Session: C24 Poster: T218A

The assimilation of surface sensitive microwave observations over land and sea ice

Florence Rabier[†]; Fatima Karbou
[†] Meteo-France and CNRS, France
Leading author: florence.rabier@meteo.fr

One of the major scientific challenges in numerical weather prediction is to extract useful information on the atmospheric boundary layer from remote sensing microwave observations. These data contribute increasingly to improve atmospheric analyses and therefore to improve short to medium range forecasts, but also to improve re-analyses. Better use of remote sensing data often requires appropriate representation of the surface in the models, in both emissivity and temperature. This is achieved over sea, and satellite data have a tremendous impact on the atmospheric analyses over oceans. However, over land, the surface emissivity is highly variable and may induce biases in the forward model if its temporal and spatial variability are not well taken into account. In such a situation, the model can not produce realistic simulations of observations sensitive to the surface and may reject many useful observations, including those not sensitive to the surface. This case concerns in particular the land and sea ice surfaces for which the surface emissivity is particularly challenging to model. We will describe some of the work carried out at Météo-France for a better description of the emissivity of land and sea ice surfaces. We will give details on the methodology for estimating the emissivity in the model and on its impact on the performance of the radiative transfer model used. We will also expose the impact of a proper modeling of the land and sea ice emissivity in the framework of global impact studies. We will focus on global analyses and forecasts, and will assess, whenever possible, the impact of additional satellite observations on analyses/forecasts by using independent measurements. Two particular regions will be particularly investigated: the African continent and the poles. Both areas are lacking conventional observations, and benefit highly from a better use of satellite observations.