

4th workshop on assimilating satellite cloud and precipitation observations for NWP



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Fast infrared modelling of cloudy infrared radiances

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Cloudy infrared observations are not currently fully exploited in operational NWP models. There are many reasons for this and the one we are interested in is the need to have an accurate and fast radiative transfer model to simulate cloud scattering in infrared. In most NWP centers, cloudy infrared observations are assimilated using the grey-cloud approximation. In this approximation clouds are considered as a single opaque layer without any scattering. By assuming this, cloudy simulations are very fast but only information on the atmosphere above the cloud top is gained in the assimilation, then excluding in-cloud information. Furthermore, the selection of observations to overcast situations reduces drastically the percentage of assimilated cloudy observations estimated between 3 and 5%. In order to go a step beyond the single layer opaque cloud model, fast infrared modelling of cloudy radiances including scattering have been proposed for many years in radiative transfer models. The three contributors to the fast infrared modelling of cloudy radiances will be discussed: fast scattering models, cloud optical properties and cloud overlap methods.

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