CCI KNOWLEDGE EXCHANGE

Paul Fisher & Sophie Hebden

10/09/2020
Objectives based on CCI+ Statement of Work:

- Increase visibility of the CCI programme
- Address new audiences: the general public and educational audience
- Showcase role of ESA satellite data in climate science
- Increase access and use of CCI ECV data

- Website
- Climate from Space app
- Open Data Portal
- CCI Toolbox (Cate)
- Education
CCI Knowledge Exchange

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- Website – just launched
- Climate from Space app – Q4
- Open Data Portal – just launched
- CCI Toolbox (Cate) – Q4
- Education – Q4 first school packs; 2021 mooc & summer school
WHAT IS THE CLIMATE CHANGE INITIATIVE?

The CCI aims to realise the full potential of the long-term global Earth Observation archives that ESA has established over the past 30 years, as a significant and timely contribution to the ECV databases required by UNFCCC.

"Satellites observing Earth provide a clear picture of changes across the entire planet, measuring and monitoring our vast oceans, land, atmosphere and areas that are...\]
What is Climate Change?
Putting current climate change into context and how society is responding

Climate change: the evidence from space
Satellites provide crucial lines of evidence for climate change

Role of EO in Understanding Climate Change
Satellites offer a unique vantage point for capturing change across the Earth system

Learn More
Learn More
Learn More
ESA climate office

Home > Educate

Learn about Climate
ESA learning resources for students on climate and environmental change

Learn More

Climate for Schools
Teaching resource packs from the Climate Change Initiative

Learn More

Climate Training for Science Excellence
Massive Online Open Courses and summer schools for learners at MSc & BSc levels

Learn More
education resource pack

IS OZONE GOOD OR BAD?
Discovery of the Antarctic Ozone Hole

education resource pack

A PASSAGE OPENS
Arctic Sea Ice and Climate Change
Aerosol
The Aerosol project provides independently validated, high-quality algorithms for precessing long-term records of global aerosol properties from European satellite instruments.

Visit Project

Biomass
The Biomass project provides global maps of above-ground biomass for four epochs (mid-1990s, 2010, 2017 and 2018), with these being capable of supporting quantification of biomass change.

Visit Project

Climate Modelling User Group (CMUG)
Linking the climate modeling community and satellite Earth observation experts across the CO programme.

Visit Project
Aerosol

The Aerosol project provides independently validated, high quality algorithms for processing long-term records of global aerosol properties from European satellite instruments.

About Project

The driving objective of the CCI Aerosol project is to provide independently validated, high quality algorithms for processing long-term records of global aerosol properties from European satellite instruments.

The current Aerosol project focuses on algorithm improvements for the dual-view sensor line, in particular the Sentinel-3 SLSTR instrument. It includes two user case studies (data assimilation for climate services, and science modeling in radiative forcing) and community support (AEROSAT experiments, GEWEX assessment).

Learn more about the Aerosol project

Aerosol news
We welcome your feedback and comments
New Climate from Space Application

https://cfs.climate.esa.int/
CfS Application objectives:

- Addresses the general public and education audiences
- Increases visibility of the CCI programme
- Showcases role of ESA satellite data in climate science
- Appealing and engaging content presentation
- Modern and fast, easy to access interface
- Runs in an internet browser and as an offline app
- Mobile device-compatible
Earth's Heat Pumps

The Equator receives much more energy from the Sun than the polar regions. This energy is then redistributed around the world by circulation patterns in the oceans and atmosphere. Ocean currents are driven by the rotation of the Earth, surface winds and differences in water density due to salinity and temperature variations. Warm currents such as the Gulf Stream bring heat from the Equator and the tropics to higher latitudes. This poleward transport of heat is responsible for the mild climate of western Europe.

The interactive globe on the left shows the Gulf Stream carrying warm water up the east coast of North America and across the Atlantic. In the Pacific, the Kuroshio Current warms the west coast of Japan, while a cold Equatorial current can usually be seen flowing westwards from South America. Ocean circulation is generally clockwise in the northern hemisphere and anti-clockwise in the southern hemisphere.

Ocean-Atmosphere Interactions

The oceans and the atmosphere transport about the same amount of heat between the poles, but the atmospheric circulation is itself partly driven by the energy exchanged during the evaporation of ocean water and its precipitation as rain. This makes the sea an important regulator of the climate and the temperature of the surface is a key measurement for climate scientists.

Higher sea surface temperatures allow more evaporation, giving more atmospheric water vapour, with the potential for more clouds and more rain. In the western Mediterranean, warmer sea water is a key factor in the sudden thunderstorms and flash floods that affect the coasts of France, Italy and Spain in late summer.

On a larger scale, high water temperatures in tropical oceans power extreme weather events such as hurricanes. The energy exchange between ocean and atmosphere during these events is necessary to create the high sea surface temperature in the wake of large hurricanes.
Fit for mobile devices
New Open Data Portal user interface (UI)

https://climate.esa.int/en/odp/#/dashboard/
https://climate.esa.int/en/odp/#/search/
The ESA Ocean Colour CCI project has produced global level 3 combined multi-sensor time-series of satellite ocean colour data with a particular focus for use in climate studies. This dataset contains all four version 4.2 preformed ocean colour products on a geographic projection of 4 km spatial resolution and at a number of time resolutions (daily, 5-day, 8-day and monthly composited). Data are also available as monthly climatologies. Data products being produced include: phytoplankton chlorophyll-a concentration, remote-sensing reflectance at six wavelengths, total absorption and backscatter coefficients, phytoplankton absorption coefficient and absorption coefficient for chlorophyll and detritus materials and the diffuse attenuation coefficient for the 490nm, information on uncertainties is also provided. This data product is on a geographic grid projection, which is a direct conversion of altitude and longitude coordinates to a rectangular grid, typically a fixed multiplier of 500 x 100. The netCDF-like file format for this projection with a resolution of 0.004/4320 (a separate dataset is also available for data on a sinusoidal projection)

These data were produced by the ESA Ocean Colour CCI project and provided to CEOS in the context of the ESA CCI Open Data Portal project. This dataset forms part of the v4.2 ocean colour dataset collection that can be cited with the following DOI to be added.
ESA climate office

Climate Data Dashboard
of the ESA Climate Change Initiative

ECU
- Data type
- Sensor
- Platform
- Processing level
- Frequency
- Institute
- Product

Ocean Colour (Ocean_colour_co)
Global ocean colour data products gridded on a geographic projection (All Products). Version 4.2.3

Title: 10001

The ESA Ocean Colour CCI project has produced global level 3 temned multi-sensor time-series of satellite ocean colour data with a particular focus for use in climate studies. This dataset contains time version 4.2 generated ocean colour products on a geographic projection at 4 km spatial resolution and at a number of time resolutions (daily, 5-day, 8-day and monthly composites). Data is also available as monthly climatologies. Data products being produced include: phytoplankton abundance concentration, remote-sensing reflectance at six wavelengths, total absorption and backscattering coefficients, phytoplankton absorption coefficient and absorption coefficients for dissolved and detrital material, and the diffuse attenuation coefficient for downwelling irradiance for light of wavelengths 440nm. Information on uncertainties is also provided. This data product is on a geographic grid projection, which is a direct conversion of latitude and longitude coordinates to a rectangular grid, typically a fixed multiple of 360 x 100. The NCEP/NCAR files follow the CF convention for this projection with a resolution of 0.4x0.4.1 (A separate dataset is also available for data on an equal area projection.

These data were produced by the ESA OceanColour CCI project and provided to ESDA in the context of the ESA CCI Open Data Portal project. This dataset forms part of the v4.2 ocean colour database collection that can be cited with the following DOI: to be added.
### Climate Data Dashboard

#### of the ESA Climate Change Initiative

<table>
<thead>
<tr>
<th>ECV</th>
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<th>Sensor</th>
<th>Platform</th>
<th>Processing level</th>
<th>Frequency</th>
<th>Institute</th>
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<td>Sea Surface Saliency</td>
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#### Search results: 16

<table>
<thead>
<tr>
<th>Dataset Information</th>
<th>Product Guide</th>
<th>Start date: 1997-09-1</th>
<th>End date: 2015-12-31</th>
<th>TPV Dataset</th>
<th>Additional Download</th>
</tr>
</thead>
</table>

#### ESA Ocean Color Climate

Catalogue size: 15.5 TBD

This page has produced global level 3 time-series of satellite ocean colour data with a particular focus for use in climate studies. This dataset contains ocean colour products on a geographic projection of 4 km spatial resolution and at a number of time resolutions (daily, 5-day, 30-day and monthly composites). Data products being produced include: phytoplankton chlorophyll-a concentration; remote-sensing reflectance at six wavelengths; total absorption and single scattering coefficients at two wavelengths; and the diffuse attenuation coefficient for downwelling irradiance for formation in situ data. This dataset is available for use in climate studies and is also provided in a geographic grid projection, which is a direct conversion of latitude and longitude coordinates to a multiple of 360x100. The netCDF file following the CF convention for this projection with a resolution of 0.0540x0.450. (A separate dataset is also available for data on the ESA Ocean Color CCI project and provided to CEDA in the context of the ESA CCI Open Data Portal project. This dataset forms part of the v4.2 that can be used with the following DOIs to be added.)

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**European Space Agency**

[Links to ESA and European Space Agency websites]

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Climate Data Dashboard
of the ESA Climate Change Initiative

 ESA Ocean Colour Climate Change Initiative (Ocean_Colour_cci) Global ocean colour data products generated on a geographic projection (41 Products). Version 4.2
Catalogue size: 15.5 TB Number of files: 10681

- Dataset Information
- Product Guide
- Start date:1977-01-01
- End date:2019-12-31
- FTP Download
- Additional Download Options

The ESA Ocean Colour CCI project has produced global level-2 blended multi-sensor time-series of satellite ocean colour data with a particular focus for use in climate studies. This dataset contains all their Version 4.2 generated ocean colour products on a geographic projection at 4 km spatial resolution and at a number of time resolutions (daily, 5-day, 6-day and monthly composited). Data are also available as monthly climatologies. Data products being produced include: phytoplankton chlorophyll concentration, remote-sensing reflectance at 44 wavelengths, total absorption and backscattering coefficients, phytoplankton absorption coefficient and absorption coefficients for dissolved and inorganic material, and the diffuse attenuation coefficient for downwelling irradiance for right of wavelength 440nm. Information on uncertainties is also provided. This data product is in a geographic grid projection, which is a direct conversion of latitude and longitude coordinates to a rectangular grid, typically a fixed multiple of 360/100. The metadata files follow the CF convention for this projection with a resolution of 0.04°x0.04°. A separate dataset is also available for data on a sinusoidal projection.

These data were produced by the ESA Ocean Colour CCI project and provided to CEDA in the context of the ESA CCI Open Data Portal project. This dataset forms part of the v4.2 ocean colour dataset collection that can be cited with the following DOI to be added:
New CCI Toolbox (Cate) modes

https://cate.climate.esa.int/
Cate can be run in two modes

Cloud: Software-as-a-Service (Saas) using the JASMIN cloud.

*Will provide user access to the Cate software without any installation and configuration: to be recommended way to use Cate for most users.*

Local: Stand-Alone mode, you run it on your own computer

*In a shell type $ cate-webapi-start
... then open Cate App in a browser
For users who wish to use Cate with their own local data sources.*
Select Cate Service

Please select a Cate service provision mode

- Cate Software-as-a-Service
- Cate Stand-Alone Mode

http://localhost:9090

How do I run the stand-alone mode?
## Cate’s various user interfaces

<table>
<thead>
<tr>
<th>Cate App</th>
<th>Cate command-line tool</th>
<th>Cate Python API</th>
</tr>
</thead>
<tbody>
<tr>
<td>… is Cate’s graphical user interface that runs in all modern internet browsers.</td>
<td>…is used to access and process ESA climate data through a command shell. Use it to write your own batch scripts.</td>
<td>…allows you to use Cate in your own Python programmes and make up new functions for the toolbox too.</td>
</tr>
</tbody>
</table>
Example functionality: Using split window to display SST and SST analysis error (top panel) and associated time series graph (bottom panel)

Cate Toolbox Documentation:

https://cate.readthedocs.io