FORCES: Constrained aerosol forcing for improved climate projections

Description

The overall objective of FORCeS is to understand and reduce the long-standing uncertainty in anthropogenic aerosol radiative forcing, which is crucial in order to increase confidence in climate projections. These projections are highly relevant for decision makers, as they provide key information on emission pathways that will facilitate the targets of the Paris Agreement to be achieved. FORCeS will identify key processes governing aerosol radiative forcing, as well as climate feedbacks related to aerosols and clouds, and improve the knowledge about these processes by bringing together leading European scientists with trans-disciplinary expertise to:

- exploit the wealth of in-situ and remote sensing data that have emerged during the recent decades;
- perform dedicated laboratory and field experiments;
- utilize a range of state-of-the-art computational models; and
- apply novel theoretical methods including machine learning techniques.

The process analysis within FORCeS will be conducted with the overall aim of improving a set of leading European climate models, which all provide essential information to climate assessments such as the IPCC report. The gap between knowledge on the process scale and model application on the climate scale is currently a main reason preventing the climate science community to move forward in terms of understanding the role of aerosols and aerosol-cloud interactions in the climate system. FORCeS will bridge this knowledge gap using systematically designed scale chains that involve methodologies for constraining processes on scales ranging from hours to decades, ultimately leading to the desired refinement of model-estimated aerosol forcing and climate sensitivity. FORCeS will reach out to decision makers and stakeholders and provide added-value information through e.g. workshops where climate science and climate policy experts meet to achieve maximum impact.

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