

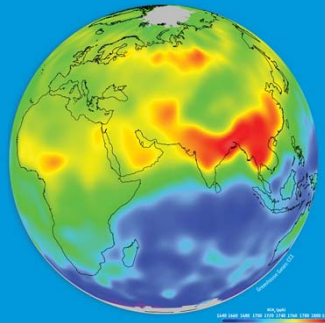
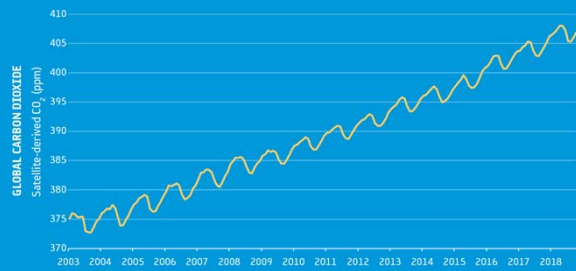
Satellite observations for climate: ESA Climate Change Initiative



Earth observation satellites provide a global view for monitoring and understanding the climate system. Spanning decades, their precise measurements enable the scientific community to detect signs of change, identify significant trends and improve the models that predict climate's evolution. ESA's **Climate Change Initiative (CCI)** supports 23 project teams working to exploit over 40 years of archived and emerging satellite observations.

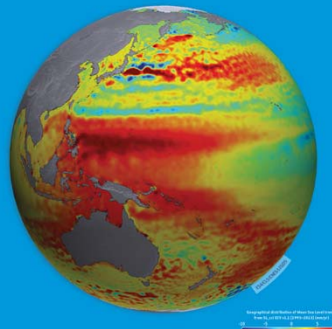
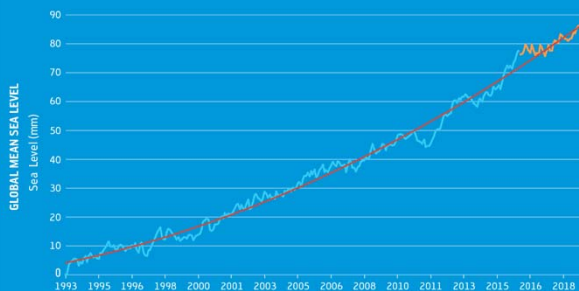
CCI's long-term, global data records describe the evolution of key components of the Earth system. Its 21 Essential Climate Variables (ECVs) can be used to track changes across the ocean, atmosphere and land environment. All ECV datasets are fully validated and have high levels of traceability and consistency, including quantitative estimates of uncertainty required by both climate science and modelling communities.

MAPPING GREENHOUSE GASES



ESA's **Greenhouse Gas CCI** is mapping the global distribution of near-surface carbon dioxide and methane, and its change from year to year, using data from ESA's Envisat mission and JAXA's GOSAT satellite. The smallest changes in concentration can be detected, to within one part per million of carbon dioxide, enabling scientists to improve the models that predict their impact on future global warming.

TRACKING RISING SEAS

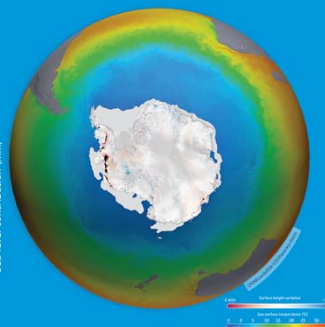


Sea level has risen globally by around 15 cm during the 20th century and is currently rising more than twice as fast.

Sea level does not rise uniformly everywhere - measurements only possible by satellite show how sea levels across the globe vary due to winds, atmospheric pressure, the ocean floor, Earth's rotation as well as the water's temperature and salinity.

By merging observations from 11 different satellite missions, the **ESA Sea Level CCI** has generated a highly precise and continuous 25-year record of sea-surface height. An accurate understanding of the changes in global sea level, including important regional differences, is vital for the international community to develop an effective response.

CHARTING ICE SHEET LOSS



There is ample evidence of large and rapid changes happening at the Antarctic and Greenland Ice Sheets. Since 1992 satellites have charted accelerating ice losses through measurements of surface height, ice velocity and change in mass.

The **Antarctic Ice Sheet CCI** produces long-term satellite records of mass balance, ice velocity, surface elevation change and grounding lines. The high spatial and temporal resolution enables modellers to improve estimates of future change. **Greenland Ice Sheet CCI** also produces calving front location.

QUANTIFYING BIOMASS ON LAND



Quantifying vegetation biomass on land is relevant to mitigating climate change and informing the Global Stocktake for the Paris Agreement commitments and REDD+.

Biomass CCI new dataset for 2017 has combined the widest possible range of satellite data - radar, optical and lidar - to construct an unprecedented high (1 hectare) resolution product.

Access CCI data:

- Download data directly from cci.esa.int/data
- View or analyse data from the desktop or shell-based CCI Toolbox: climatetoolbox.io

