



Global users in the Copernicus Climate Change Service

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The Copernicus Climate Change Service (C3S) aims to provide various information of past, present and future climate relevant to support adaptation and mitigation strategies. The C3S Climate Data Store (CDS) provides a "one stop shop" for users to discover and process quality-assured climate data of different origins (e.g. in-situ observations, reanalysis, climate projections, and seasonal forecasts). The CDS toolbox was implemented to facilitate the transformation of data into climate information and products that are tailored to user needs. This toolbox provides functions that allow users to develop their own web-based applications for their specific requirements. All data and processing is open and free, and can be used by anyone for any purpose in downstream applications from the C3S website (<https://climate.copernicus.eu/>).

Here we present user examples and experiences from 19 different showcases on six continents from across the globe on existing and future potential of user uptake using C3S. The aim is to inspire more users addressing sectors such as health, water security, transport, biodiversity, tourism, agriculture, and food production to make use of the high relevant climate and water information of the C3S global datasets for site-specific impact analysis. In addition to technical training and guidance, specific datasets of climate impact indicators (related to temperature, precipitation and water) as well as seasonal forecasts of water-related variables have been produced in co-design with users for the implementation in the CDS. These new global datasets are based on bias adjusted CMIP5 data on a 50 km grid. Water-related climate impact indicators are based on hydrological impact modelling using the HYPE model (<http://hypeweb.smhi.se/>) and are provided for catchments. Continuous time-series of essential climate variables were made available at a daily temporal resolution whereas the climate impact indicators are presented in 30 years means of annual or monthly values.

The experience from user uptake in the global community show that climate science is difficult and that science communication and training is needed for the data to be fully transparent and useful. We found that there is a need of information at various levels of complexity, for instance: (1) short and clear key-messages and summarizing maps and graphs for policy-makers and global companies; (2) confidence figures and tools for transferring the climate signal to local applications for consultant engineers; (3) workflows and scripts for indicator production in new applications for developers of information systems. Particularly, users from across the globe found an added value in quick visualization, zooming and easy downloading facilities of ensemble data for their region. User guidance, tutorials and info sheets were also found very effective for better understanding and applications in regional or local showcases.