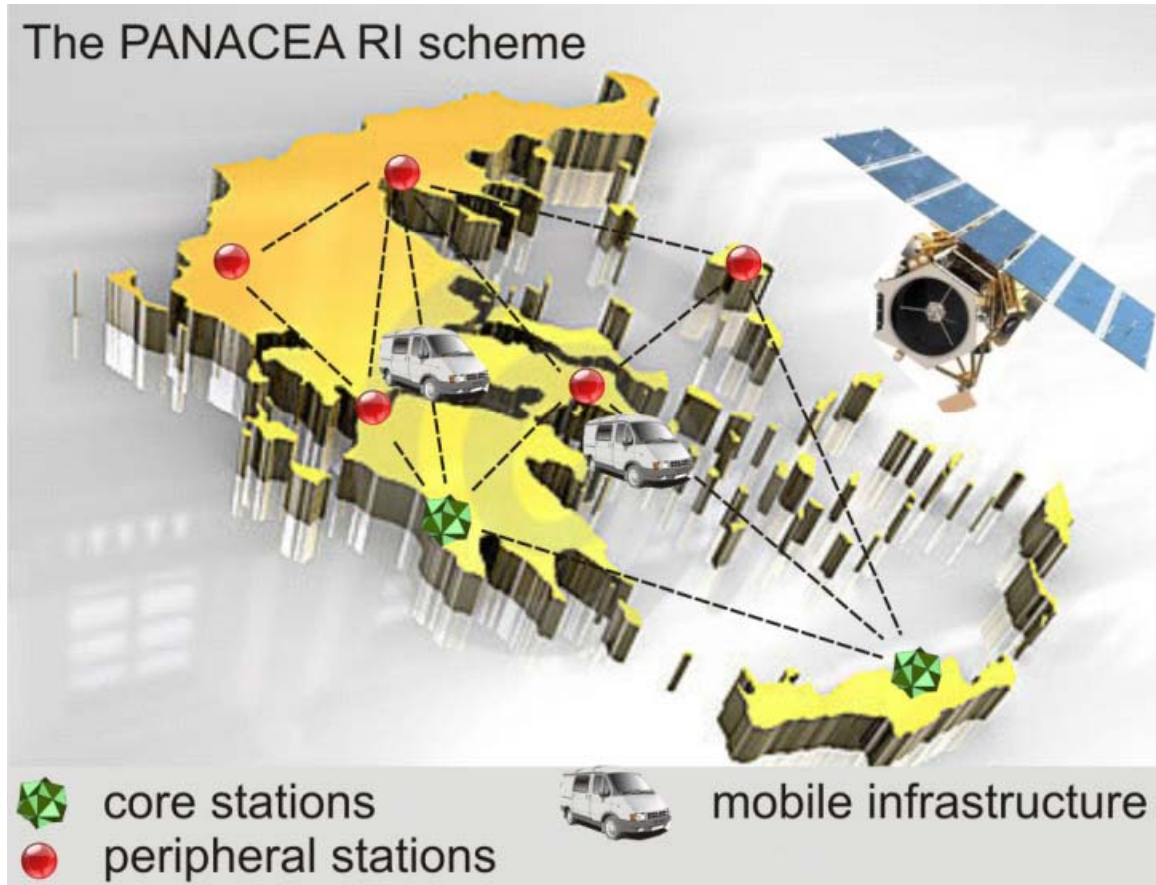
THANK YOU

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The scheme



The integration

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PANACEA will fill this observational gap by developing a **coordinated system** for monitoring of atmospheric composition, solar radiation variations, climate change and related natural hazards in Greece.

This will be achieved through **merging, enhancing, and coordinating** all existing Greek ground-based stations and networks (e.g., in-situ gas and aerosol, LIDAR and AERONET stations, RADARs and solar radiation networks) under the umbrella of a **single integrated RI**, essential to achieve excellence in research and innovation.

