Copernicus
Europe's eyes on Earth

Copernicus Climate Change Service

# Copernicus Climate Change Service (C3S) – User engagement

COPERNICUS is the **European Program** for **Earth Observations.** The Copernicus Climate Change Service (C3S) will provide **free access to climate information** through the Climate Data Store (CDS).

| | | | |
|---|---|---|---|
| Observations | Global estimates of ECVs from satellites and in-situ observations | Reprocessed CDRs, reference observations | Support for data rescue, climate data collections |
| Climate reanalysis | Global atmosphere, ocean, land | Regional reanalysis for Europe | Coupled climate reanalysis for 100 years |
| Model output | Multi-model seasonal forecast products | Access to CMIP data and products (global and regional) | Reference set of climate projections for Europe |

Climate indicators ↕ DATA

Action engaged
In preparation
Not started

The C3S data can be used to **inform policy** to protect from climate-related hazards, **improve planning** of mitigation and adaptation practices or promote the development of **tailored climate service**.

Evaluation and QC function

From European commission (e.g. FP7 Space call, H2020)

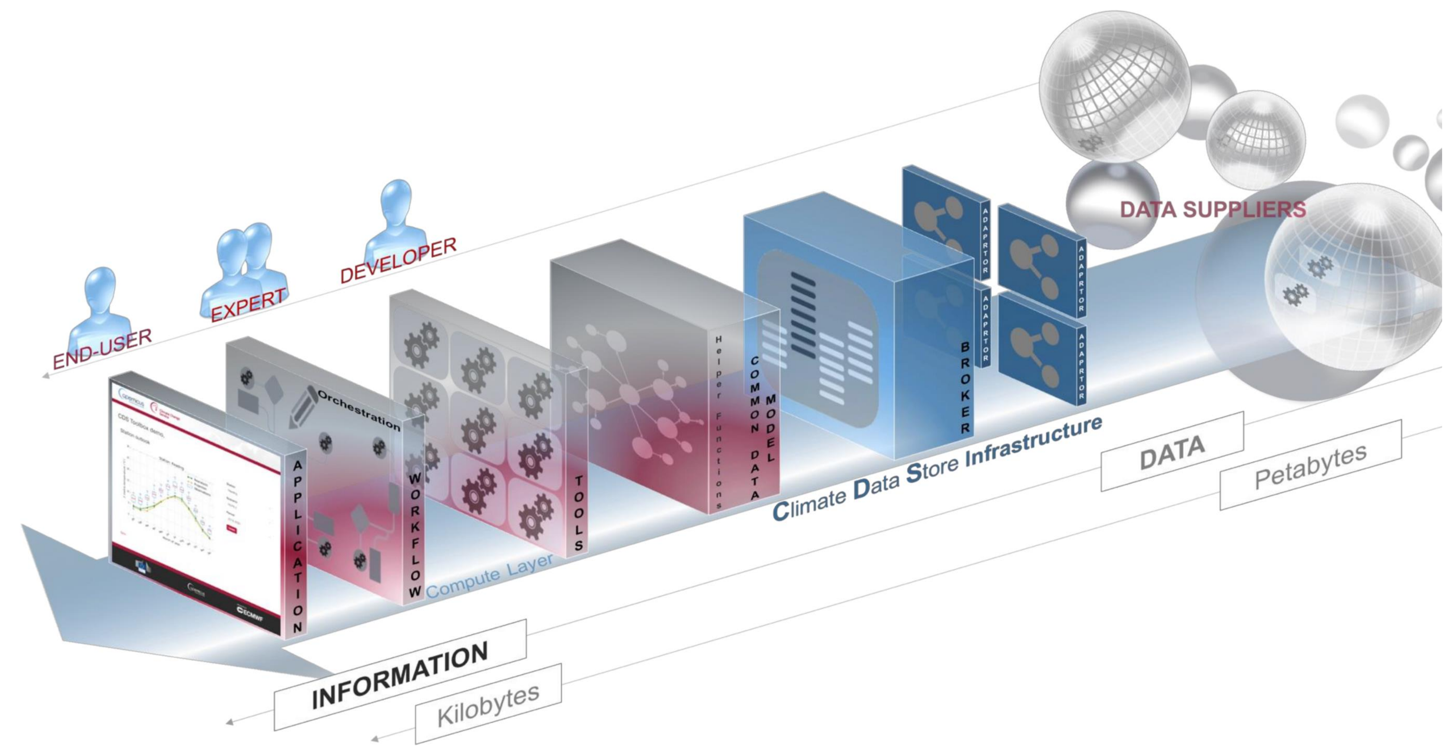
From EU Member States, ESA, EUMETSAT, EEA, WMO, …

Climate Data Store

Sectoral Information System

Stakeholders & users

Outreach & Dissemination




## Sector Engagement for the Copernicus Climate Change Service: Translating European User Requirements

- Agriculture/ Forestry
- Coastal areas
- Health
- Infrastructure
- Insurance
- Tourism

The SECTEUR project works with private and public organizations so that the C3S can provide **fit-for-purpose** climate information to help society and business sectors **improve** their **planning** and **decisions-making for climate adaptation and mitigation.**

SECTEUR is a **multi-sectoral project** from 11 European institutions working across 6 key sectors.

BSC has been entrusted to provide Copernicus with insurance sector user requirements to **tailor the climate information that Copernicus will offer.** We engage with end-users thanks to the collaboration of our sector champion, XL Catlin.


## Insurance

The **first workshop** was held on October 5th 2016 in **Hamilton** (Bermuda). 15 scientists from the insurance industry were in attendance. A **second workshop** was held in **London** (UK) on March 23rd 2017 and was attended by 20 scientists. Some results from these workshops are discussed below.

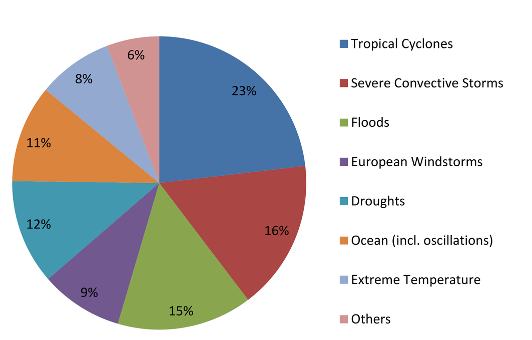



Figure: Distribution of climate variables amongst events.

In first the first workshop, we asked the participants to identify the **five most important climate variables** used by their organization, their origin and the chain of post-processing that they go through (both internally and externally). Most of the variables that were cited could be linked, not surprisingly, to an **extreme event** (either of wind, precipitation or temperature). **Around 75% of the variables can be tied to only five perils**: **tropical cyclones, severe convective storms** (including hail and tornadoes), **flooding events**, **European windstorms** and **droughts**. This distribution of climate variables broadly aligns with the global damage (in terms of $) caused by these perils. Tropical cyclones are the most devastating meteorological phenomenon in terms of economic losses and variables linked to these events were mentioned the most often. Similarly, flooding and severe convective events are the next two major causes of economic losses, respectively. Variables linked to European windstorms were ranked behind there three perils, probably because they are concentrated over Europe, as opposed to the first three perils, which occur worldwide. Furthermore, flood impacts of extra-tropical cyclones have sometimes historically been separated from the European windstorm peril.

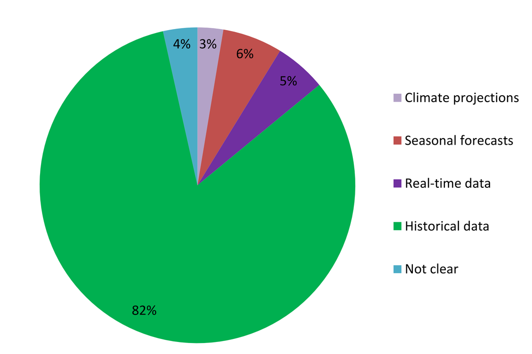



Figure: Type of climate data used by the insurance sector.

**More than three quarters of the climate variables** that are used were labelled as **historical data**, which, in this case, includes both observations (in situ/satellites) and reanalyses. The line between the two being somewhat blurry, they were combined in the chart on the left. Most of these historical data are used to develop a view of risk in regards to the perils highlighted above. They can be used directly to, for example, estimate the return period of a certain event (European legislation makes it mandatory to insure up to 1 in 200 year events) or indirectly by feeding into the development of catastrophe models. The remaining 23% of climate variables include climate projections, real-time observations and seasonal forecasts. The small proportion taken by seasonal forecasts is undoubtedly linked to the current difficulties by the insurance industry in using them.

### Barriers to using seasonal forecasts

- There is a mismatch between the moment the forecasts are produced and when insurers buy and sell re-insurance.
- Seasonal forecasts are too short: insurance contracts are usually for one year and currently seasonal forecasts are only provided for a few month lead time.
- Seasonal forecasts are perceived as lacking sufficient skill for the lead time and regions of interest to write business.

### Some requests from the industry

- Provide high-resolution (km range) data and/or statistical downscaling tools (or guidance).
- Allow the use of shape (GIS) files.
- Provide data in a format compatible with loss models.
- Provide tools that would reduce the amount of data manipulated locally.
- Maps visualizing the return period of certain perils, if possible using the shape file provided by the user.

## SECTEUR Goals

**We engage through…**

interviews | workshops | surveys

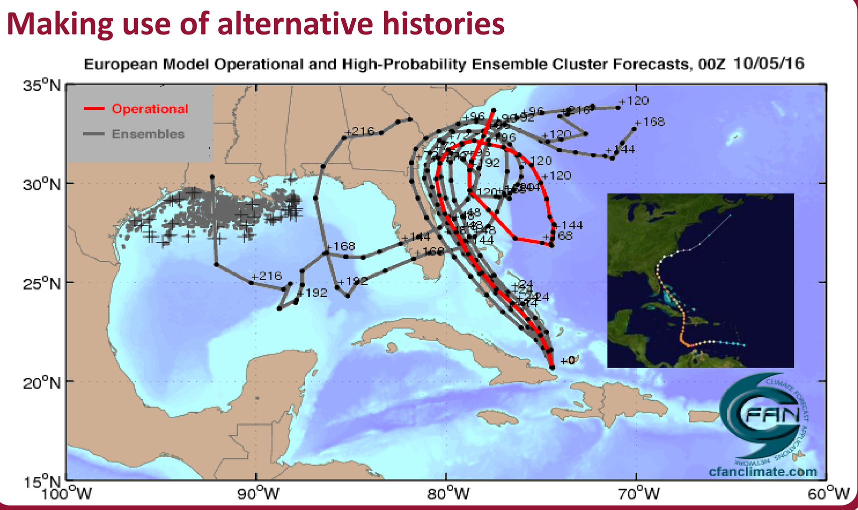
**To produce and deliver…**

| | |
|---|---|
| C3S User Requirement Database | Actionable information |
| Gaps Identification and future recommendations for the European Commission | Present and future guidelines and prioritization |
| In-depth use cases | Detailed real applications |

### *Windstorm Information Service Copernicus*

The **WISC** project aims to provide a transparent and authoritative dataset to improve the understanding of windstorm risk from extra-tropical cyclones over Europe. As such, it is developing a catalogue of past storms and storm tracks at high resolution from observations and re-analysis, which will provide, amongst other things, 3-second wind gusts and maximum surface wind speeds. WISC makes use of ERA-Interim, ERA-5 and ERA-20C, tracking the storms directly in these reanalyses, but also provides additional spatial downscaling. WISC will also provide an event set based on ensemble runs derived from the UPSCALE climate model, providing 130 model years in current climate conditions. It is hoped that the storm footprints will eventually be combined with an exposure/vulnerability component in an open source Loss Modelling Framework (OASIS) to assess potential losses.

### Making use of alternative histories




Find out more…
http://climate.copernicus.eu/secteur

## Survey

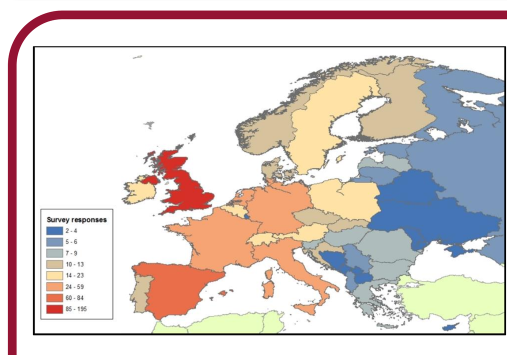



*Figure: The perceived usefulness of climate information & impact indicators*

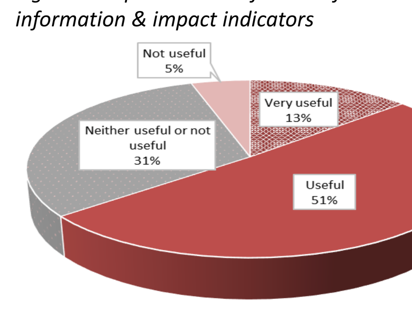



*Figure: Level of importance of key characteristics of climate information & impact indicators and how these are provided*

### Key observations

**A wide range of climate information is in use. Common indicators shared across sectors include:**

- Precipitation (mean, extreme)
- Temperature (mean, max, min)
- Wind speed
- Flood frequency
- Drought (frequency, severity)
- Etc.

**Leading providers:**

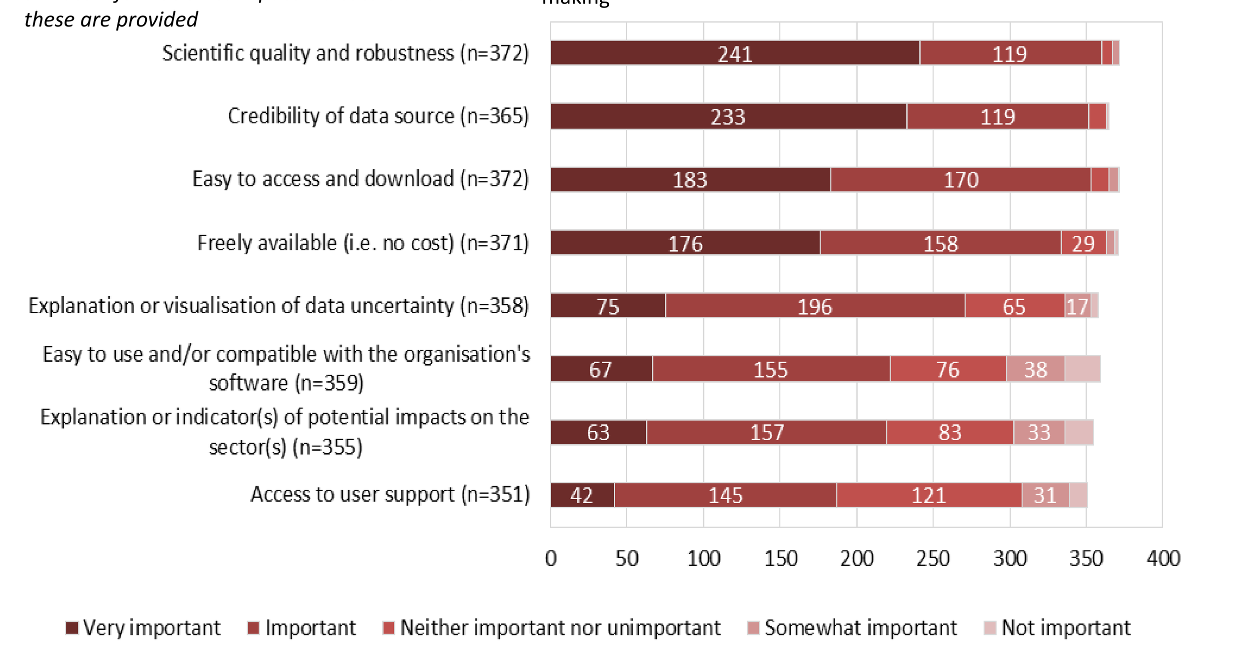
- National Meteorological and Hydrological Services (with ECMWF 5th)

**Key applications:**

- Research
- Risk management,
- Evaluating risk exposure
- Raising awareness outside the organisation
- Day-to-day operational activities
- Strategic activities (2-49 years)

**Spatial and temporal scales of decision-making:**

- Mostly medium term (2 to 49 years) and annual scales, though seasonal, immediate, weekly and monthly temporal frames are also widely supported
- Tendency towards sub-national, national and point-scales of decision-making




**Some conclusions…**

- **A user spectrum exists -** From the more competent, scientific and technical users working directly with raw data, to those more detached from data processing and applying climate information to specific decision-making tasks.
- **Tailoring climate services** is not simply about making different types of climate information available to users, but making this information available in a form that is *useful.*
- **Quality requirements** - Accuracy and uncertainty are prominent concerns. Communication of these factors is essential for **quality, robust and credible** information, and, in turn, facilitating the uptake of climate information in decision-making.
- **Understandable information** – Better explanations of climate data (e.g. metadata and/or easy to understand descriptions) are requested.
- **Access** - Calls for easily accessible information and centralised platform for downloading data.
- **User interface** – In light of the shared interest in key groups of ECVs/CIIs (particularly climate-related and extreme events/trends), it may be useful to design user-interfaces for accessing this information according to key themes of information (e.g. precipitation, temperature, floods, windstorms etc.), accessible to all types of sectoral users, in addition to sectoral groups of climate information. A **user-friendly and intuitive interface** is essential.
- **Resolution -** The spatio-temporal resolution of data is generally regarded as sufficient, yet many users still call for higher resolutions. To some extent there will always be calls 'for more', however this must be balanced with the demand for quality information.
- **Sectoral impacts -** There is a clear interest in climate impact indicators, therefore C3S should consider establishing linkages with the existing providers of other types of data.
- **Sustaining user engagement** is necessary in order to meaningfully inform climate services/C3S.

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