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Towards improved geostationary radiance records for global reanalysis

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Earth observations constitute a critical input for monitoring and advancing understanding of the Earth climate system including its variability and change. From observations taken by satellites or ground-based systems so-called Climate Data Records (CDRs) can be created. In particular long records of satellite data have a high potential for being utilised for assimilation into Numerical Weather Prediction (NWP) models to create a physically consistent model-based reanalysis,for the assessment of climate model performance and climate studies directly targeting an improved understanding of the mechanisms of climate change and variability. However, the requirements concerning long-term stability and uncertainty for CDRs are challenging. This is because many long-term satellite observations are provided by operational satellite systems build for the purpose of weather and not climate monitoring. Thus, a high demand for satellite radiance data records with quality analysed and corrected observations as well as a homogenisation over time facilitating the use of multiple satellites carrying similar and different instruments exists.

This presentation discusses this challenge along the example of EUMETSAT's activities within the ERA-CLIM project. At the core of the activities are the long existing data records of the EUMETSAT Meteosat and Eumetsat Polar System program satellites. In particular the usage of the Meteosat data presents a challenge because the instruments were originally not designed to be used for climate monitoring. The presentation outlines how inter-satellite calibration for the Meteosat data record spanning a period from 1982 to today can be achieved by tying observations to reference instruments in space such as IASI and
how the associated uncertainties might be quantified.