



QUADIEEMS

About QUADIEEMS

The project aims at the detailed quantification and mapping of the aerosol direct and indirect radiative effect and examination of the relations between aerosols and clouds over the region of Eastern Mediterranean based on satellite observations.

QUADIEEMS is implemented within the framework of the Action "SUPPORTING POSTDOCTORAL RESEARCHERS" being co-financed by the European Social Fund (ESF) and national resources under the operational programme Education and Lifelong Learning (EdLL).

The first 2/3 of the project (16 months) is implemented at the Max Planck Institute for Chemistry (MPIC) in Mainz, Germany while the rest 1/3 is implemented at the Aristotle University of Thessaloniki (AUTH) in Thessaloniki, Greece.

Satellites & Models

Observations from five satellites, MODIS (Moderate Resolution Imaging Spectroradiometer) sensors aboard EOS TERRA and EOS AQUA, TOMS (Total Ozone Mapping Spectrometer) aboard Earth Probe, OMI (Ozone Monitoring Instrument) aboard EOS AURA and CALIOP (Cloud-Aerosol Lidar with Orthogonal Polarization) aboard CALIPSO will be used in conjunction with meteorological data from ECMWF ERA-interim reanalysis, data from a global chemical-aerosol-transport model and results from REGCM4 regional climate model simulations.

Results from these model runs will be compared with the satellite-based observations in order to evaluate REGCM4's ability to simulate aerosols and their direct radiative effect.



Expected Results

A spatially and temporally homogenized high resolution ($0.1^\circ \times 0.1^\circ$) gridded dataset will emerge from the analysis of the data. The relative contribution of maritime, anthropogenic and dust aerosols will be determined. These parameters will be used as an input to recently proposed satellite-based parameterizations in order to quantify the direct and in-direct radiative effects of different aerosol types. The first and second indirect effect of aerosols, through their impact on the droplet size and lifetime of clouds, will also be investigated analyzing 2D (latitude/longitude) and 3D (latitude/longitude/height) satellite data. The position of the aerosol layer relative to clouds seems to be critical for the effect of aerosols on clouds. In addition, the direct and indirect radiative effect of aerosols also depends on the relative position of aerosol and cloud layers. The high resolution of the analysis applied here is expected to reveal local features that cannot be discriminated with the usually used (100 times lower) 1×1 degree resolution. The procedure will be repeated using a 1×1 degree resolution in order to examine the footprint of the aerosol direct and indirect effects. The investigation of the local features will help us to better understand the aerosol-cloud-radiation interactions. Within this research simulations will be implemented using REGCM4 regional climate model.

Partners

- Aristotle University of Thessaloniki (AUTH) in Thessaloniki, Greece
- Max Planck Institute for Chemistry (MPIC) in Mainz, Germany.

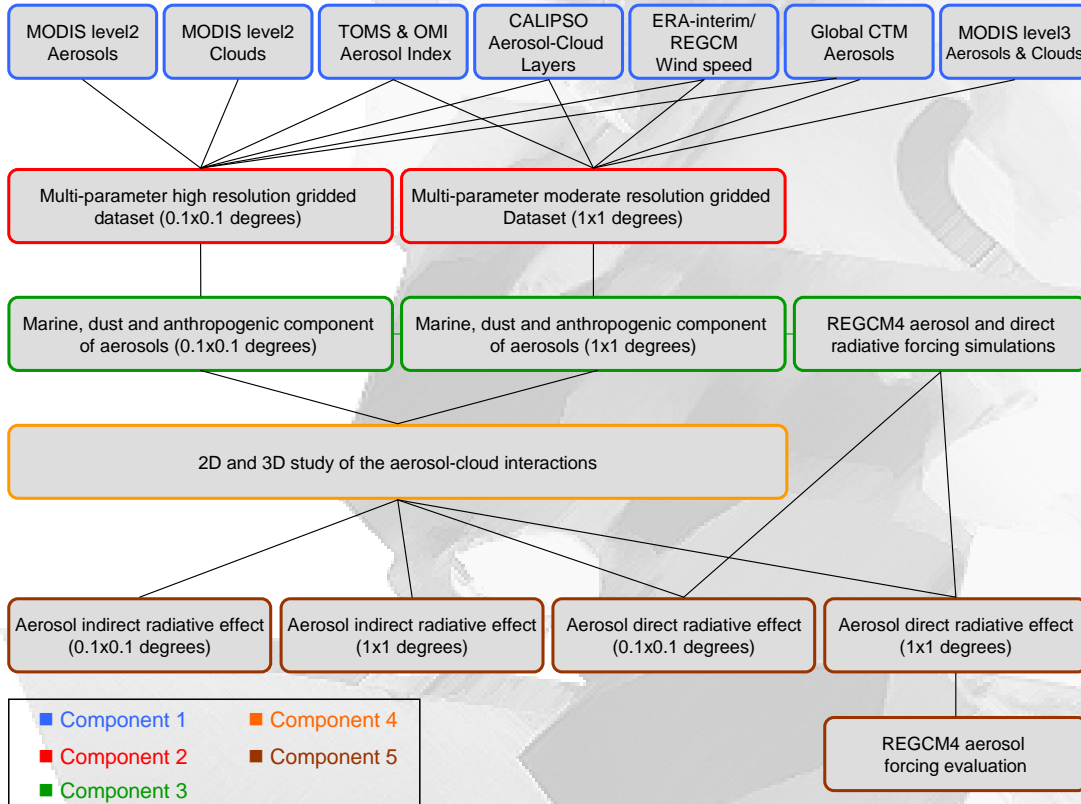
For the purposes of the project a postdoctoral researcher (**Dr Aristeidis K. Georgoulas**) works with MPIC for a 16-month period (2/3 of the project) under **Dr Ulrich Pöschl** the founding Director of the Multiphase Chemistry Department (Host institution Scientific Advisor). The rest 1/3 of the project (8 months) is implemented at the Department of Meteorology and Climatology, School of Geology of AUTH under the supervision of **Dr Prodromos Zanis** (Principal Investigator). A PhD candidate and a postgraduate student are expected to work within QUADIEEMS while a number of external collaborators will also contribute.



UADIEEMS

Project Components

- Data acquisition and storage (1-5th month)
- Analysis and spatial homogenization of the raw data (1-9th month)
- Quantifying the marine, dust and anthropogenic component of aerosols (9-12th month)
- A 2D and 3D study of the aerosol-cloud interactions (11-16th month)
- Quantifying the aerosol direct and indirect radiative effect (17-24th month)



For details about the project contact:

Aristeidis K. Georgoulis, MSc, PhD
(Postdoctoral Researcher)

Department of Meteorology and Climatology
School of Geology, Faculty of Sciences
Aristotle University of Thessaloniki (AUTH)
Postal Address: New Building of Faculty of Sciences (4th floor)
University Campus of AUTH, 54124, Thessaloniki, GREECE
Tel: +30-2310-998572
Email: ageor@auth.gr

Prodromos Zanis, Assistant Professor
(Principal Investigator)

Department of Meteorology and Climatology
School of Geology, Faculty of Sciences
Aristotle University of Thessaloniki (AUTH)
Postal Address: Building of Meteoroskopeio (1st floor)
University Campus of AUTH, 54124, Thessaloniki, GREECE
Tel: +30-2310-998240 / Fax: +30-2310-995392
Email: zanis@geo.auth.gr



Implemented within the framework of the Action "SUPPORTING POSTDOCTORAL RESEARCHERS" being co-financed by the European Social Fund (ESF) and national resources under the operational programme Education and Lifelong Learning (EdLL).