Climate Change

Copernicus and the Climate Change Service(C3S)

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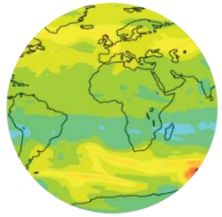
COPERNICUS

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**

SERVICE COMPONENT



Value Added Services and Applications

SPACE COMPONENT

IN-SITU COMPONENT

Source: copernicus.eu, retrieved April 2014

Full, free and open access to data

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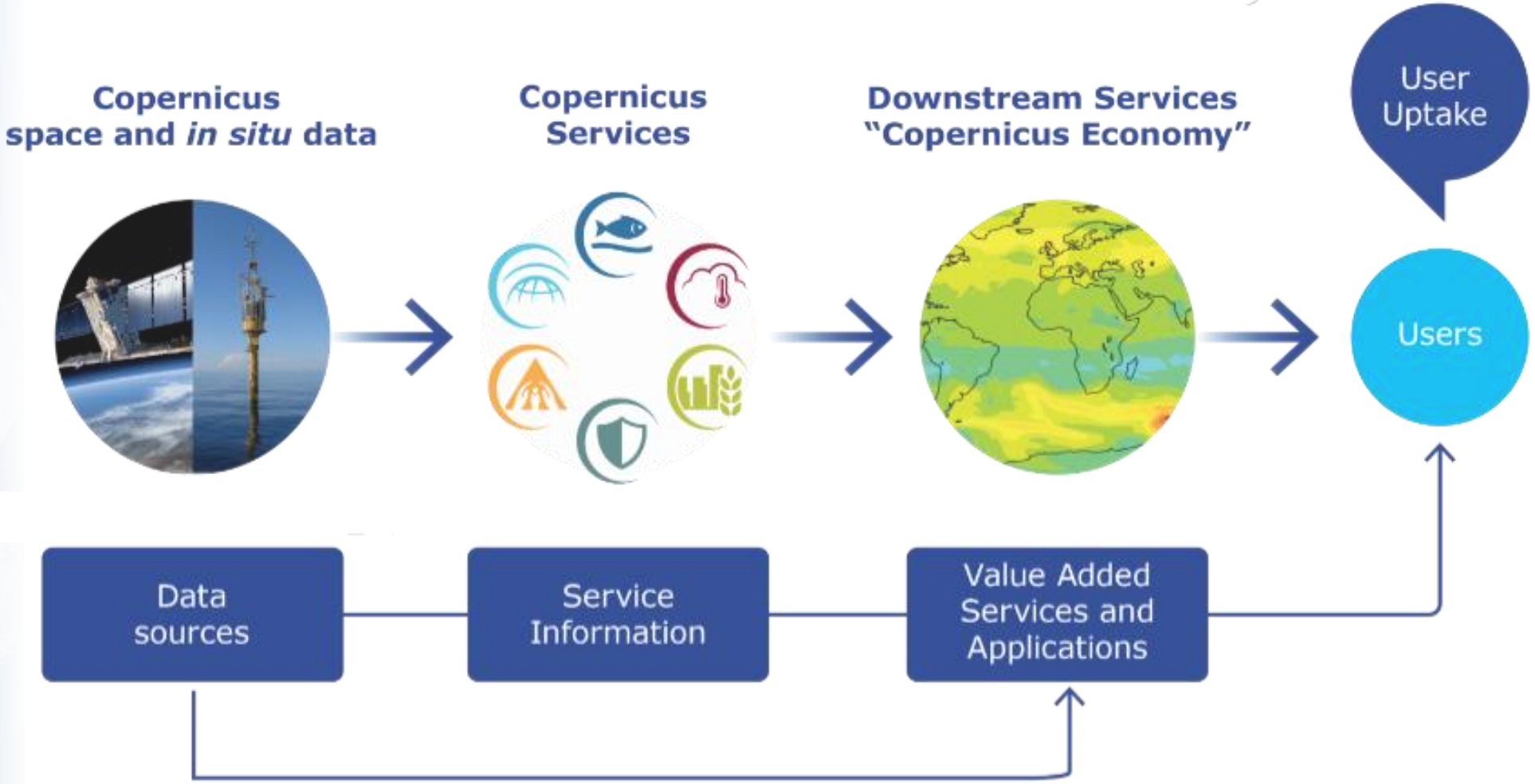

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Program Manager

SPACE

TECHNICAL COORDINATION BY esa

SENTINELS MISSIONS OPERATED BY esa EUMETSAT

CONTRIBUTING MISSIONS

EU Member States

SERVICES

IMPLEMENTED BY

ECMWF

MERCATOR OCEAN

European Environment Agency

ECMWF

FRONTEX

IN SITU

EU Member States

COORDINATED BY

European Environment Agency

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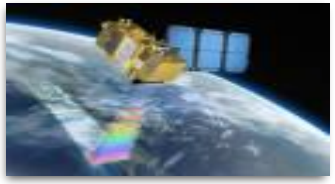
COPERNICUS SPACE Component

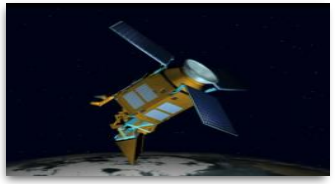
Sentinel-1 (A/B) – SAR imaging
All weather, day/night applications, interferometry



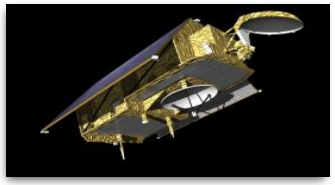
Sentinel-2 (A/B) – Multi-spectral imaging
Land applications: urban, forest, agriculture,…
Continuity of Landsat, SPOT

Sentinel-3 (A/B) – Ocean and global land monitoring
Wide-swath ocean color, vegetation, sea/land surface temperature, altimetry

Sentinel-4 (A/B) – Geostationary atmospheric
Atmospheric composition monitoring, trans-boundary pollution



Sentinel-5 precursor/ Sentinel-5 (A/B) – Low Earth-orbit
Atmospheric composition monitoring



Jason-CS (A/B) – Low inclination Altimetry
Sea-level, wave height and marine wind speed

2014

2020

Source: ESA

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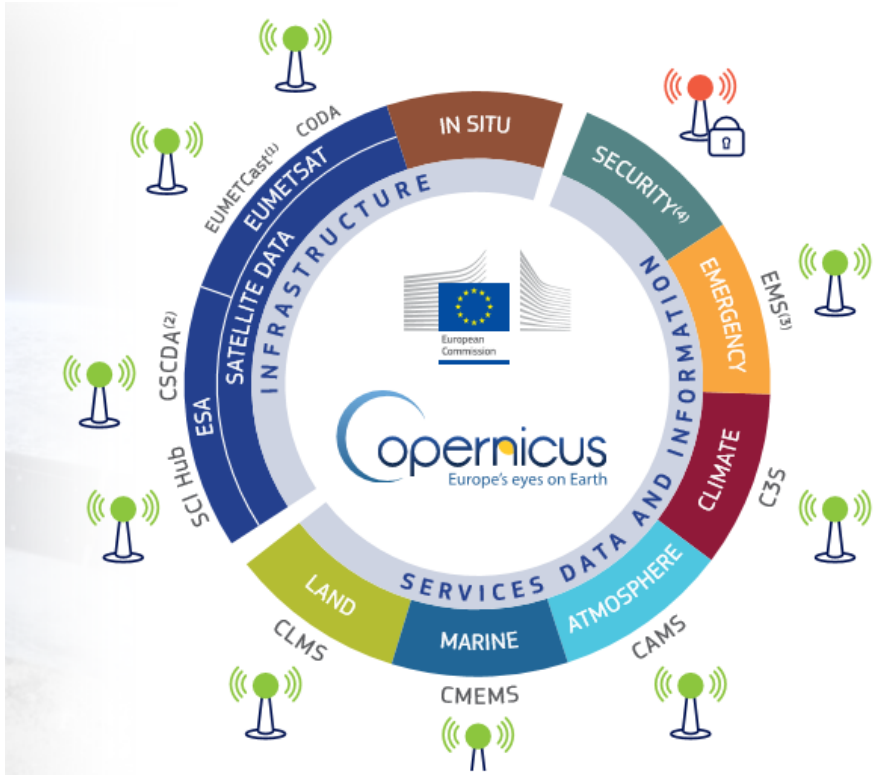
COPERNICUS DATA ACCESS OVERVIEW

- **Satellite Data distribution Hubs**
  - Sentinels
  - Contributing missions
  - Access to images in NRT
  - Access to archives



- **Services Information portals for**
  - Added value products, indicators
  - Models
  - Archives, Near Real Time and Forecasts products

Note: *Copernicus in situ component provides in situ data access, serving the Copernicus services. It is not delivering in-situ data to the end-users.*

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COPERNICUS Climate Change service - C3S

- The European Commission has **entrusted** ECMWF with the implementation of the **Copernicus Climate Change Service – C3S**

- The Copernicus Climate Change service will provide **information** to increase the **knowledge** base to support **adaptation** and **mitigation** policies.

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C3S in a nutshell

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International expert panel

from European Commission
e.g.,FP7 Space call, H2020

from EU Member States, ESA, EUMETSAT, EEA, WMO..

Evaluation & Qc Function

Quality assurance
Integrity of Service
User requirements

CLIMATE DATA STORE
Toolbox

SECTORAL INFORMATION SYSTEM

Outreach & Dissemination

Stakeholders & Users

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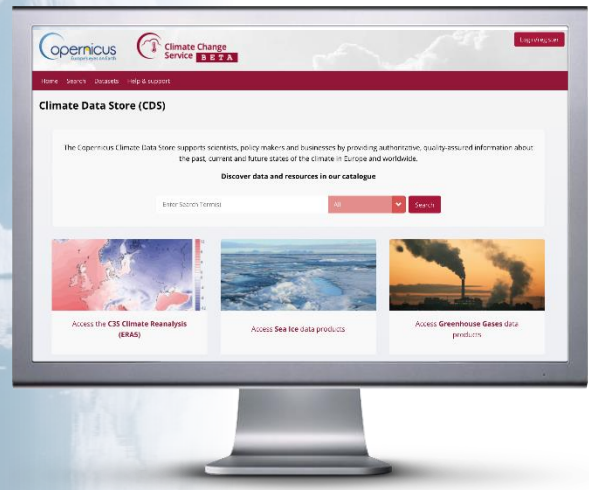
Climate Data Store - CDS



- The **Climate Data Store** is at the heart of the C3S infrastructure and providing information about **past**, **present** and **future** climate in terms of **Essential Climate Variables** and **derived climate indicators**
- The CDS has been designed as a **distributed system**, providing improved access to **existing datasets** through a **unified web interface**
- The CDS contains **observations**, global and regional **climate reanalyses**, global and regional **climate projections** and **seasonal forecasts**
- The CDS also provides an **authoritative set of software** (**toolbox**) that allows the users to **develop applications** making use of the content of the CDS
- This service accommodates the needs of the highly **diverse set of users** including **policy makers**, experts as well as **scientists**

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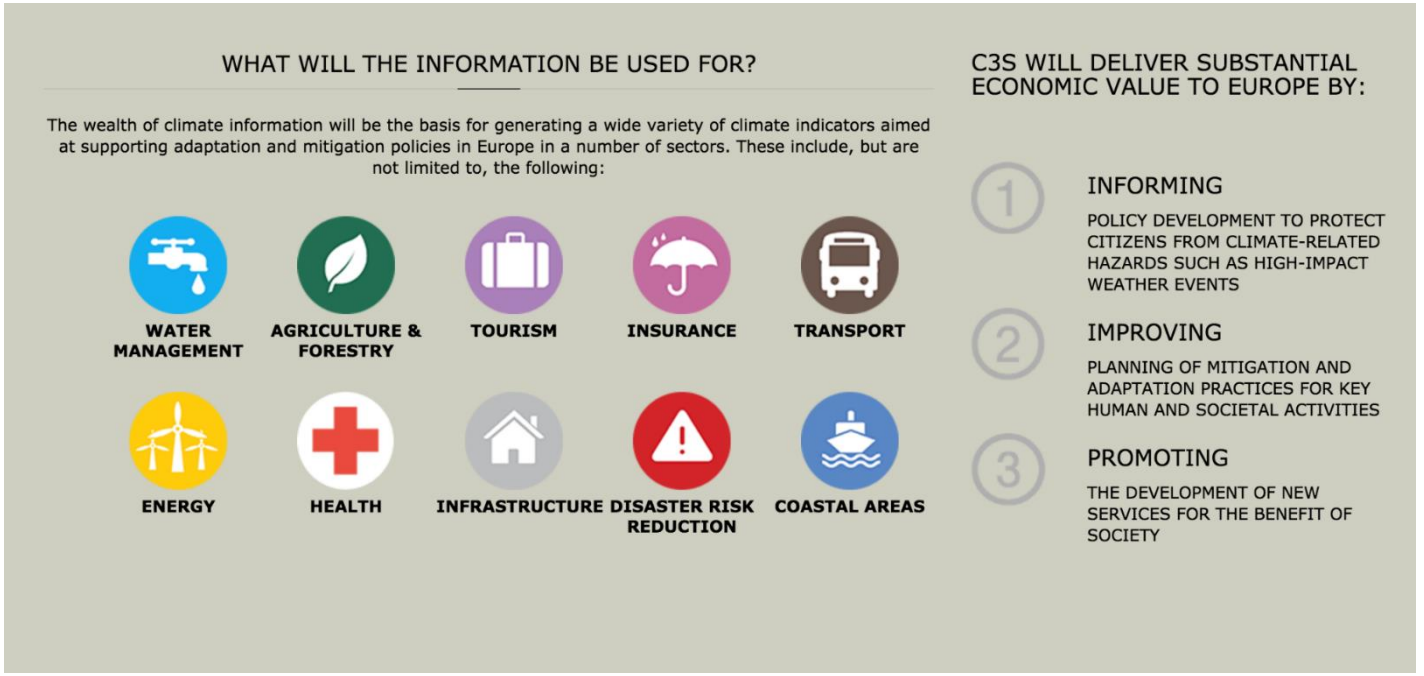
Sectoral Information System

Proof-of-concepts of climate services: Demonstration of the value chain with several end-to-end demonstrators

As an operational Service, C3S ambitions to become an enabler of downstream climate services, by providing or brokering high quality and sector relevant climate data and indicators, good practices, tools and by supporting compelling use cases.



See Carlo's presentation

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Evaluation & Qc Function

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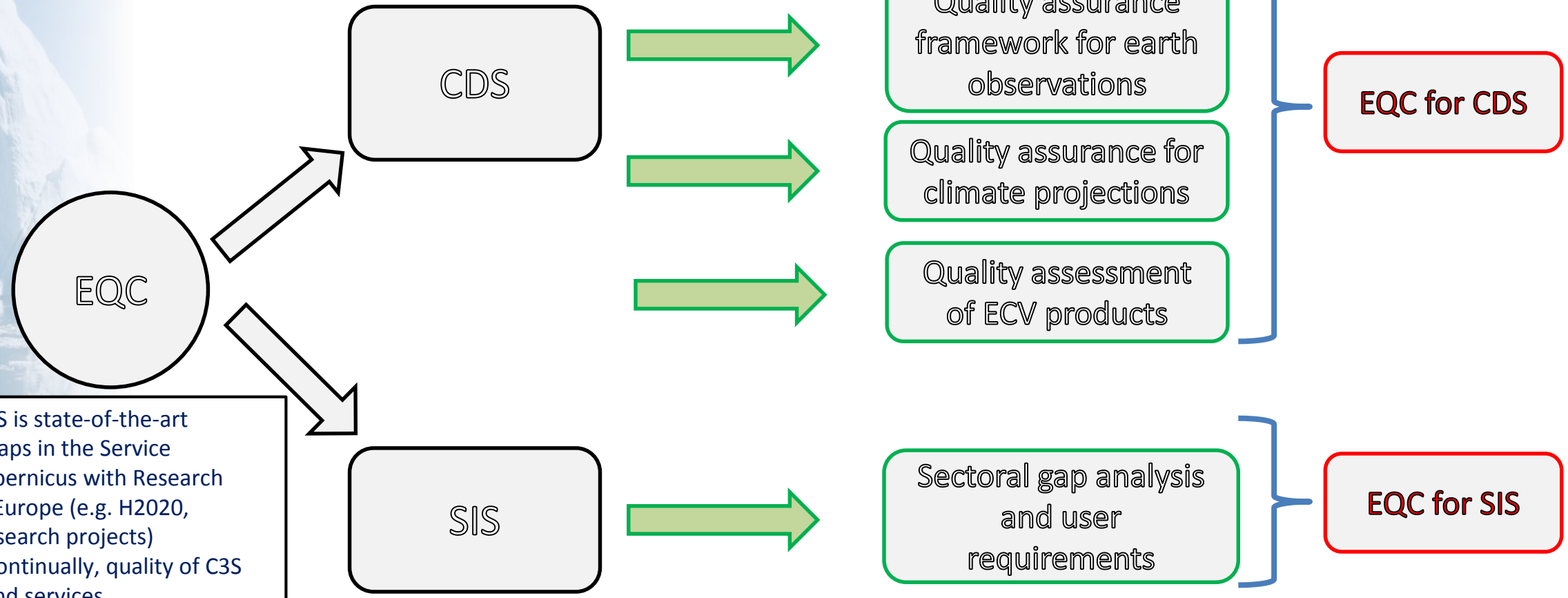

Ensures C3S is state-of-the-art
Identifies gaps in the Service
Bridges Copernicus with Research Agenda in Europe (e.g. H2020, national research projects)
Monitors continually, quality of C3S products and services
"Quality Assurance" body
Contributes and develops URDB, etc. documents

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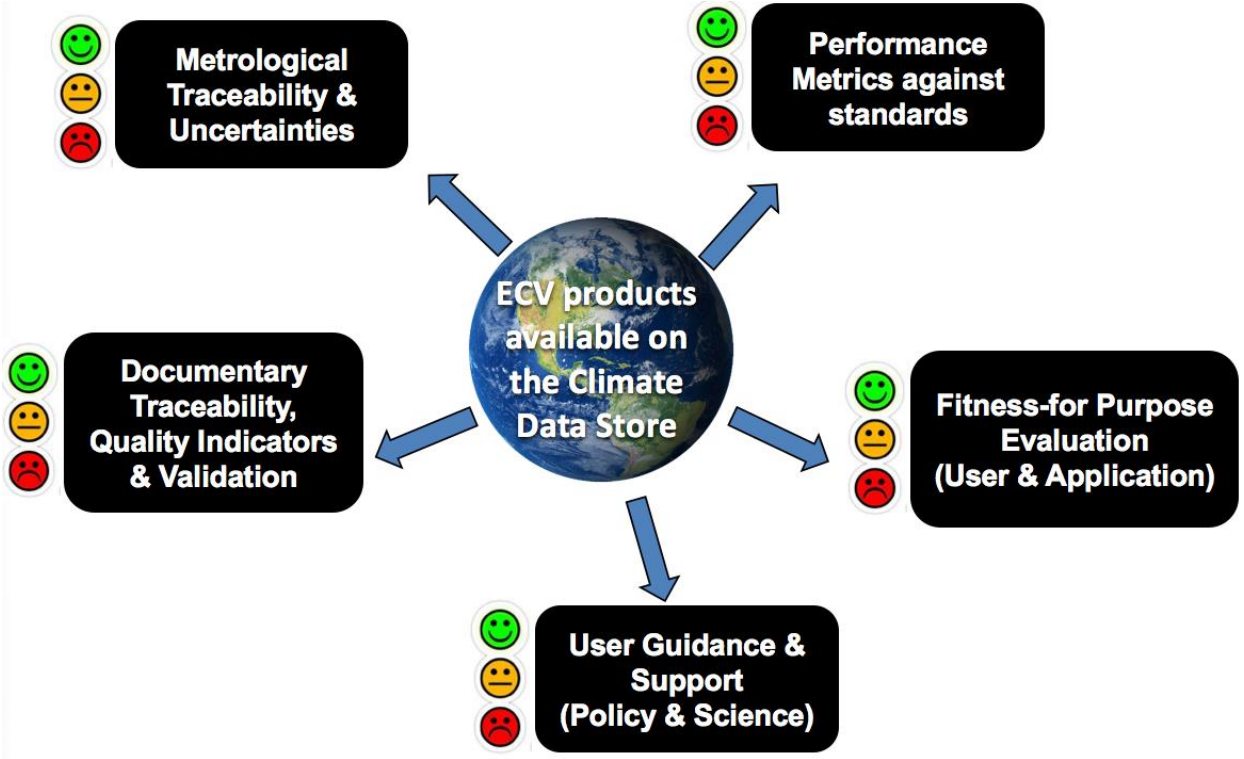
Example: Operational EQC for ECV products

Quality Assurance Framework for earth observations

- Demonstrating scientific rigor
- Practical guidance

Quality assessments of ECV products

- Single-product assessments
- Multi-products assessments
- Thematic product assessments



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