CERTAINTY: Cloud-aERosol inTeractions & their impActs IN The earth sYstem

Description

Cloud, aerosols and their interactions are key regulators of climate. However, uncertainties in the magnitude of the net cooling impact of aerosols on climate and in the cloud response to evolving anthropogenic emissions and climate change induced feedbacks on natural emissions are major challenges that limit our understanding of how global and regional climate, including extremes, respond to changes in greenhouse gases. It is of paramount importance to better understand aerosol-cloud processes and their role in the Earth System, from regional to global scales, and over different time scales, from days to decades.

Over the last decade, extensive research networks, infrastructures, satellite instruments, and atmospheric models have been developed, making it possible to obtain a holistic view of the effects of clouds and aerosols on climate and weather. CERTAINTY will capitalise on this available data together with advanced algorithms, machine learning and data assimilation methods, high resolution models, and Earth system models to bring the fundamental knowledge of interactions between clouds, aerosols, and radiation to a new level.The consortium partners are in key roles as operators, data originators, developers, providers, and users of European aerosol and cloud data and ESMs/high resolution models. The consortium leads the activities of next generation satellite missions (such as EarthCARE), and the development of new satellite products, to facilitate their scientific use in CERTAINTY by preparing tools for early adoption of data.

CERTAINTY will bring the observation-based knowledge to be used in modeling frameworks to improve predictive models and knowledge of processes controlling aerosols, clouds, and their interactions from hours to decades. The ultimate outcome will be better understanding and predictions of extreme events that facilitates planning of climate mitigation/adaptation strategies for the good of European citizens and global society.

Barcelona Supercomputing Center - Centro Nacional de Supercomputación