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SPACE BASED CLIMATE CHANGE MONITORING OF CONTRAILS AND CIRRUS CLOUD - PROGRESS AND FUTURE DIRECTIONS

Abstract

The paper reviews the outstanding problems focused on Contrails and Cirrus Cloud, its assessment, consequences and solution synthesis, and identify future directions that could be followed. The Rationale for assessing Clouds, Aerosols and their interactions is associated with the representation of cloud processes in climate models which has been recognized as a dominant source of uncertainty in our understanding of changes in the climate system. Clouds respond to climate forcing mechanisms in multiple ways, and inter-model differences in cloud feedbacks constitute by far the primary source of spread of both equilibrium and transient climate responses simulated by climate models despite the fact that most models agree that the feedback is positive. Thus confidence in climate projections requires a thorough assessment of how cloud processes have been accounted for a radiative forcing (RF) of climate change through their interaction with radiation, and also as a result of their interaction with clouds. Estimate of Effective Radiative Forcing from Combined Aerosol–Radiation and Aerosol–Cloud Interactions is also relevant. There are a large number of satellite surface sensors recently launched or shortly to be launched. Recent satellite instruments such as CHRIS, MERIS, MODIS and ASTER, are essential in obtaining relevant data to that end. Theory, model studies and observations suggest that some Solar Radiation Management Methods (SRM methods) may be able to counteract a portion of global warming effects (on temperature, sea ice and precipitation) due to high concentrations of anthropogenic Green House Gases (GHGs). A new coordinated earth observation, aviation and environment program should be able to bring in at minimal cost the aircraft and ground-based measurement community, the satellite analysis community, the chemistry and climate modeling communities, along with the international research community to participate in specific projects, to deliver realistic outcomes. These initiatives may incorporate Models and Measurements, which in this case describes a critical, objective evaluation of the models used to predict aviation impacts, a unified global data set for contrails and cirrus, with well characterized accuracy and within reach using existing satellite observations, in a coordinated effort within Earth Observation initiatives.