FORUM for Essential Climate Variables

Simon Pinnock, ESA Climate Office, Harwell, UK

ESA’s Climate Change Initiative

The ESA Climate Change Initiative (CCI) supports climate science by developing and delivering satellite-based Climate Data Records (CDRs) according to requirements for Essential Climate Variables (ECVs) specified by the Global Climate Observing System (GCOS), on behalf of UNFCCC.

Since 2010 CCI has delivered 13 global, multi-mission CDRs, and in 2018 new projects were started adding a further nine CDRs: Water Vapour, Permafrost, Snow, Land Surface Temp., HR Land Cover, Biomass, Lakes, Sea State, and Salinity.

Spectrally resolved observations of the far-infrared outgoing longwave radiation, potentially delivered by the FORUM mission, could provide valuable information needed to improve the accuracy and quality of several of the GCOS ECVs.

How could FORUM contribute?

Cloud ECV
- Improved cloud ice crystal microphysical properties
- Improved retrievals of cirrus cloud macrophysical properties (height, optical depth, ice water path, etc.)
- Polar stratospheric and mesospheric cloud properties

Water Vapour ECV
- Better characterization of upper tropospheric water vapour
- Better understanding of the H₂O continuum absorption, and of the continuum’s influence on outgoing longwave radiation and atmospheric heating/cooling rates.

Other ECVs
- Greenhouse Gases: CO₂, O₃, N₂O, CH₄ profiles (incl. nighttime)
- Fluxes: Spectrally resolved TIR radiative fluxes
- LST: Polar emissivity and surface skin temperatures

References:
- M. Schleder et al., ESSD, 2018, doi:10.5194/essd-10-1095-2018
- R. Siddans et al. / EUMETSAT, doi:10.5285/4df91eb24a43e49d5f6d097c1a4