

## **Progress in modeling efforts related to radiance assimilation of clouds and precipitation**

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We will report on the progress we made in radiative transfer forward modeling and algorithm development related to microwave radiance assimilation under cloudy or precipitating conditions.

Firstly, an update will be given on the status of the successive order of interaction (SOI) fast forward and adjoint radiative transfer model that has been developed in a project supported by the Joint Center for Satellite Data Assimilation (JCSDA). The model has now been implemented into the community radiative transfer model (CRTM) and is currently undergoing testing.

Secondly, a new scattering database for non-spherical particles within the framework of the SOI model will be discussed and example comparisons between observed and simulated AMSU-A/B brightness temperatures will be shown. The results indicate that the scattering database is capable of accurately simulating both the angular as well as the frequency dependence of scattering at microwave frequencies between 23 GHz and 190 GHz.

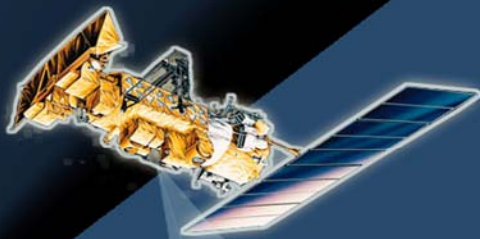
Thirdly, a new computationally effective cloud overlap scheme for the microwave has been developed. This scheme allows to simulate radiative transfer within a variational assimilation context under cloudy and precipitating situations. It has been tested at ECMWF against global passive microwave observations and has been found to reduce biases between model and observations over the scheme that is currently implemented operationally at ECMWF.

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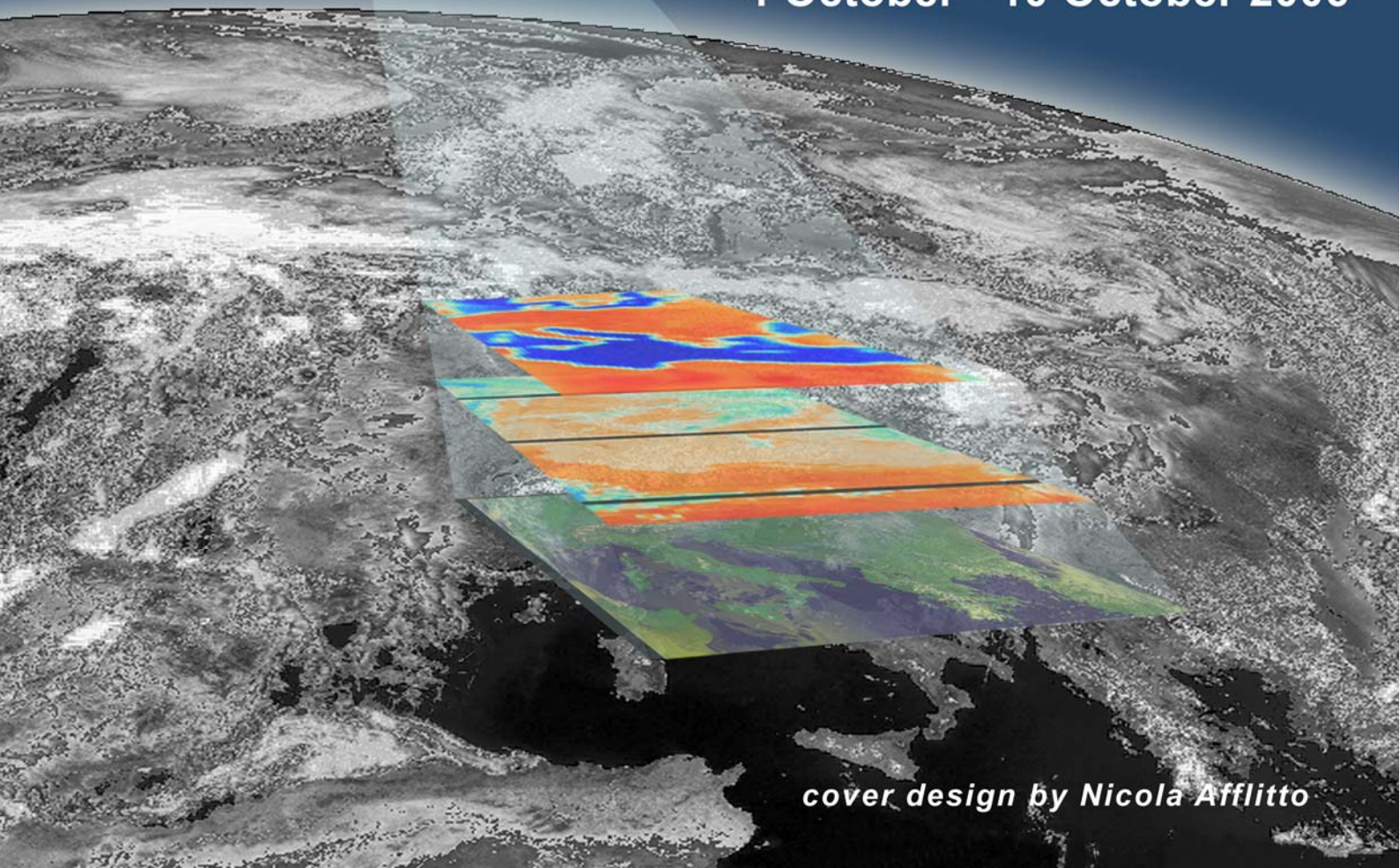
*using space-based observations*



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