Hyperspectral infrared sounders contribution to climate monitoring

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Hyperspectral infrared sounders provide highly informative data since 2002 for AIRS and 2006 for IASI. Their assimilation in Numerical Weather Prediction (NWP) operational systems have shown a very positive impact in improving the quality of the atmospheric analyses, as will be shown in the poster. Furthermore, these sensors provide an accurate information on the cloud cover, which is one of the key points in climate monitoring. In particular, the CO2-slicing technique is used in operations to derived cloud information from AIRS spectra. This technique has been adapted to IASI and its validation against measurements from the A-Train, in the framework of the Concordiasi field campaign which took place in Antarctica, will be discussed in the poster. A further step is the analysis of cloud variables (profiles of cloud liquid and ice water, profiles of cloud fraction) thanks to the cloudy radiative transfer model RTTOV-CLOUD. Preliminary studies are currently carried out with the French convective-scale model AROME. The corresponding results will be discussed. Another key point in the climate monitoring is the surface temperature. Hyperspectral infrared sounders can easily provide information on sea surface temperature in clear sky conditions. Over land, surface temperature retrieval is more difficult as the variation of the surface emissivity with the soil type and the spectral range is difficult to handle. Which leads to discard numerous channels from the assimilation because of the subsequent uncertainties in the surface conditions. Results on surface temperature retrievals from IASI over Antarctica will be displayed. More over, first results on the use of emissivity atlases as a basis to improve the usage of IASI data over land will also be discussed. All these studies and improvements on AIRS and IASI will ease the usage of next IASI which will be launched, as well as the usage of future missions (namely IASI-NG and CrIS). This will provide long series of homogeneous records of high accuracy, which will be used for fine climate monitoring.