Geophysical Research Abstracts
Vol. 17, EGU2015-8548, 2015
EGU General Assembly 2015

Developing the architecture for the Climate Information Portal for Copernicus

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Climate change is impacting the environment, society and policy decisions. Information about climate change is available from many sources, but not all of them are reliable. The CLIPC project is developing a portal to provide a single point of access for authoritative scientific information on climate change. This ambitious objective is made possible through the Copernicus Earth Observation Programme for Europe, which will deliver a new generation of environmental measurements of climate quality. The data about the physical environment which is used to inform climate change policy and adaptation measures comes from several categories: satellite measurements, terrestrial observing systems, model projections and simulations and from re-analyses (syntheses of all available observations constrained with numerical weather prediction systems). These data categories are managed by different communities: CLIPC will provide a single point of access for the whole range of data. Information on data value and limitations will be provided as part of a knowledge base of authoritative climate information.

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 (indicator toolkit), 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.

Indicators of climate change and climate change impact will be provided, and a toolkit to update and post process the collection of indicators will be integrated into the portal. For the indicators three levels (Tiers) have been loosely defined: Tier 1: field summarising properties of the climate system; e.g. temperature change; Tier 2: expressed in terms of environmental properties outside the climate system; e.g. flooding change; Tier 3: expressed in social and economic impact.

For the architecture, CLIPC has two interlocked themes:
1. Harmonised access to climate datasets derived from models, observations and re-analyses
2. A climate impact toolkit to evaluate, rank and aggregate indicators

For development of the CLIPC architecture an Agile 'storyline' approach is taken. The storyline is a real world use case and consists of producing a Tier 3 indicator (Urban Heat Vulnerability) and making it available through the CLIPC infrastructure for a user group. In this way architecture concepts can be directly tested and improved. Also, the produced indicator can be shown to users to refine requirements.

Main components of the CLIPC architecture are 1) Data discovery and access, 2) Data processing, 3) Data visualization, 4) Knowledge base and 5) User Management.

The Data discovery and access component main challenge is to provide harmonized access to various sources of

climate data (ngEO, EMODNET/SeaDataNet, ESGF, MyOcean). The discovery service concept will be provided using a CLIPC data and data product catalogue and via a structured data search on selected infrastructures, using NERC vocabulary services and mappings.

Data processing will be provided using OGC WPS services, linking/re-using existing processing services from climate4impact.eu. The processing services will allow users to calculate climate impact indicators (Tier 1, 2 and 3). Processing wizards will guide users in processing indicators. The PyWPS framework will be used.

The CLIPC portal will have its own central viewing service, using OGC standards for interoperability. For the WMS server side the ADAGUC framework will be used. For Tier 3 visualizations specific tailored visualisations will be developed. Tier 3 can be complicated to build and require manual work from specialists to provide meaningful results before they can be published as e.g. interactive maps.

The CLIPC knowledge base is a set of services that supply explanatory information to the users when working with CLIPC services. It is structured around 1) a catalogue, containing ISO standardized metadata, citations, background information, links to data; 2) Commentary information, e.g. FAQ, annotation URLs , version information, disclaimers; 3) Technical documents, e.g. using vocabularies and mappings 4) Glossaries, adding and using existing glossaries from e.g. EUPORIAS/IS-ENES, IPCC; 5) literature references.

CLIPC will have a very light weight user management system, providing as little barriers to the user as possible. We will make use of OpenID, accepting from selected OpenID providers such as Google and ESGF.

In the presentation we will show the storyline implementation: the first results of the Tier 3 indicator, the architecture in development and the lessons learned.