Consistent computation of the chemistry-cloud continuum and climate change in Cyprus

From 2009-01-01 to 2014-12-31, closed project

### Project details

**Total cost:**
EUR 2 196 000

**EU contribution:**
EUR 2 196 000

**Coordinated in:**
Cyprus

**Topic(s):**
ERC-AG-PE10 - ERC Advanced Grant - Earth system science

**Call for proposal:**
ERC-2008-AdG  
See other projects for this call

**Funding scheme:**
ERC-AG - ERC Advanced Grant

### Objective

We have developed a new numerical method to consistently compute atmospheric trace gas and aerosol chemistry and cloud processes. The method is computationally efficient so that it can be used in climate models. For the first time cloud droplet formation on multi-component particles can be represented based on first principles rather than parameterisations. This allows for a direct coupling in models between aerosol chemical composition and the continuum between hazes and clouds as a function of ambient relative humidity. We will apply the method in a new nested global-limited area model system to study atmospheric chemistry-climate interactions and anthropogenic influences. We will focus on the Mediterranean region because it is a hot spot in climate change exposed to drying and air pollution. The limited area model will also be applied as cloud-resolving model to study aerosol influences on precipitation and storm development. By simulating realistic meteorological conditions at high spatial resolution our method can be straightforwardly tested against observations. Central questions are: - How does the simulated haze-cloud continuum compare with remote sensing measurements and what is the consequence of abandoning the traditional and artificial distinction between aerosols and clouds? - How are cloud and precipitation formation influenced by atmospheric chemical composition changes? - To what extent do haze and cloud formation in polluted air exert forcings of synoptic meteorological conditions and climate? - Can aerosol pollution in the Mediterranean region exacerbate the predicted and observed drying in a changing climate? The model system is user-friendly and will facilitate air quality and climate studies by regional scientists. The project will be part of the Energy, Environment and Water Centre of the newly founded Cyprus Institute, provide input to climate impact assessments and contribute to a regional outreach programme.

### Related information

**Result In Brief**
Aerosol Chemistry and Climate

**Report Summaries**
Final Report Summary - C8 (Consistent computation of the chemistry-cloud continuum and climate change in Cyprus)
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See on map

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**Beneficiaries**

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**To know more**

http://erc.europa.eu/

**Subjects**

Earth Sciences - Environmental Protection - Physical sciences and engineering

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