inDust

Dust observations

Lucia Mona, Serena Trippetta, Vassilis Amiridis

Rome| Italy | 11-March- 2019

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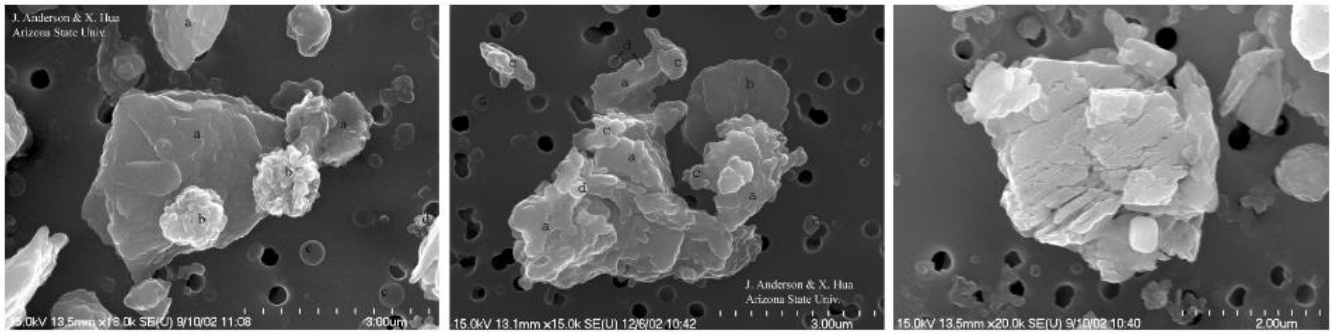
Funded by the Horizon 2020 Framework Programme
of the European Union

Observing Dust Particles

- Small particles travelling in the air

Observing Dust Particles

- Small particles travelling in the air
- What desert dust particles are



Microscopic silicate dust particles collected in Asia are aggregated with soot and black carbon, left, and aluminosilicates and carbon, center. Right: a calcite particle that was etched by acid as it was transported across China.

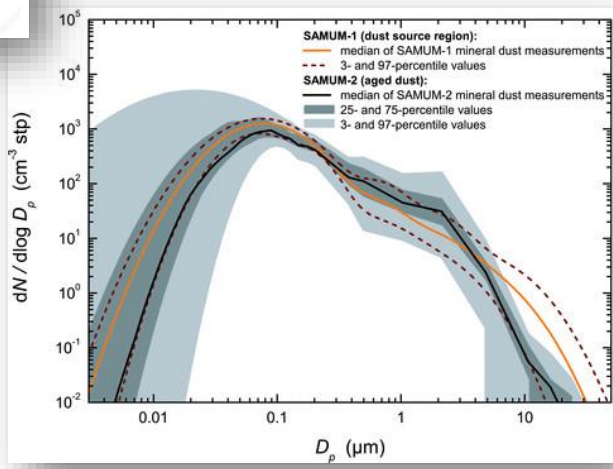
J. Anderson and X. Hua/Arizona State University

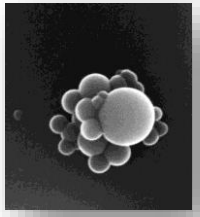
Observing Dust Particles

- Small particles travelling in the air
- What desert dust particles are
- Mixed with other particles

Observing Dust Particles

- Small particles travelling in the air
- What desert dust particles are
- Mixed with other particles
- How to identify dust within the mixture
  - chemical composition, size distribution
  - shape & morphological information





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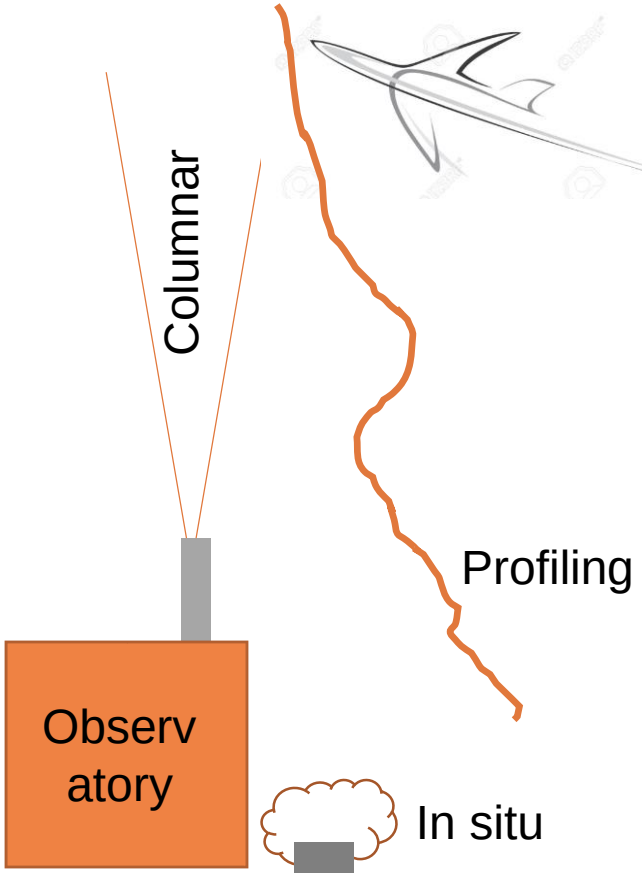
State of art for particle characterization

- Satellite measurements
- Ground based remote sensing
- Near surface characterization
- Measurement campaigns

(developing and testing methods)



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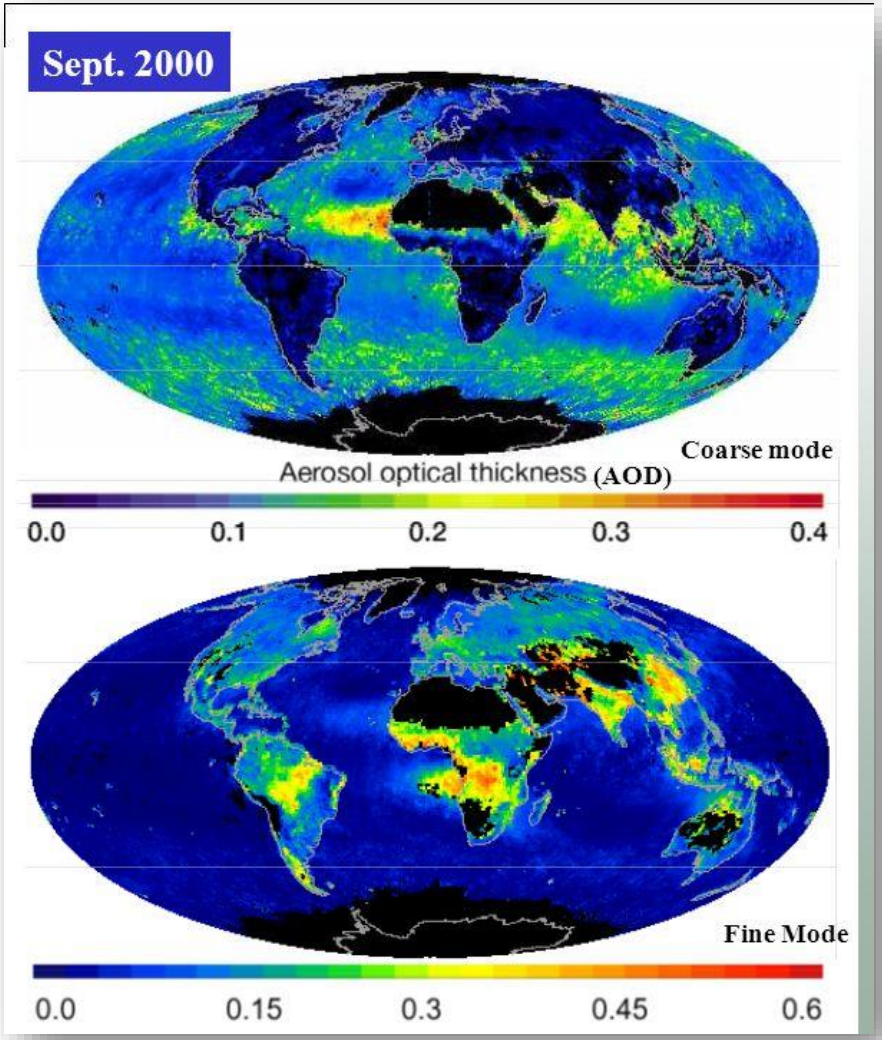
Looking dust from the space

- Satellite can detect dust pattern

Looking dust from the space

- Satellite can detect dust pattern
- Satellite can provide dust component (big particles)



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Looking dust from the space

- Satellite can detect dust pattern
- Satellite can provide dust component (big particles)
- Satellite can identify particles and provide 4D path

https://www.youtube.com/watch?v=u1IrzhILWZk

Looking dust from the space

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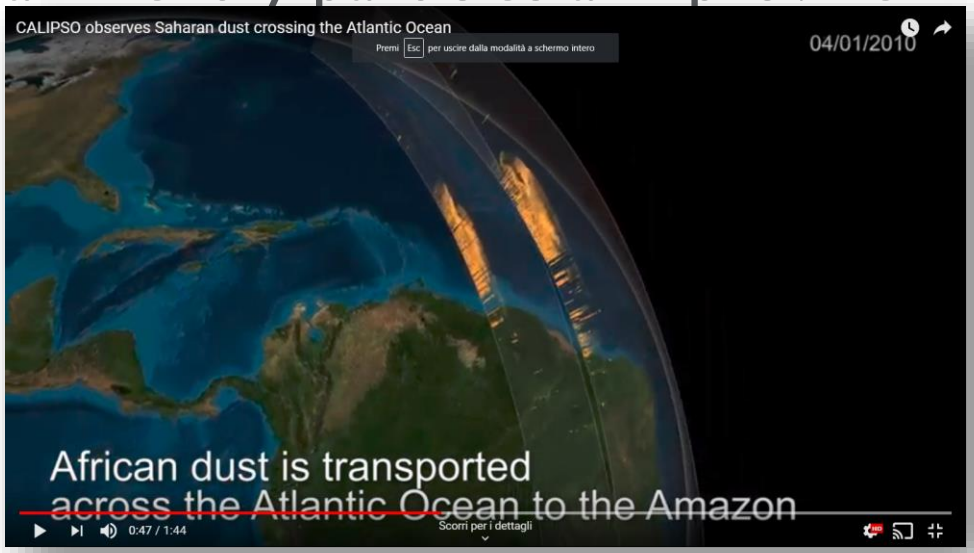

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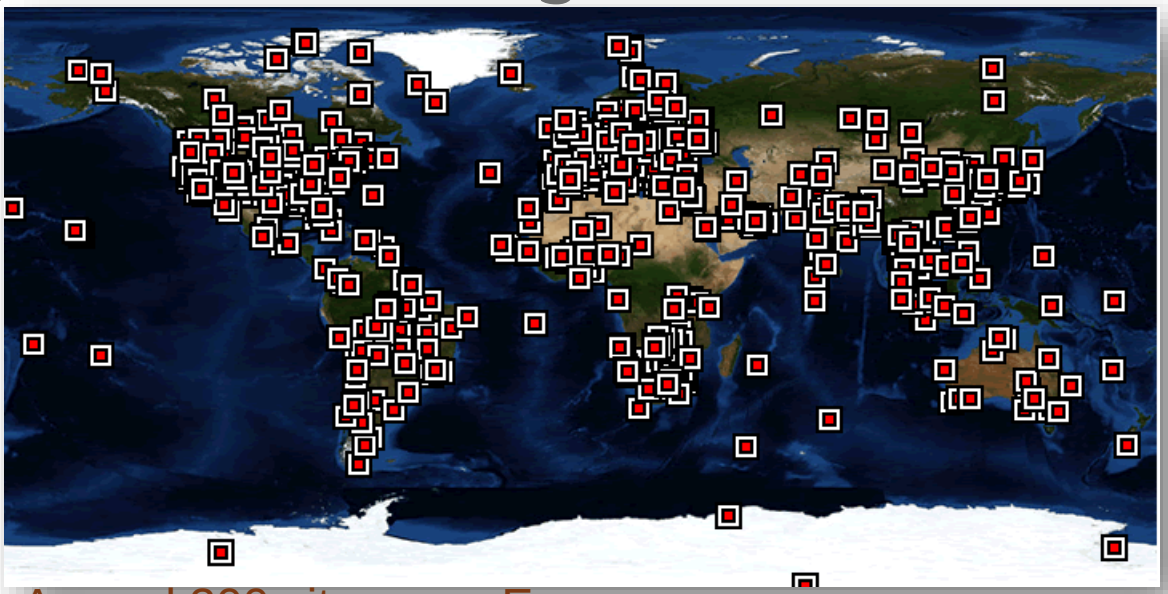
Looking dust from the ground

Columnar info

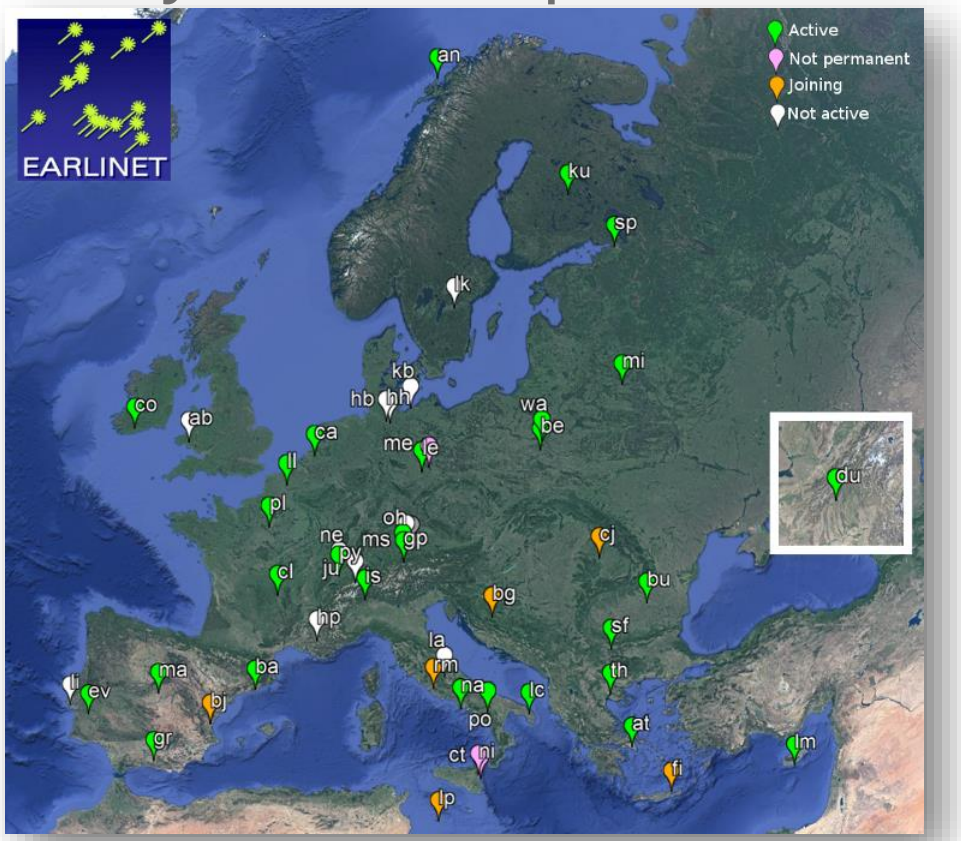


Around 300 sites over Europe:

- ❑AOD at several wavelengths
- ❑Angstrom exponent
- ❑SSA
- ❑Size distribution
- ❑Fine mode fraction
- ❑Asymmetry function
- ❑Phase function

Looking dust from the ground

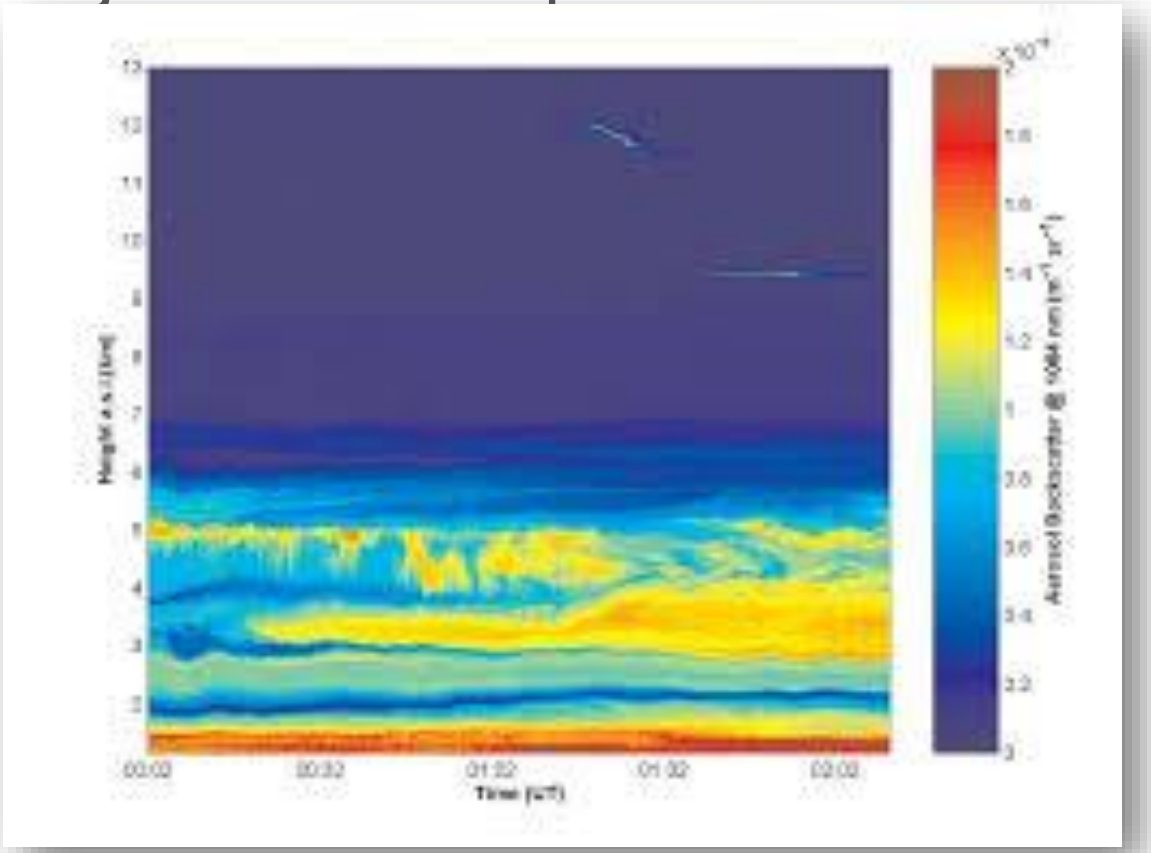
- Profiling capability over Europe with EARLINET



Looking dust from the ground

- Potenza- 26 June 2006 example

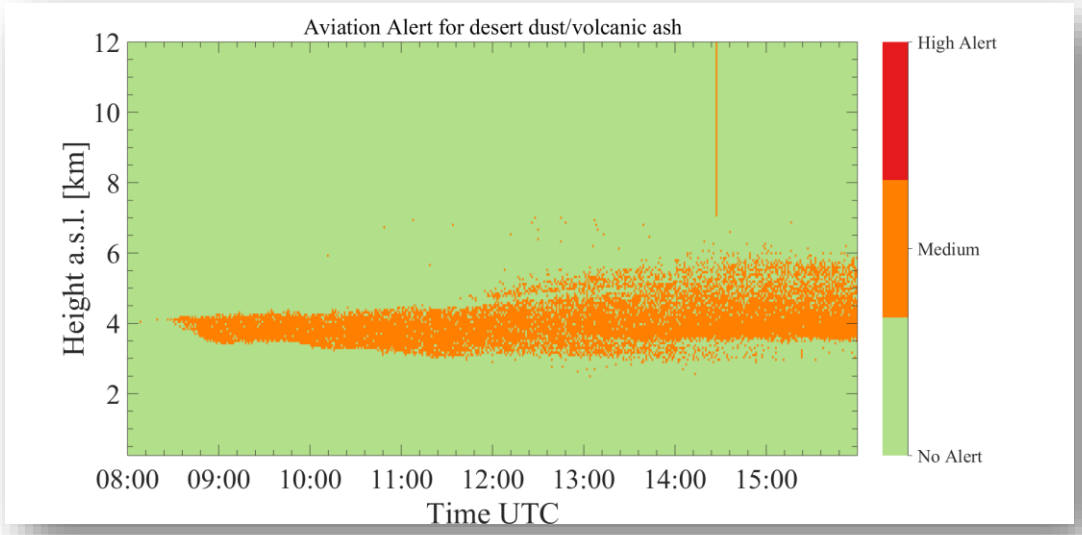
Profiling



Looking dust from the ground

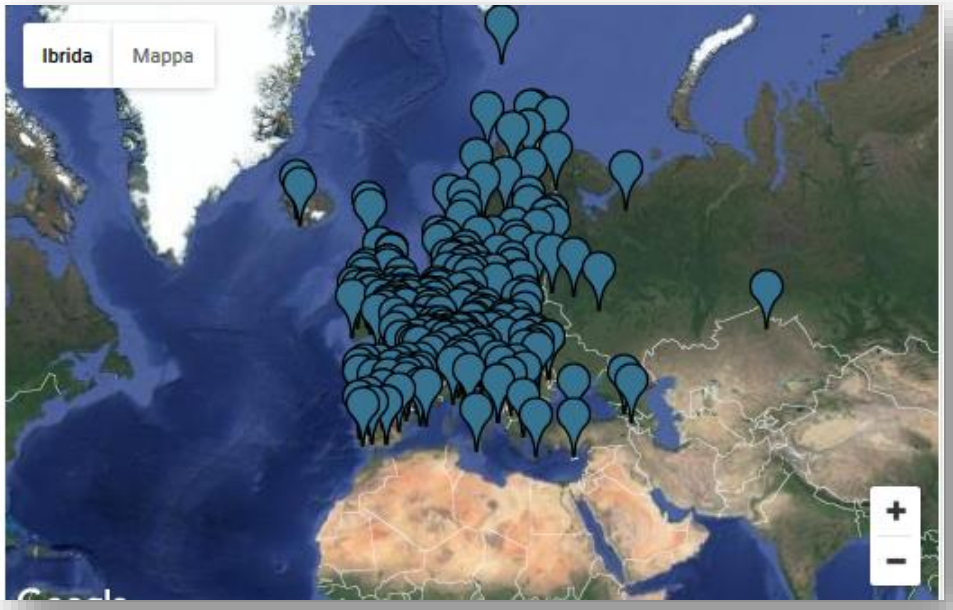
- Early Warning System under development

Ash/dust alerting system as an experimental tailored product. Example for 21 /03/2018 – Closure of Herakleion airport. (concentration up to 4700 µg/m3)



Looking dust near the surface

- **European Monitoring and Evaluation Programme (EMEP)**



244 stations providing different parameters (in different combinations) like PM10, PM2.5 and PM1 + wet deposition

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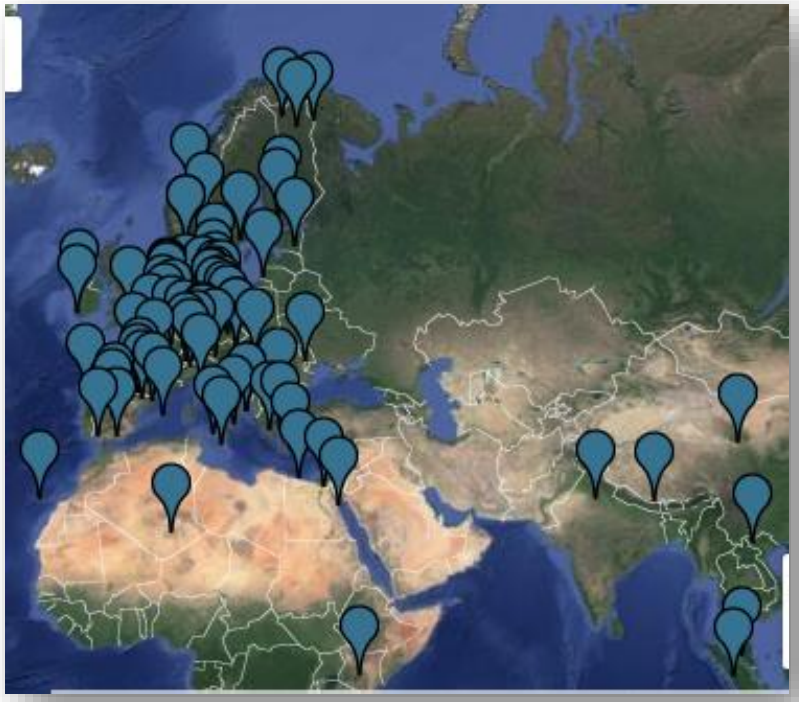
Looking dust near the surface

- **ACTRIS-Near Surface – linked to GAW**



173 stations: Chemical composition, size distribution, backscatter coefficient, PMx

Looking dust near the surface

- **European environment Information and Observation NETwork (EIONET)**

Eionet is a partnership network of the European Environment Agency (EEA) and its 39 member and cooperating countries.

The EEA is responsible for developing Eionet and coordinating its activities, together with national focal points (NFPs) in the countries, based in national environment agencies or environment ministries.

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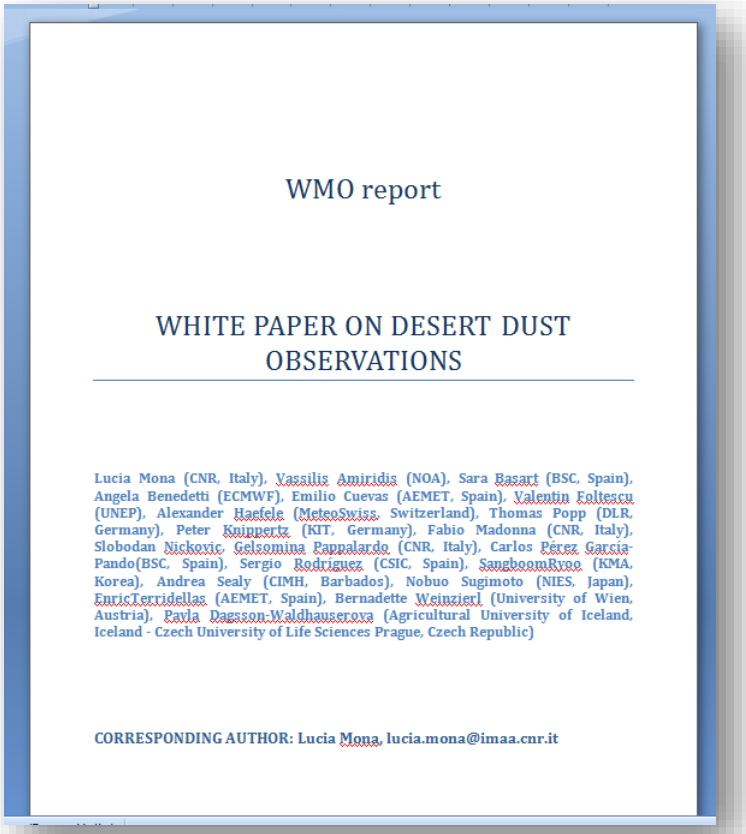
WMO White paper report for dust obs

- Near surface characterization
- Photometer measurements
- Lidar measurements
- Lidar +Photometer
- Satellite observations
- Networks
- Gaps and Needs



WMO report

WHITE PAPER ON DESERT DUST OBSERVATIONS

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BAMS online paper

- Concise version of WMO report for obs status of the art + needs and gaps
- It will offer broad and free access to the information

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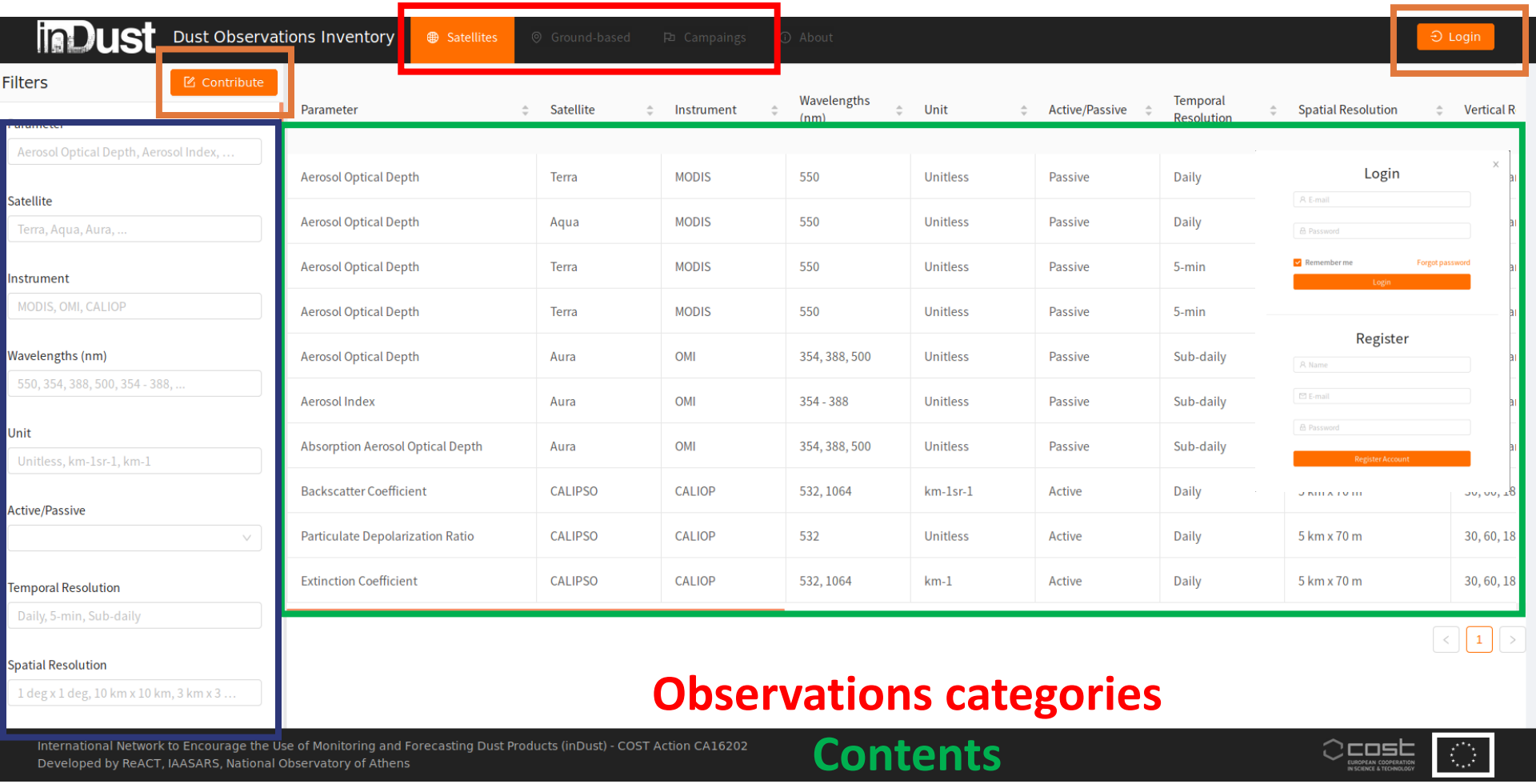
Online database of dust observations

- Under development in InDust
- Linked to the WMO report+ BAMS paper
- On line inventory collecting in 1 place all dust info

Web interface



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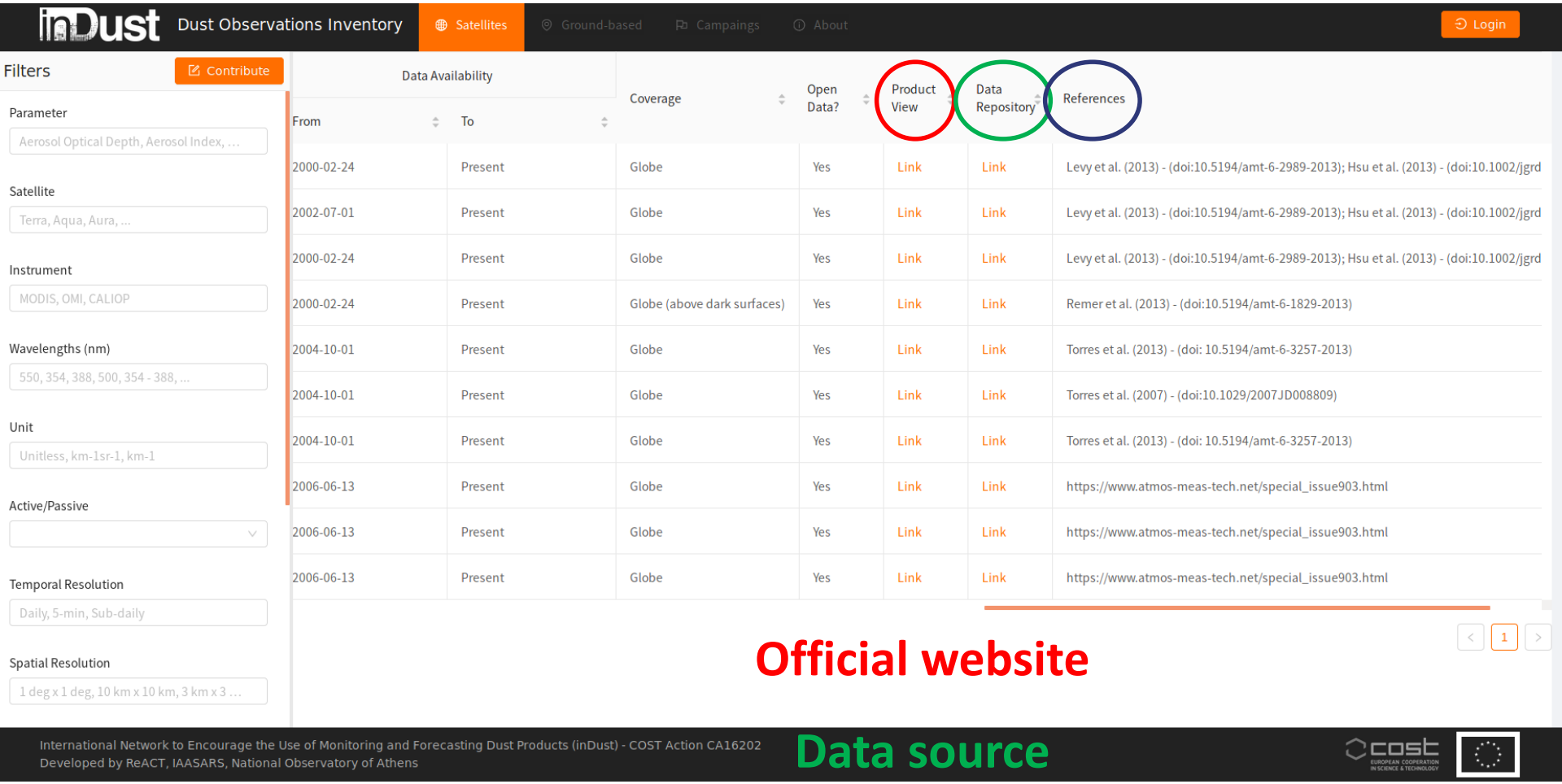
Remote sensing of Aerosols, Clouds and Trace gases

Web interface



Literature

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