Preparations for assimilating rescued and reprocessed satellite sounding observations in the next generation global atmospheric reanalysis at ECMWF - ERA6

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Abstract

An extension of the fifth generation atmospheric reanalysis at ECMWF, ERA5, back to 1950 has recently been completed. ERA5 makes use of early infrared sounding data from VTPR, carried on NOAA-2 through-5 from 1973-1979. Preparations are now underway for the next generation of reanalysis, ERA6, due to start in early 2024. These preparations aim to address some aspects, reviewed here, in the assimilation of sounding data evident in ERA5, including: drifting biases for the advanced IR sounding data due to the handling of evolving CO2 concentrations; large inter-satellite biases in MSU data; and discontinuities in analysed stratospheric temperatures as a result of discontinuities and inter-satellite biases in SSU data.

In addition, ERA6 will make use of several reprocessed radiance datasets produced by EUMETSAT as part of the first (2015-2021) and second (2021-2027) phases of the EU's Copernicus Climate Change (C3S) programme. Plans currently include the assimilation of FCDRs for ATMS, MHS, MWHS-2, HIRS, SSM/T, SSMIS and Japanese geostationary satellite radiances. This element of C3S also, under current plans, aims to produce FIDUCEO-type uncertainty analyses for MSU, AMSU-A and ATMS.

ERA6 will also make use of several recently rescued early (1970s) satellite datasets, including radiances from SI-1, SMMR, SSH, IRIS, SIRS, PMR, MRIR, NEMS, SCAMS, ESMR

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and SCR. Preparations to date have included the generation of new RTTOV coefficients and evaluation of the quality of these radiances relative to ERA5 using analysis departures computed off-line. These evaluations have uncovered several biases in these datasets which are under investigation.

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