

Virtual Event: ECMWF/EUMETSAT NWP SAF Workshop on the treatment of random and systematic errors in satellite data assimilation for NWP



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Satellite data rescue for climate reanalysis

In the modern era satellite data have increasingly become the dominant source of information assimilated in Numerical Weather Prediction (NWP) models. Before 1979, however, very little satellite data is currently assimilated into climate reanalyses. For example, ERA5 only uses one pre-1979 sensor (the VTPR instrument flown on the NOAA series of satellites) even though other sensors are potentially available. This poster highlights work from one of the C3S projects which are aiming to identify and prepare early satellite datasets (in our case mostly in the period 1964 to 1979) that will help to improve the ECMWF's next centennial climate reanalysis, ERA6.

These early datasets come from a range of infrared radiometers, sounders and imagers. We will show examples of data quality issues and methods of quality control for some of these very old datasets. We will also show comparisons of the observations to ERA5-based simulations which also provides a basis for assessing the data quality and characterising biases in the data.

Where possible the analysis of uncertainties in the satellite datasets is carried out via a metrologically based approach. This includes obtaining estimates of the random component of the uncertainty (noise) as well as estimating systematic uncertainties arising from instrumental problems/issues. We will also discuss methods for reducing systematic errors in the data as well as attempts to improve the current variational bias correction models which are used to minimise observational biases relative to the prior model state. The final set of data will then be used to provide valuable information for the 1960s and 1970s and beyond as part of the ERA6 reanalysis.

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