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Reanalyses form a key component of the suite of data products developed by the Copernicus Climate Change Service (C3S). ECMWF's fifth generation global reanalysis (ERA5) has supported a growing user base, currently numbering more than 50 000 users. A preliminary extension of ERA5 back to 1950 was published in 2021. In addition to assimilating a comprehensive set of satellite data starting from the TOVS suite of instruments from 1979 onwards, ERA5 makes use of early infrared sounding data from VTPR, carried on NOAA-2 through-5 from 1972-1979. Reprocessed satellite data have played a role, alongside model and data assimilation developments, in delivering improved analyses relative to ERA5's predecessor, ERA-Interim. Preparations are now underway for the next generation of reanalysis, ERA6, due to start in early 2024.
ERA6 will make use of several reprocessed satellite datasets produced by EUMETSAT as part of the first (2015-2021) and second (2021-2028) phases of the EU's C3S programme. Plans currently include the production and assimilation of Fundamental Climate Data Records (FCDRs) for ATMS, MHS, MWHS-2, HIRS, SSM/T, SSMIS and European (MVIRI and SEVIRI) and Japanese geostationary satellite radiances. The first phase of the C3S programme has also delivered reprocessed datasets for several radio occultation missions (GRAS, COSMIC, GRACE and CHAMP) as well as Atmospheric Motion Vectors (AMVs) and scatterometer data (ASCAT). This element of C3S aims to produce comprehensive uncertainty analyses for the microwave sounders MSU, AMSU-A and ATMS. The impact of these new reprocessed datasets has been assessed in observing system experiments (OSEs) at ECMWF which show the new data generally exhibits lower biases, results in improved re-forecast quality and, in some cases, have an impact on the mean state estimate.
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 and SCR. Preparations to date have included the generation of improved radiative transfer models and evaluation of the quality of these radiances relative to ERA5 using analysis departures computed off-line.