

What is the actual impact of assimilating IASI radiances into the global model ARPEGE ?

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ABSTRACT

The 2008 arrival of the IASI hyperspectral sounder was considered a revolution in the history of numerical weather prediction (NWP), providing information on vertical temperature and humidity profiles with a resolution that was unrivalled at the time. Since that time, the number of instruments aboard polar-orbiting or geostationary satellites has increased significantly, exploring both infrared and microwave spectra. The models have also evolved considerably, with notably finer resolution, requiring ever more data to constrain their initial conditions. A new version of Météo-France's NWP system, due to be operational in fall of 2024, includes a number of innovations, in particular the assimilation of some microwave instruments in cloudy weather. These changes could modify the impact of infrared instruments, including IASI, on the quality of the ARPEGE global model. The need was therefore felt to reassess the benefits of assimilating IASI into ARPEGE. We therefore present here a detailed study of IASI's impact on this new version of the model, distinguishing between the respective contributions of temperature-, humidity- and ozone-sensitive channels, as well as window channels. This investigation aims at providing a final assessment of IASI's contribution to a state-of-the-art NWP system, before the arrival of new-generation instruments such as IASI-NG and IRS.