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Satellite observations in support of the Copernicus Climate Change Service

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Abstract
The Copernicus Climate Change Service (C3S), operated by ECMWF on behalf of the European Commission, provides climate services built around a comprehensive suite of data products. These products include multidecadal estimates of the atmospheric state, based on atmospheric reanalysis, and a range of observational datasets on Essential Climate Variables (ECVs). Atmospheric reanalyses are now regarded as valuable sources of information for monitoring trends in the global atmospheric state and employ highly optimised methods for combining observations of meteorological variables, both *in-situ* and satellite. The most recent C3S global atmospheric reanalysis, ERA5, covering the period 1979-2019 (to be extended to 1950) is now available and since its release in early 2019 has a rapidly growing user base, currently numbering more than 30,000. It uses a recent version of the ECMWF Numerical Weather Prediction (NWP) system to assimilate observations (87 billion for the period 1979 - 2018) in order to analyse the atmospheric state. Satellite observations are a key input to reanalyses and the range of observations assimilated are reviewed. ECVs derived from satellite and in-situ observations, spanning land, atmosphere, ocean and biosphere domains, produced as part of international collaborations, are available via the C3S Climate Data Store (CDS). The aspiration of C3S is to further develop the CDS to include a wider range of (~ 35) ECVs in the next phase of the Copernicus programme (2021-2027).