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A stable, unbiased, long-term satellite based data record of sea surface temperature from ESA's Climate Change Initiative

Nick Rayner (1), Simon Good (1), and Chris Merchant (2)

(1) Met Office Hadley Centre, Met Office, Exeter, U.K. (nick.rayner@metoffice.gov.uk; simon.good@metoffice.gov.uk), (2) University of Edinburgh, Edinburgh, U.K. (c.merchant@ed.ac.uk)

The study of climate change demands long-term, stable observational records of climate variables such as sea surface temperature (SST). ESA's Climate Change Initiative was set up to unlock the potential of satellite data records for this purpose. As part of this initiative, 13 projects were established to develop the data records for different essential climate variables - aerosol, cloud, fire, greenhouse gases, glaciers, ice sheets, land cover, ocean colour, ozone, sea ice, sea level, soil moisture and SST. In this presentation we describe the development work that has taken place in the SST project and present new prototype data products that are available now for users to trial.

The SST project began in 2010 and has now produced two prototype products. The first is a long-term product (covering mid-1991 - 2010 currently, but with a view to update this in the future), which prioritises length of data record and stability over other considerations. It is based on data from the Along-Track Scanning Radiometer (ATSR) and Advanced Very-High Resolution Radiometer (AVHRR) series of satellite instruments. The product aims to combine the favourable stability and bias characteristics of ATSR data with the geographical coverage achieved with the AVHRR series. Following an algorithm selection process, an optimal estimation approach to retrieving SST from the satellite measurements from both sensors was adopted. The retrievals do not depend on in situ data and so this data record represents an independent assessment of SST change. In situ data are, however, being used to validate the resulting data. The second data product demonstrates the coverage that can be achieved using the modern satellite observing system including, for example, geostationary satellite data. Six months worth of data have been processed for this demonstration product.

The prototype SST products will be released in April to users to trial in their work. The long term product will be available as uncollated data from the ATSR and AVHRR instruments (in the former case they are on a regular 0.05 degree grid and in the latter on a 4 km irregular grid) and as combined, interpolated daily data on a regular 0.05 degree grid. The demonstration product also features an interpolated product with 0.05 degree grid spacing. Uncertainty information is included with the SSTs, split into components with different spatio-temporal correlation structures.

We are very keen for people to test the products out and to provide feedback to the project. This feedback will be used to improve the products in the future. Please contact us (nick.rayner@metoffice.gov.uk) or visit the project website at http://www.esa-sst-cci.org.