Assimilation of FY-3 data at the Met Office

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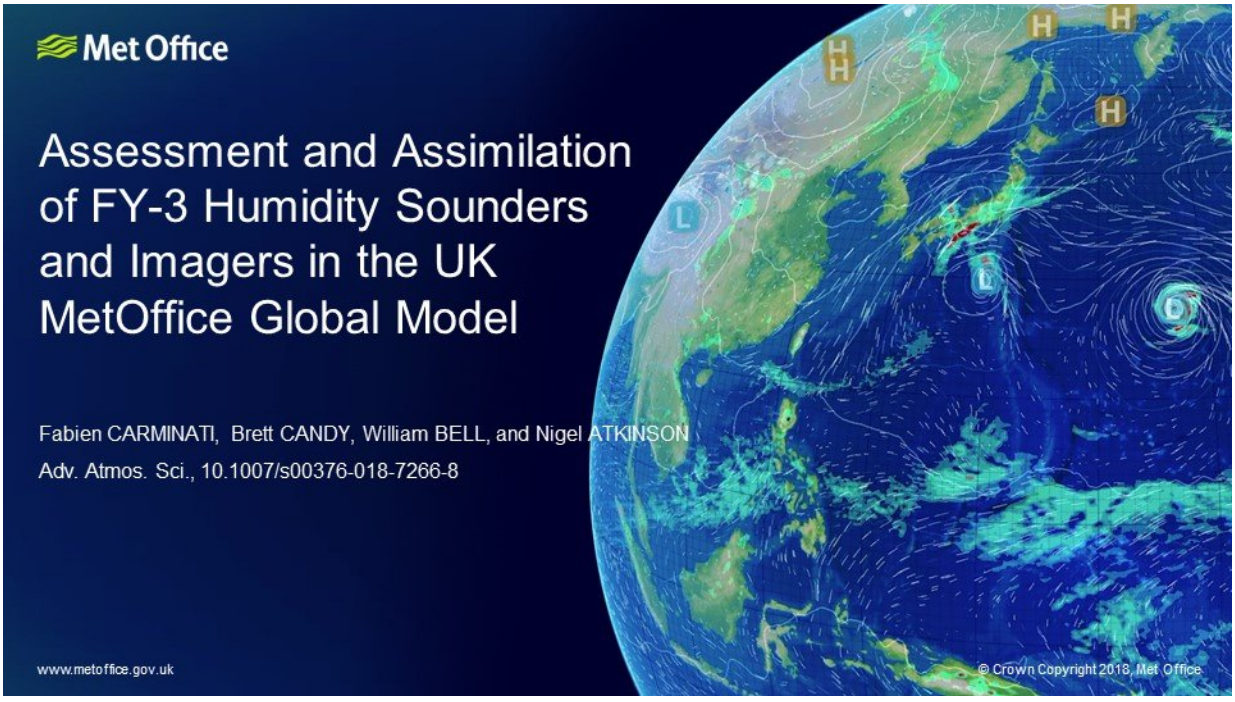

The assessment and assimilation of FY-3 humidity sounders and imagers in the UK Met Office global model. Credit: Fabien CARMINATI

Chinese meteorological satellite data provide an increasingly important contribution to the global observing system, supporting weather and climate applications. In that context and as part of the Climate Science for Service Partnership China (CSSP China) the UK Met Office has been working in collaboration with the China Meteorological Administration-National Satellite Meteorological Center (CMA-NSMC)

to realize maximum benefits from the FY-3 satellite program.

A new study published in *Advances in Atmospheric Sciences* presents the strategy for the assimilation of the FY-3 microwave humidity sounders (MWHS) and the microwave radiation imager (MWRI) in the Met Office global numerical weather prediction (NWP) model. The assessment and monitoring of satellite radiances are the first steps towards their assimilation in NWP models and reanalyses, the development of climate data records, and the improvements of future instruments.

The assimilation of observations from the MWHS instruments is shown to have a beneficial impact on the Met Office global model and significantly participates to the 24-h global forecast error reduction. In addition, the study demonstrates how the operational monitoring allows rapid detection of data anomalies that are fed back to CMA for investigation and remedy.

In parallel, MWRI ascending-descending bias is investigated and a bias correction method is proposed. MWRI ascending-descending bias is a complex bias varying with the orbital angle (i.e. the angle between the center of Earth and the satellite position with respect to the ecliptic plane). Such a bias has been previously observed in the data of the U.S. DMSP instrument Special Sensor Microwave Imager Sounder (SSMIS) and a specific bias correction has been developed at the Met Office. The development of MWRI bias correction is based on the work carried out for SSMIS and the future assimilation of bias corrected MWRI observations is expected to strongly benefit NWP models.

Since the beginning of the CSSP China program, the close collaboration between the Met Office and CMA-NSMC helped support China in generating high quality satellite data for weather and climate services. In time, it is expected that FY-3 data will play a key role in NWP and

reanalyses used, for example, as input to a wide range of models (such as crop, livestock, pasture, or economic loss) providing basis for management and decision-making.

More information: Fabien Carminati et al, Assessment and Assimilation of FY-3 Humidity Sounders and Imager in the UK Met Office Global Model, *Advances in Atmospheric Sciences* (2018). DOI: 10.1007/s00376-018-7266-8

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