

ESA Climate Change Initiative: Long-term changes in atmospheric water vapour

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Water vapour is the single most important natural greenhouse gas in the atmosphere, thereby constraining the Earth's energy balance, and is also a key component of the water cycle. Due to its importance, the WMO's Global Climate Observing System (GCOS) program has highlighted water vapour as an Essential Climate Variable (ECV) in the GCOS 2016 Implementation Plan. There is consequently the need to consolidate our knowledge of natural variability and past changes in water vapour and to establish climate data records of both total column and vertically resolved water vapour for use in climate research. These climate data records need to be homogeneous in space and time, which bears great challenges due to changing instrument characteristics and performances. Well-characterized uncertainties will be a key attribute of the envisaged climate data records in order to reduce the uncertainty in estimates of climate change and global radiative forcing. The Climate Change Initiative (CCI) is a program of the European Space Agency (ESA), established to tackle the challenges encountered in merging climate data records of ECVs and has the goal to provide climate modelers and researchers with long-term satellite records from current and past European (and other space agencies') missions. In this contribution, we will introduce the ESA CCI plus Water Vapour project and present first results related to both stratospheric and tropospheric water vapour.

Key words: Essential Climate Variables, Atmospheric Water Vapour, Satellite Observations, Climate Data Records, Hydrological Cycle