

# Climate Information Portal for Copernicus

[www.clipc.eu](http://www.clipc.eu)

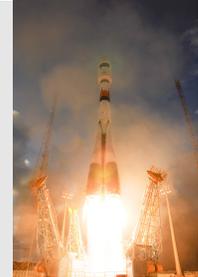
The CLIPC project is developing a pre-operational information portal for the Copernicus Climate Change Service (CCCS – see Box 1). Copernicus has a comprehensive scope: any European resident or entity is a potential user, and the portal must reflect this broad and comprehensive ambition. Different users have very different needs: CLIPC design will be guided by an extensive consultation organised around four user categories (Box 2).

The portal will include datasets derived from measurements of the environment as well as from simulations and projections of the environment. CLIPC will provide access both to the data and information about the data. The latter are often described as meta-data and sometimes treated as being less important than the data, but this information about the data is often of critical importance for users. Whether the data or information about the data is required, CLIPC will provide a point of access.

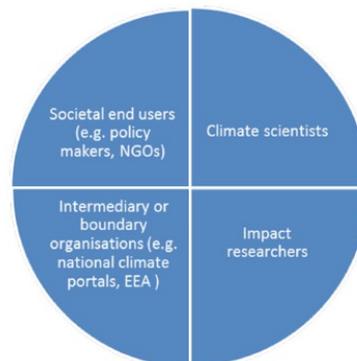
The CLIPC project is a 3 year research activity (start: December 2013), but it is designing services as candidates for implementation by the operational Copernicus Climate Change Service (CCCS – see Box 1).

## Box 1: The Copernicus Climate Change Service is

part of the European Commission's Earth Observation Programme: Copernicus. This programme will launch and maintain a family of satellites observing a many aspects of the environment. Within the programme, the six Copernicus Services (monitoring of land, atmosphere and ocean, security, disaster response and climate change) will ensure that the information gathered by the space missions is delivered efficiently to the people who have a need or interest. The operator of CCCS is expected to be appointed towards the end of 2014, after which there will be a build up phase of 3 to 4 years before the CCCS becomes fully operational. The CLIPC project will work with the CCCS operator to support the creation of an efficient and effective service.



**Box 2: User consultation** will be based on an initial review of consultations in over 60 relevant projects. Four categories will be used to analyse user requirements: societal end users, intermediary organizations, impact researchers and climate scientists.



The CLIPC portal will provide harmonised access to a broad range of climate datasets in order to facilitate the work of climate data users, many of whom want to access information from a wide range of sources. CLIPC defines four broad categories of information which will be used to organise work

within the project and the presentation of information: representations of the climate state; climatological statistics; indicators of impact on the physical environment and indicators of impact on society. Some more specific information about each of these categories is given in Box 3.

<p align="center"><b>Box 3: Four categories of information provided by CLIPC</b></p> <p>In each of these categories there will be data as well as information about the data and the models and methods used to generate the data.</p>	
<p><b>Climate state</b></p> <p>Data describing the recent and current state of the climate will be delivered from satellite borne observation systems, particularly, of course the information coming from the space missions of Copernicus. Climate services will depend on a broader range of measurements than can be provided by space era alone (discussed further in the text). Simulations and projections from authoritative ensembles of climate models delivered by World Climate Research Programme (WCRP) projects will be included, as well as syntheses of models and observational data for the historical period.</p>	<p><b>Climatological statistics</b></p> <p>A range of statistical products will be provided. These will provide both an overview of the state of the climate and information relative to particular sectors and groups of users. Biases in climate models cause substantial problems for many users: a range of methods for estimating and reducing the bias will be analysed.</p> <p>Standard climate indices will be created both from observations and from climate model results.</p>
<p><b>Impact on the physical environment</b></p> <p>Climate change and climate variability can influence the physical environment in many ways. The term “physical environment” is used here to refer to the natural environment excluding the climate state itself and the human environment excluding human society itself (see “Impact on Society”). It thus includes natural and managed ecosystems, water resources and many more categories. CLIPC will focus on a limited range of impacts, after conducting a broad review.</p>	<p><b>Impact on society</b></p> <p>The impact of climate change on human society can be split into two broad categories, health and economics, but there are many topics within these categories. Estimations of impact on society depend both on additional data sources describing social and economic systems of interest and also on models, often of a statistical or empirical nature, relating changes in climate statistics or the physical environment to impacts on human society.</p>

**Observational sources of information** will be critical to the Copernicus Climate Change Services. Strictly speaking, climate is not observed but only estimated from observations of the system. The state of the atmosphere at any time is a reflection of weather, and climate refers to statistical properties derived from a suitably long temporal record. In the near future, Copernicus (see Box 1) and parallel Japanese and US space programmes will deliver new data with improved quality and consistency. For climate services it will continue to be of critical importance to have the best possible

historical record of climate. A significant contribution will come from the European Space Agency Climate Change Initiative, which will deliver consistent data from the space observation era obtained using new algorithms applied to existing primary data. Ground based measurements are also a critical source of information from before the space observation era, and for variables which are not or have only recently been measured from space. **Some of the best ground based data is subject to restrictions on use imposed by the national organisations responsible for collecting and processing which, if not modified, will mean that the best data available for research is not available for climate services.** CLIPC will seek to promote transparency in the hope that these data will become more accessible in the operational Copernicus Climate Change Services.

CLIPC will provide services to access, transform and visualise data. Easy and flexible data access is critical for many users who want to work with the data in their own systems. CLIPC will support users who need to access large volumes of data describing the climate state, typically in a technical format which enables efficient processing of large data volumes, as well as users who need to select small volumes of data and obtain them in a transparent and easy format. Visualisation services will allow standard zooming and panning features, and will include some new approaches to visualising uncertainty. Data processing services will allow users to perform a range of transformations on the data before visualising it or transferring it to their local systems (e.g., simple statistics, aggregation). There will be options to perform a range of standard statistical operations, and also to combine datasets in various ways. It is, of course, possible that a user exploring different combinations of datasets may create misleading products, and reliable assessment cannot be automated. The portal will be designed to ensure a clear distinction between the exploratory area in which users can create their own products and a reference area containing information which has been appropriately assessed and approved.

Information about the quality and limitations of data products is also of crucial importance for CLIPC. At present there are many different approaches to assessing data quality within each of the four categories described in Box 3, and even greater differences between these categories. CLIPC will seek to develop a harmonised approach to the evaluation of data quality, in a way which can combine algorithmic estimations, based on ensembles and calibration against measurements, with expert assessments.

**The impacts of climate change on society** will generally reflect a range of different environmental and climate system changes, and different sectors and actors within society will react differently to these changes. The CLIPC portal will provide some a number of indicators showing impacts on specific sectors which have been generated using a range of factors selected through structured expert consultation. It will also, as part of the transformation services, allow users to explore the consequences of using different combinations of driving factors which they consider to be of particular relevance to their work or life. The portal will provide information on the scientific quality and pitfalls of such transformations to prevent misleading usage of the results.

The CLIPC project will not be able to process a comprehensive range of climate change impacts on the physical environment and society, but will develop an end to end processing chain, from comprehensive information on the climate state through to highly aggregated decision relevant products. This processing chain will be demonstrated within three thematic areas: water, rural and urban.

The CLIPC project brings together representatives of a broad range of communities. There is considerable diversity in terms of scientific approach not only between the climate science

community and the climate impacts research community but within these communities. CLIPC will create a framework which promotes the efficient exchange of information between these communities and the users of climate data.



**Partners**

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 STFC  
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 British Oceanographic Data Centre

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 Dutch Met Office  
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 The Finnish Environment Inst.(SYKE)

**Sweden**  
 SMHI  
 Linköping University

**Norway**  
 Met Office

**Italy**  
 CMCC

**Spain**  
 University of Barcelona

**International**  
 Joint Research Centre

**CLIPC at a glance**

Start: 1<sup>st</sup> December, 2013  
 Duration: 36 months  
 Lead: STFC ([www.stfc.ac.uk](http://www.stfc.ac.uk))  
 Budget: €6million  
 Website: [www.clipc.eu](http://www.clipc.eu)

**Glossary**

The **Climate Change Initiative (CCI)** is a research programme established by the European Space Agency to provide stable, long-term, satellite-based data products for climate modellers, researchers and operational communities ([www.esa-cci.org](http://www.esa-cci.org)).

**Copernicus**, previously known as GMES (Global Monitoring for Environment and Security), is the European Programme for the establishment of a European capacity for Earth Observation ([www.copernicus.eu](http://www.copernicus.eu)).

**Copernicus Climate Change Service (CCCS):** one of six services thematic services within Copernicus. The CCCS is not currently operational: the European Commission seeking to appoint an operator of the CCCS during 2014.

**World Climate Research Programme (WCRP):** The WCRP was established in 1980 to determine the predictability of climate and to determine the effect of human activities on climate. It is jointly sponsored by the International Council for Science, the World Meteorological Organization, and, since 1993, the Intergovernmental Oceanographic Commission ([www.wcrp-climate.org](http://www.wcrp-climate.org)).