

→ A CHANGING LANDSCAPE

While land covers only one third of the Earth's surface, it is where the impacts of climate change are felt directly by people and societies. Satellite data is an essential tool to help us monitor changes in the land due to climate change and allows us to investigate the effect of these changes on the water, energy and carbon cycles.

Satellites are excellent at providing land cover data: classifying the Earth's surface into categories such as vegetation type, bare rock, water bodies, etc. This is an essential base to know in order to investigate changes to the carbon and water cycles over time, as well as climate variability.

ESA's CCI programme has used data from European satellite sensors to provide the first set of consistent global land cover maps, over a 22-year period, specifically designed for climate modellers. When used within climate models, these datasets showed improvements on estimates of land-based carbon and its seasonal variation, thus helping to improve climate models and climate predictions.

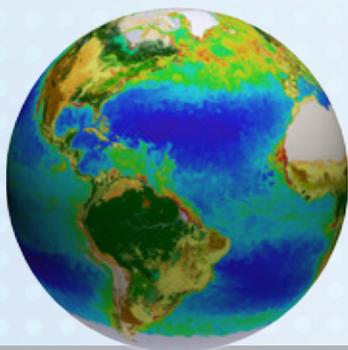
Disturbance by fire is one of the key processes that impact land cover across both human-dominated and natural environments. The effects of fire vary significantly depending on location, size and timing. Climate change is expected to lengthen fire seasons and increase fire severity in some regions.



However, there is still uncertainty in the current measurements of global fires that means their contribution to carbon emissions, and therefore their impact on climate change, isn't certain. The CCI programme is tackling this, using ESA missions, to improve the accuracy of the 'burned area' information that satellites are able to deliver.

A major driver of how land ecosystems function is the amount of moisture held in the ground. This 'soil moisture' content impacts the climate system through processes including evapotranspiration, runoff and drought. Spaceborne sensors have been used by the CCI to provide the most complete and consistent record of surface soil moisture across the globe, for over 35 years.

These data are being used to evaluate climate models and to assess the regional variation in water availability. The CCI programme has also enabled the formation of an international network of scientists to check the data against ground-based measurements and improve the quality of these essential products.



Land cover data, together with chlorophyll data, provide information on the global carbon cycle

