FUTURE CLIMATE OBSERVATIONS FROM SPACE

Comprehensive, coherent, long-term and reliable measurements of various geophysical parameters are needed to establish climatic models and to enhance our understanding of climate change. Satellites are particularly suited to supply such measurements since they provide data with regular, homogeneous and global coverage. Moreover, they allow for reliable assessments of temporal trends for specific variables, enable observations in remote regions that are under-sampled by conventional networks, and facilitate the detection of individual biases in conventional data.

ESA has been providing measurements of relevant geophysical parameters through a number of space-based Earth Observation missions, starting with ERS-1, ERS-2 and Envisat. The Earth Explorer missions SMOS, GOCE, Cryosat and Swarm have also been contributing data, as has the most recently launched Earth observation mission, Sentinel-1. Topics addressed within these missions include carbon dioxide levels, ice sheets, sea ice, glaciers, soil moisture, the magnetic field, ocean salinity, sea surface temperature, ocean circulation and sea level rise.
ESA’s Climate Change Initiative (CCI) contributes to the database of Essential Climate Variables required by the United Nations Framework Convention on Climate Change (UNFCCC). It aims to exploit the full potential of the global Earth Observation archives that ESA has established over the last 30 years together with its Member States.

The Copernicus programme – whose space component features the dedicated Sentinel satellites, which will provide data relevant for a wide variety of environmental variables, together with contributing missions – will enhance climate observations from space within the Copernicus Climate Change Service. It will make use of satellite data to develop accurate and detailed long-term series of geo-physical products related to climate change, thereby responding to environmental and societal challenges associated with human-induced climate change.