SPECIES: reSolving aerosol absorPtion, burdEn and size with Earth system model assimilation of spaCe and In-situ sEnsorS

Description

Aerosols constitute an important component in the physics and chemistry of the atmosphere, and concretely of the atmospheric radiative balance and cloud formation, and yet the uncertainties about aerosols concentrations and distributions, and about their life cycle are considerable.

The recent advances in numerical modeling developments, observational capabilities, information technologies - and in particular High Performance Computing (HPC) - have contributed to a better understanding of aerosol processes and a better quantification of aerosol impacts upon key sectors of society and economy. It is undoubtedly that the synergistic use of the three (model, observations, HPC) has played the most pivotal role in those advances. Observations from new generation sensors (e.g., from the Sentinel, EPS-SG and EarthCARE missions) and state-of-the-art modeling combined with advanced data assimilation algorithms will help to further advance our knowledge of atmospheric aerosols and of their impact in the Earth system.

SPECIES addresses what are the advantages, synergies, limitations for aerosol observational data assimilation taking into account new generation sensor capabilities at different scales: from the prediction of extreme events to global long-term monitoring of atmospheric composition.

The project will advance our knowledge on atmospheric aerosol parameters by:

- Performing studies with an unprecedenteduse of extensive observational information from different sources: space and in-situ components, which will jointly improve surface andcolumn concentration of pollutants
- Creating advanced analyses with improved aerosol composition where aerosol model quantity, sizeand absorption are seamlessly constrained
- Developing a state-of-the-art data assimilation methodology to improve the prediction ofextreme events as well as to produce an exceptionally constrained scout aerosol reanalysis for atmospheric and climate studies.

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