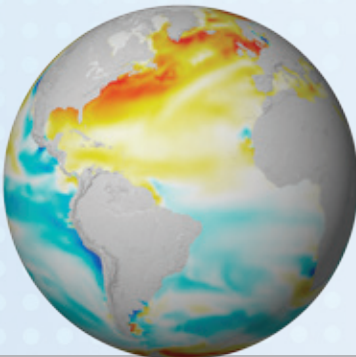


## → CLIMATE MODELS

Computer models hold the key to being able to predict day-to-day weather and long-term climate change. Climate models are used to provide predictions and projections from tens to hundreds of years in the future.

These projections also help us to understand the changes we observe, and attribute them to specific causes. This can then guide strategies to lessen the worst impacts of climate change through mitigation, and adapt to the effects of climate change that we cannot avoid.

Climate models are tried and tested in a number of ways, one of the most important of which is to see if they are able to reproduce the climate of the recent past, both in terms of the average climate and also its variability, i.e. changes in space and time. Better observations, such as the ones provided by satellites through ESA's Climate Change Initiative programme, help to develop better models and, ultimately, provide more reliable information for policy and decision-makers.



Ocean colour data have improved modelled estimates of carbon dioxide fluxes from ocean to atmosphere (red) and atmosphere to ocean (blue)



## Improving climate models through the CCI:

Led by the UK Met Office, the CCI Climate Modelling User Group advises on the conduct of the CCI programme and the needs of the modelling community. CCI datasets are used for several different applications to support climate modelling, including

- Improvement of carbon cycling processes with the inclusion of ocean colour data, as ocean colour data tells us where tiny marine organisms remove CO<sub>2</sub> from the atmosphere.
- Comparison of global ozone, greenhouse gas and aerosol concentration datasets with model simulations of the same variables to assess model accuracies.
- Use of new sea surface temperature products to define the sea surface temperatures used for initialising model predictions.
- Use of sea-ice, glacier and ice-sheet datasets, together with the sea-level record, to help improve models of the hydrological cycle and hence improve predictions of rising sea-level.
- Use of the terrestrial datasets, such as land cover, fire and soil moisture, to improve estimates of land use change and the carbon cycle, thereby constraining predictions of global warming from CO<sub>2</sub>.

As the CCI datasets are extended, and updates to their quality for climate research are made, they will become a standard through which climate model simulations can be benchmarked.

