

# CLIPC: Tools and visualisation services for climate datasets to assess climate change

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## CLIPC Climate Information portal for Copernicus

The CLIPC project has developed an integrated platform of Climate Data Services to provide a single point of access for authoritative scientific information on climate variability and change, and climate change impacts. This project supports the Copernicus Earth Observation Programme for Europe, which will deliver a new generation of environmental data for Europe's citizens, decision-makers in the public and private sector, and academics.

The CLIPC portal : [www.clipc.eu](http://www.clipc.eu)

## Viewing and processing climate data

The CLIPC project aims to enhance access to climate and climate impact information, and support the translation, post-processing and visualisation of climate data in order to tailor climate and climate impact information to user needs.

The presentation will focus on one of the main components of the CLIPC portal to achieve this climate data visualisation: The CLIPC climate indicator toolkit. This toolkit has been developed technically by MARIS in close cooperation with KNMI and is based on concepts of other partners in the project. This toolkit includes:

- A map viewer to view the climate datasets and impact indicators (large NetCDF files) in a map interface with quick response
- Per dataset options to select the timestamp, view description, uncertainty, timeseries, histograms, change legendtype
- An explorative tool for users to compare and combine indicators, along with guidance on how to interpret the produced combinations
- A MyCLIPC space where users have a personal environment to:
  - Store datasets and map viewer settings
  - Process datasets to create their own indicators
  - View previous jobs.

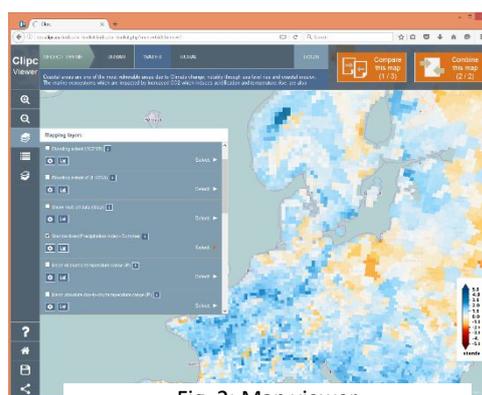


Fig. 2: Map viewer

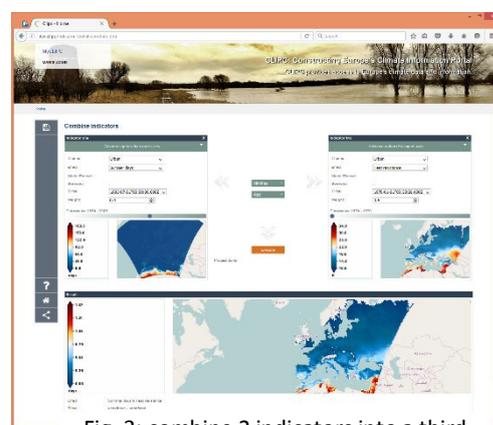


Fig. 3: combine 2 indicators into a third

The data and information presented meets the highest feasible standards in terms of credibility (evidenced by clear metadata), legitimacy (through an internationally supported mechanism) and linked to user needs.

Technically the toolkit software runs on Open Standards where possible : OpenLayers 3, WMS, WCS, (Geo)Json, (Py)WPS, webservices, WCS, Geonetwork and PHP are the main software libraries used. The user interfaces for CLIPC run on MARIS servers and are separated from the processing and storage server side. Currently the strong KNMI (Dutch MetOffice) servers are used for processing and storage, but this could well be expanded towards a full cloud solution.

### **Guidance for different users is important**

The CLIPC aims to enhance access to climate and climate impact information for a variety of users including climate scientists, impact researchers, intermediary (or boundary) organisations (e.g. consultants, EEA) and societal end users (including policy makers and NGOs). Different users have different requirements, needs and skills, and usually look for more than just mere access to data – they need information that is relevant, robust and legitimate.

A unique aspect of CLIPC is the expert/or qualitative uncertainty analysis of impact indicators for which a quantitative analysis is not always possible.

The portal has several types of guidance, including:

- Use /user case descriptions to illustrate what specifically can be done via the portal;
- Traffic lights and other types of ‘warnings’ / recommendations;
- Glossary of terms used in the portal, taken from trustworthy sources like IPCC.
- FAQ’s;

### **Parallels to marine data domain**

There are many parallels between meteorological data and marine data, especially when it comes to metadata, large quantities of data, processing capacity for e.g. climatologies, and demand for services on top of the data with sufficient guidance to users.

Metadata is important, as well as harmonisation of metadata and data exchange formats. In CLIPC BODC has been involved to use and expand the NERC Vocabulary Server to facilitate the metadata harmonisation and support data discovery.

Processing capacity next to the data in the form of cloud solutions are foreseen (and demanded by users). A toolbox approach seems very promising, especially when developed in open standards so services can be used by several applications.

Googlemaps has paved the way, and since many years viewing services are a « must » in order to convince users. WMS, WCS combined with WPS processing and OpenLayers3 provide a strong combination.

Guidance is key in all communities. Users have to understand what is quality of all input data, the processing services, and output data in order to use the results.