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## ESA CLIMATE CHANGE INITIATIVE TERRESTRIAL ESSENTIAL CLIMATE VARIABLES IN SUPPORT OF CLIMATE SERVICES AND TERRESTRIAL CARBON

### Abstract

To respond to the UNFCCC need for climate data, ESA has established in 2010 its climate programme, the Climate Change Initiative (CCI). The CCI is a coordinated RD programme amongst ESA's member states that generates robust, long-term, global satellite-derived datasets for key indicators of climate change, the Essential Climate Variables (ECVs). Therefore, the objective of the CCI is to realise the full potential of the long-term global EO archives that ESA, together with its Member states, has established over the past 40 years, as a significant and timely contribution to the ECV databases required by UNFCCC. It ensures that full capital is derived from ongoing and planned ESA missions (including ERS, Envisat, the Earth Explorer missions), relevant ESA-managed archives of Third-Party Mission data and the Sentinel constellation. Preparing for the integration of future missions is also very relevant.

The CCI programme currently comprises over 25 parallel projects geared to ECV data RD and production, plus a dedicated climate modelling user project for assessment of the products (<https://climate.esa.int/en/projects/>), a fellowship program, a portal providing all products, a toolbox to facilitate the combining and analysis of the products, and a visualisation tool supporting outreach.

The Climate Data Records (CDRs) of observation associated with the ECVs provide the empirical evidence needed to understand and predict the evolution of climate, to guide mitigation and adaptation measures, to assess risks and enable attribution of climatic events to underlying causes, and to underpin climate services.

CCI, and later the next climate project of ESA, CLIMATE SPACE, works in close collaboration on common RD with operational climate services such as those from Copernicus to insure complementarity and synergy. It Provides pre-operational development for operational climate services: 16 ECVs has been transferred to operational climate services including Copernicus Climate Change (C3S). Further collaboration also exists on interoperability, quality assurance, data provenance and user Information.

This presentation will illustrate various ESA CCI ECV projects related to land surface with a focus on terrestrial carbon.