<table>
<thead>
<tr>
<th>Title:</th>
<th>Aerosols, Clouds, and Trace Gases Research Infrastructures Network</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument:</td>
<td>Combination of Collaborative Project (CP) and Coordination and Support Action (CSA), FP7 Capacities specific programme for Integrating Activities - Research Infrastructures for Atmospheric Research</td>
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<tr>
<td>Budget:</td>
<td>7.8 M€ (total costs: 11.5 M€)</td>
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<tr>
<td>Duration:</td>
<td>2011 – 2015</td>
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<td>Consortium:</td>
<td>28 Partners from 19 countries</td>
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<tr>
<td>Project Coordination:</td>
<td>Dr. Gelsomina Pappalardo (CNR-IMAA, Italy) – Coordinator Dr. Paolo Laj (CNRS-LGGE, France) – Co-Coordinator</td>
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<tr>
<td>Project Website:</td>
<td><a href="http://www.actris.net">www.actris.net</a></td>
</tr>
</tbody>
</table>
### PARTNERS

28 Partners from 19 Countries

| Consiglio Nazionale delle Ricerche | Natural Environment Research Council |
| Centre National de Recherche Scientifique | Foundation for Research and Technology, Hellas |
| Norsk Institutt for Luftforskning | Commission of the European Communities, DG JRC |
| Helsingin Yliopisto (FI) | Deutscher Wetterdienst |
| Technische Universiteit Delft | B.I. Stepanov Institute of Physics |
| Paul Scherrer Institut | Institute for Nuclear Research + Nuclear Energy |
| Leibniz Institut fuer Troposphaerenforschung e.V. | Uniwersytet Warszawski |
| Eidgenoessische Materialpruflungs- & Forschungsanstalt | Consorzio Nazionale Interuniversitario |
| University of Reading | National Institute of R&D for Optoelectronics |
| Universitat Politechnica de Catalunya | Ludwig-Maximilians-Universitaet Muenchen |
| Max-Planck-Institut fuer Meteorologie | Czech Hydrometeorological Institute |
| Lunds Univiersitet | Pannon Egyetem |
| Agencia Estatal Consejo Superior | Belgian Institute for Space Aeronomy |
| National University of Ireland, Galway | Universidad de Valladolid |
Sustainable network of coordinated long-term atmospheric observations in Europe

- High-quality data relevant to climate and air quality research on the regional scale
- Centralised data centre
- Access to world-class research infrastructures and advanced instrumentation
- Training of researchers and young scientists
- New technologies and integration tools for ground-based observations of relevant atmospheric parameters
Long-term observations of key atmospheric parameters and environmental assessments related to climate, air quality, and long-range transport.

Direct observation of atmospheric hazards: forest fires, dust storms and volcanic eruptions.

Improved regional forecasts of both weather and air quality.

PM 2.5 aerosol analysis
GMES-MACC 30/10/11

Eyjafjallajökull eruption April 2010
Volcanic Ash over France
MERGING EXISTING NETWORKS

Harmonized measurements of physical, chemical and optical aerosol properties

Climate Change

Observation of vertical profiles of important cloud parameters

Radiative Forcing

Long-range transport

Advanced laser remote sensing for 4-D spatio-temporal distribution of aerosols

Air Quality & Health

Measurement of atmospheric precursor compounds

CREATE FP5 - EUSAAR FP6

CLOUDNET FP5

EARLINET FP5+6

APRIORI
AEROSOL OBSERVATIONS

SURFACE-BASED RETRIEVALS
- Aerosol properties (EU)
  - optical: >30 sites
  - size distribution: >30
  - off-line chemistry: >30
  - 3D extinction profiles: >30

SATELLITE RETRIEVALS

MODELLING
- Radiative Forcing
- DIRECT
- INDIRECT

AEROSOL OBSERVATIONS

AEROSOL OBSERVATIONS
AEROSOL OBSERVATIONS

Radiative Forcing

⇒ DIRECT
⇒ INDIRECT

Strong need for long term aerosol observations
- Large uncertainties
- Natural and anthropogenic contribution

From: IPCC 4th AR
Saharan dust observed over Potenza EARLINET lidar station - 26 June 2006
Eyjafjallajökull volcanic plume

Munich lidar station, 16 and 17 April 2010

MODIS Terra – 16 April 2010 10:45 UTC

VAAC
Comparison with models

Target classification

Jan-Dec 2004
Monitoring of atmospheric trace gases NO\textsubscript{xy} and VOC

- Short-lived but significant climate forcing
- Central regulatory role
  - free radical and oxidizing photochemistry of the troposphere (IPCC estimate of RF from tropospheric ozone is +0.35 ± 0.15 W m\textsuperscript{-2})
  - Nitrate (direct RF of −0.10 ± 0.10 W m\textsuperscript{-2}) and aerosol formation (SOA: increasing organic fraction of global aerosol burden affecting climate + air quality)
✓ Ground-based component of global Earth Observation System

✓ Provision of advanced data products and services

✓ Response to user needs (AEROCOM, GMES, ECMWF, research, policy-driven networks, natural hazards)

✓ Support policy issues on climate change, air quality, and health
ACTRIS is a network of networks / Federation of existing networks
Each network operates with a rigorous QA program for both instrument and data processing
Observation strategy
Standardization of data and metadata
Integration is the added value
- at instrument level: exploiting the synergies among different sensors and providing integrated advanced products
- at data base level: providing open access to a central data portal
Centralised advanced information of key variables relevant to climate and air quality research from a multitude of representative environments and air mass types in Europe.

In addition the data center provides tools and applications for end users to facilitate the use of all measurements for broad user communities (AEROCOM, ECMWF, ...)

Harmonization with measurements of atmospheric components from other highly relevant networks and programmes at (e.g, GMES, MACC, EMEP)

Through the ACTRIS integrated data centre, more than 100 000 data sets of atmospheric parameters are expected to be available.

This is by far the most comprehensive atmospheric data centre available worldwide including in-situ aerosol and gas phase measurements, remote column aerosol observations, vertical aerosol profile information and cloud observations.
Opportunities for world-class research and international collaboration at its unique infrastructures and advanced instrumentation

Training of researchers and young scientists to become future leaders in the field and promote scientific excellence in less-favoured regions in Europe

New technologies and algorithms for monitoring activities relevant for climate and air quality models, satellite retrievals, and forecast systems.
ACTRIS represents an unprecedented effort towards integration of a distributed network of ground-based stations, covering most climatic regions of Europe, and responding to a strong demand from the atmospheric research community.

GMES and ESFRI for a more sustainable observation system in Europe

Standardization at EU and international level within GEOSS
THANKS FOR YOUR ATTENTION

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www.actris.net