Royal Netherlands
Meteorological Institute
Ministry of Infrastructure and the Environment

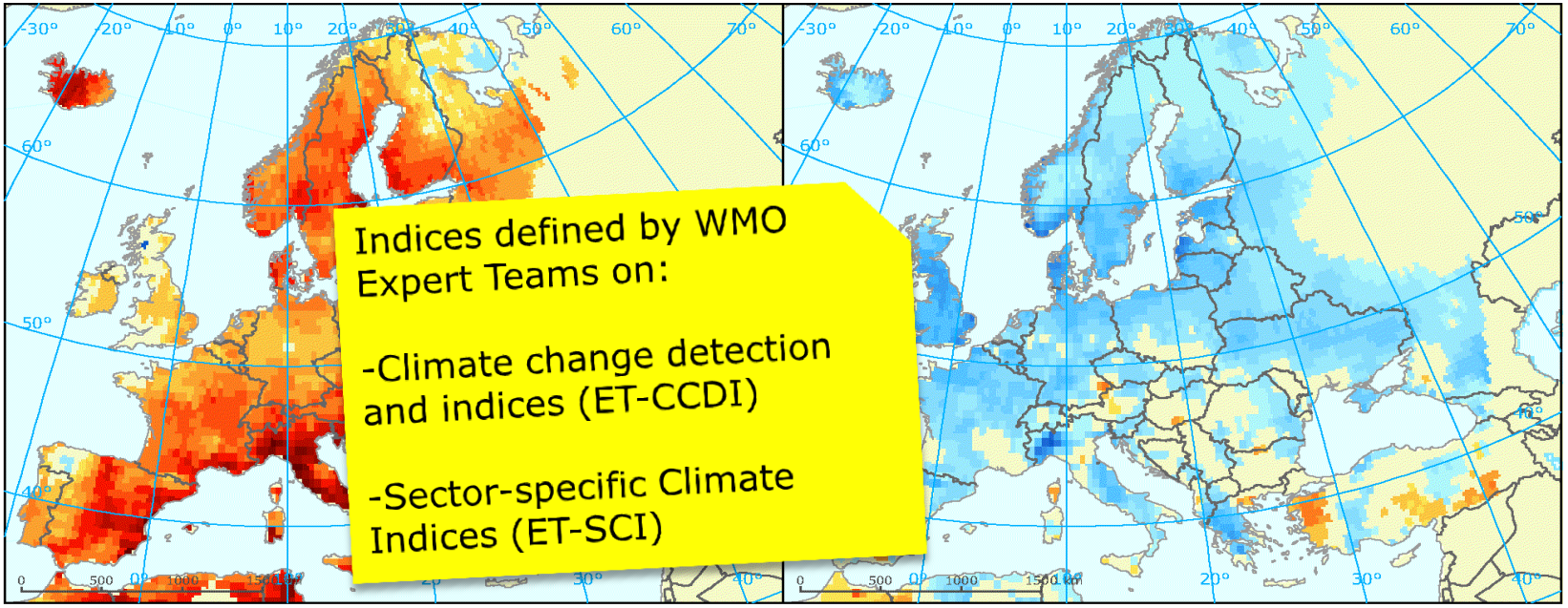
Climate Information for Transport Applications

Gé Verver (KNMI, The Netherlands)

- *European Climate Assessment & Dataset*
- *KNMI Climate Explorer*
- *Copernicus*

European Climate Assessment & Dataset

Changing duration of warm spells (left) and frost days (right)



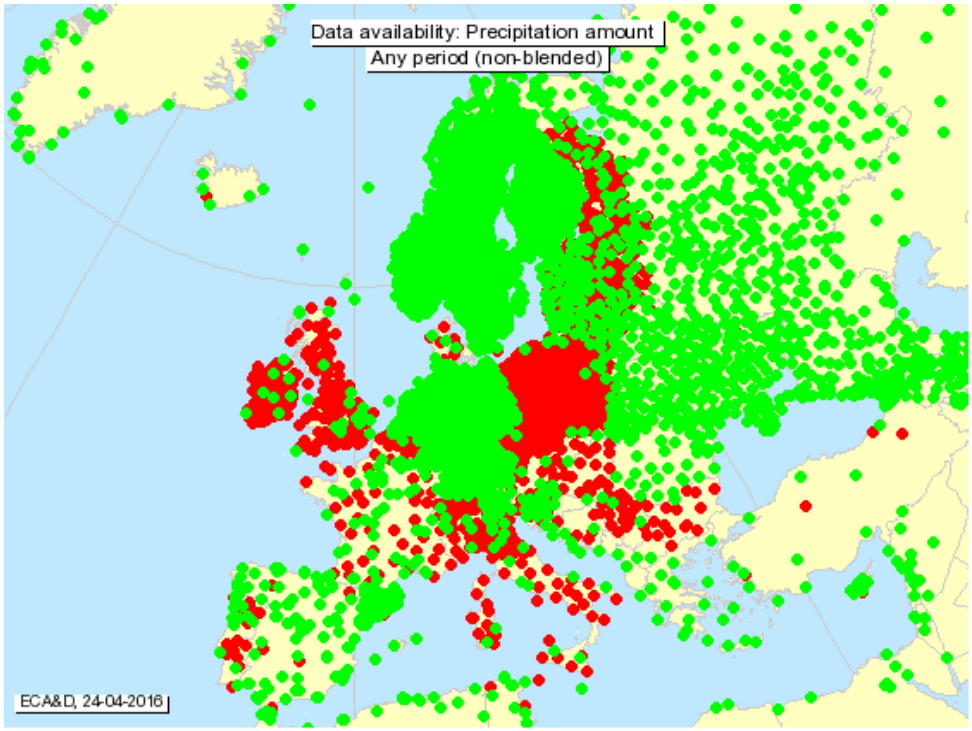
Observed changes in duration of warm spells in summer (left) and frequency of frost days in winter (right), in the period 1976–2006

Days per decade

– 10 – 9 – 8 – 7 – 6 – 5 – 4 – 3 – 2 – 1 0 1 2 3 4 5 6 7 8 9 10

From: EEA/JRC/WHO impact indicator report, 2008;
Source: ECA&D project, http://www.ecad.eu

European Climate Assessment & Dataset



- 67 Participants
- 62 Countries
- 10481 Stations
- 42752 Daily station series
- 70 Derived indices

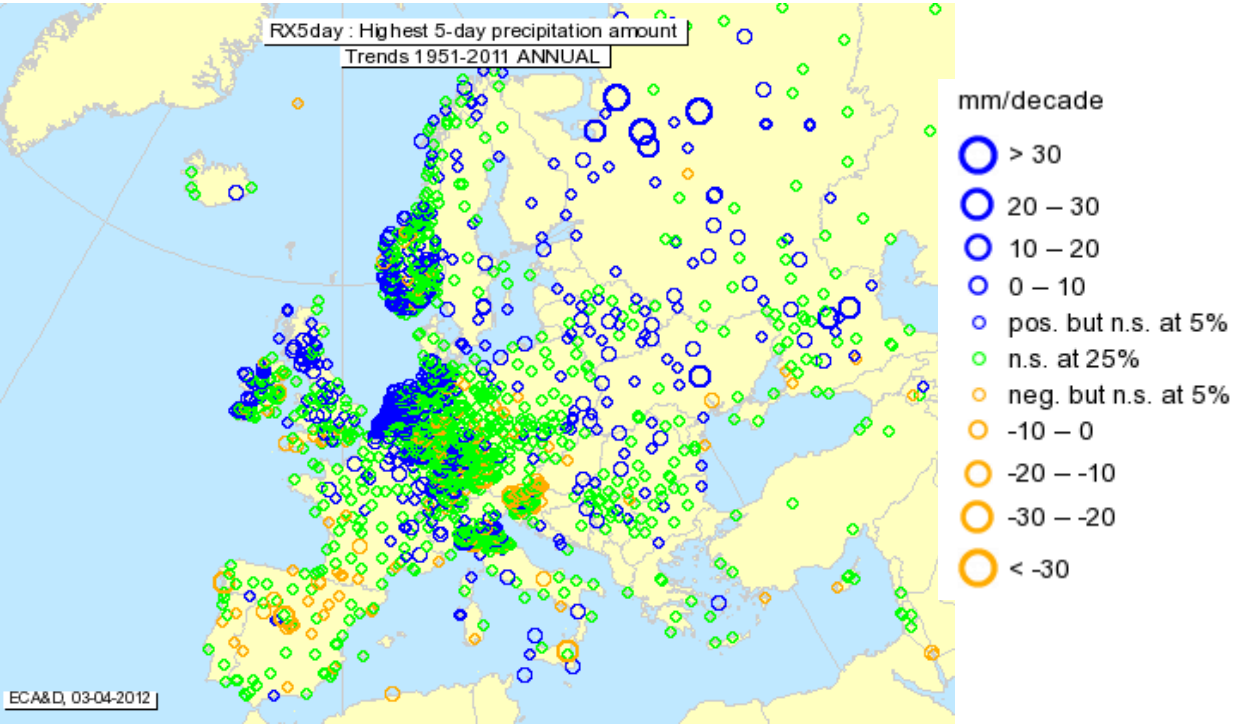
www.ecad.eu

Daily values for:
Temperature (min/max/avg)
Precipitation, Pressure,
Snow depth, Humidity,
Sunshine, Cloud Cover,
Wind (speed/gust/direction)

Indices of extremes
in 8 categories:

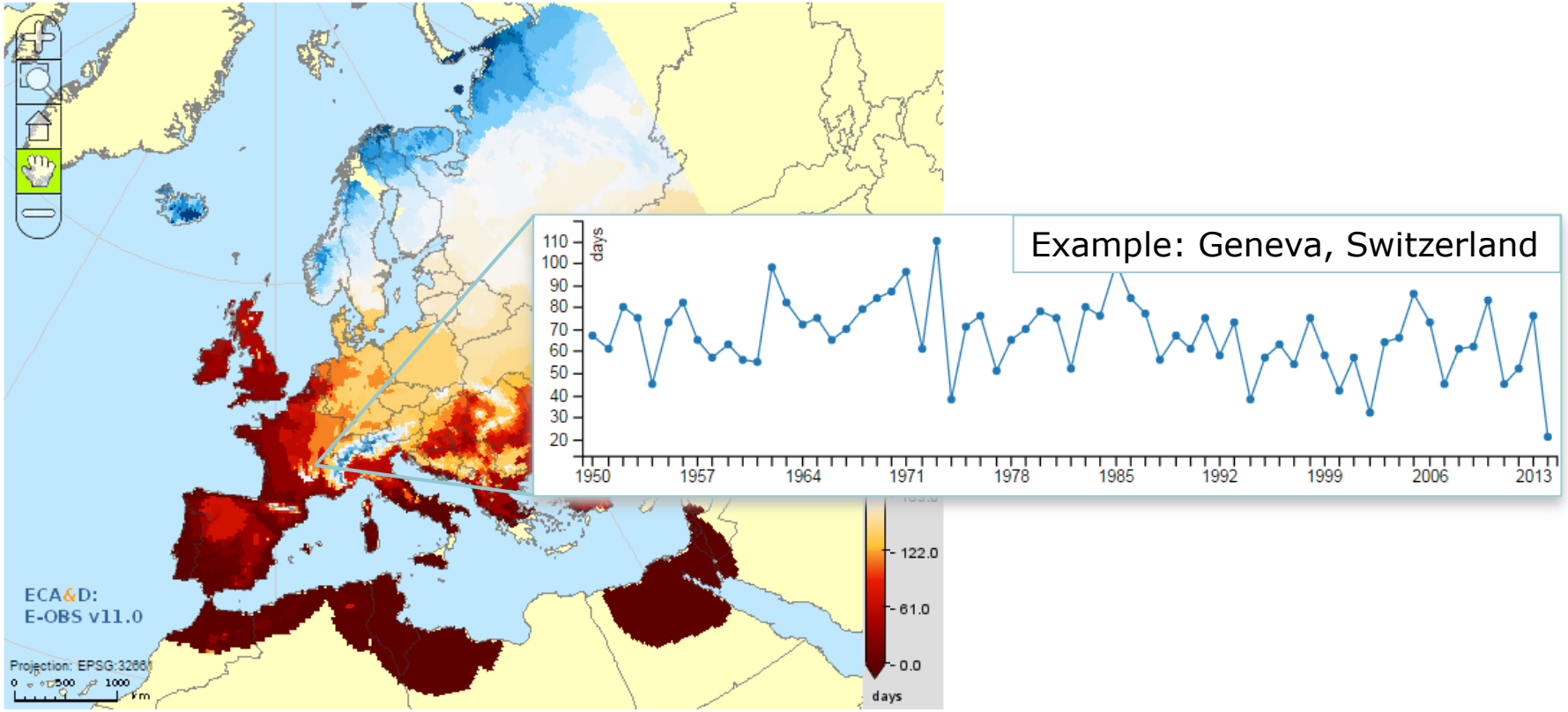
- Cold
- Drought
- Heat
- Pressure
- Rain
- Snow
- Sun
- Temperature

Web interface to the data



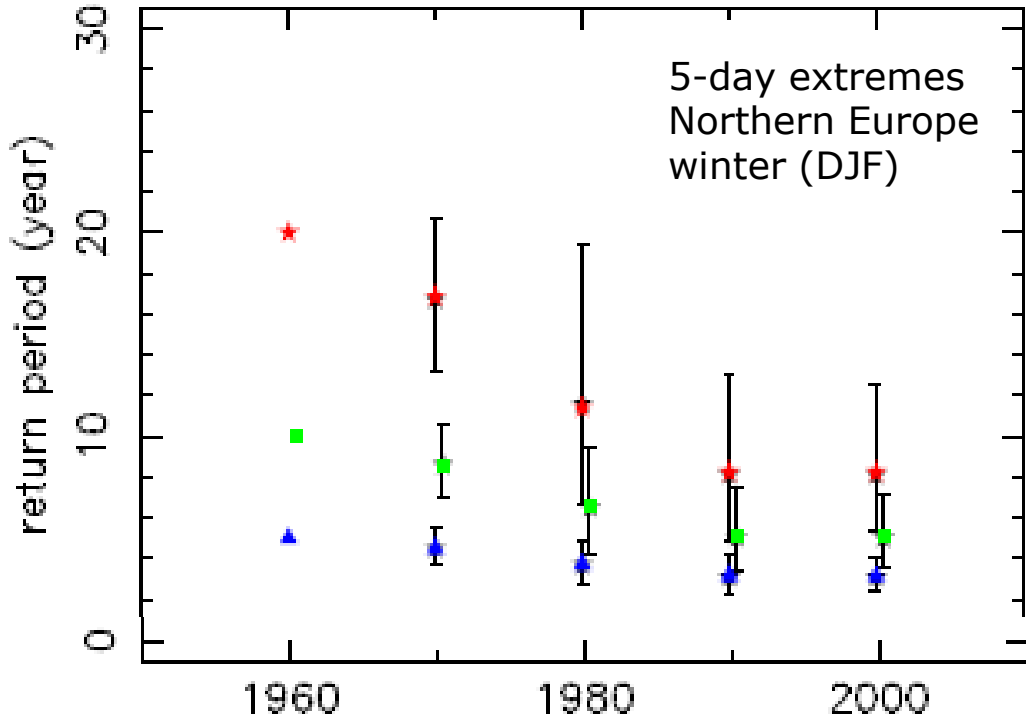
Web interface for browsing time series plots, trend maps, climatology/anomaly maps, and return value maps for selected stations, time periods, etc.

Number of frost days (Tmin<0°C)



In-situ observations of precipitation extremes

Van den Besselaar et al., Int.J.Climatol., 2013



Reduction is in qualitative agreement with model projections for the 21st Century e.g. Kharin et al. J.Climate, 2007

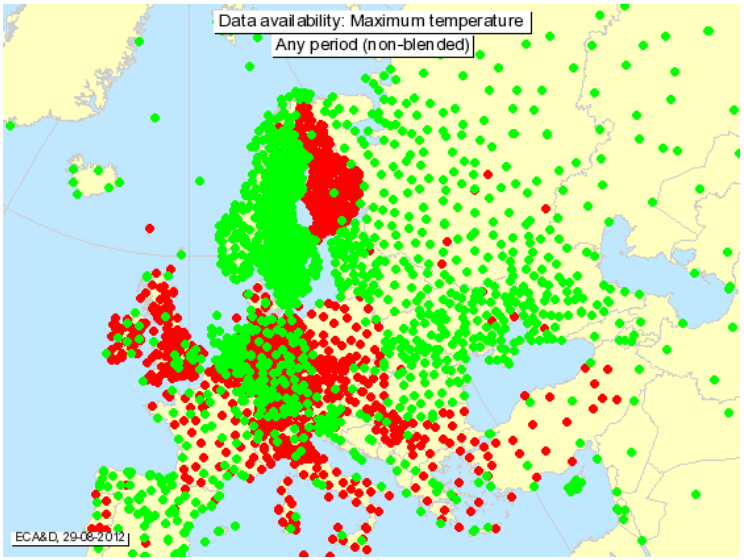
European Climate Assessment & Dataset

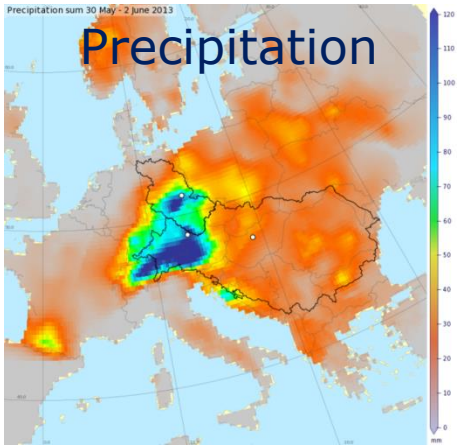
Applications: hydrology

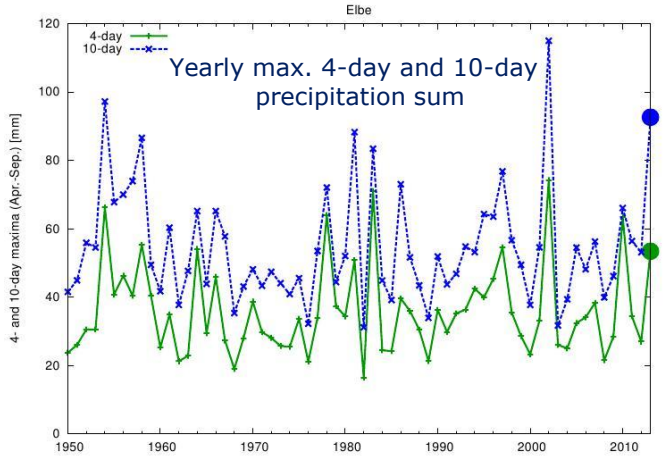
KNMI Regional Climate Centre (RCC) for European Climate Data

EUMETNET
The Network of European Meteorological Services

WMO-World Meteorological Organization





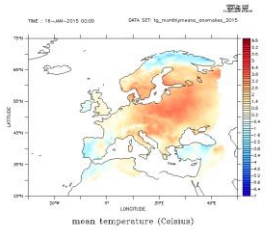


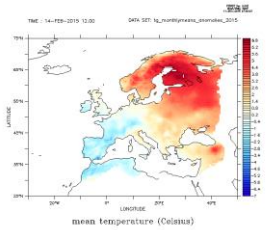
Central-European flooding event in 2013

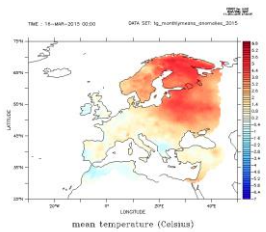
Historical perspective

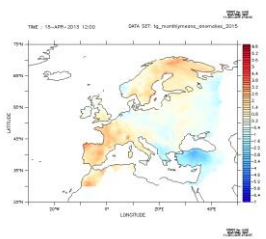
European temperature anomaly

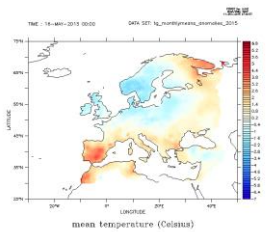
(wrt 1981-2010 climatology)

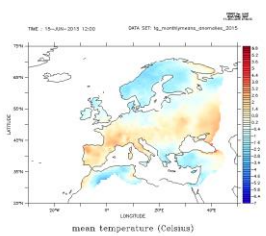


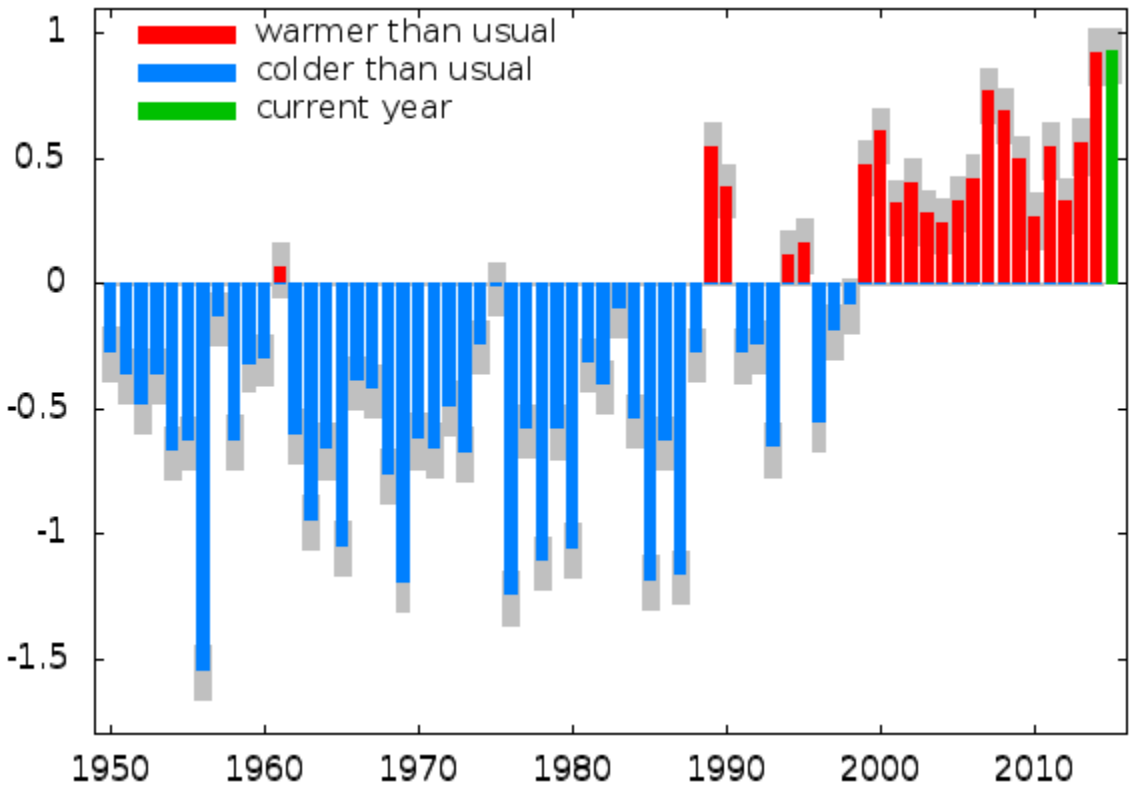


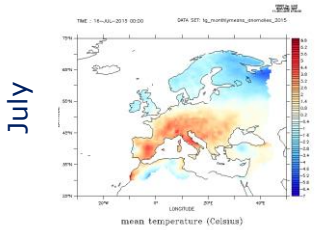


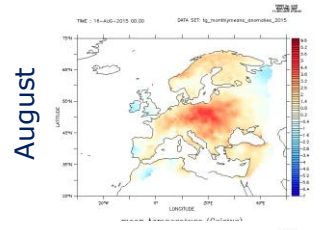


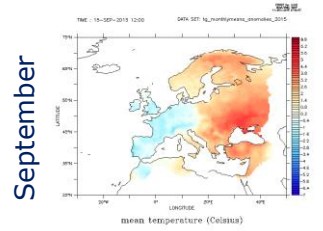


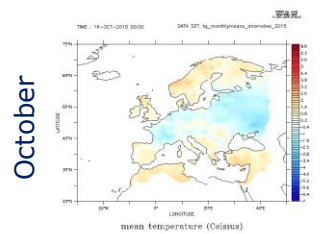


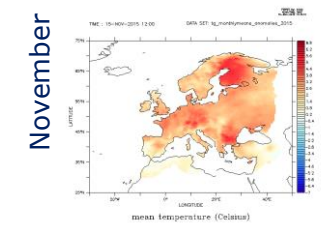


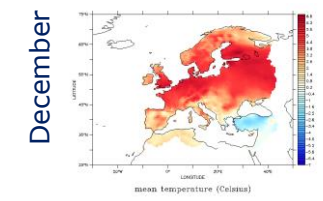






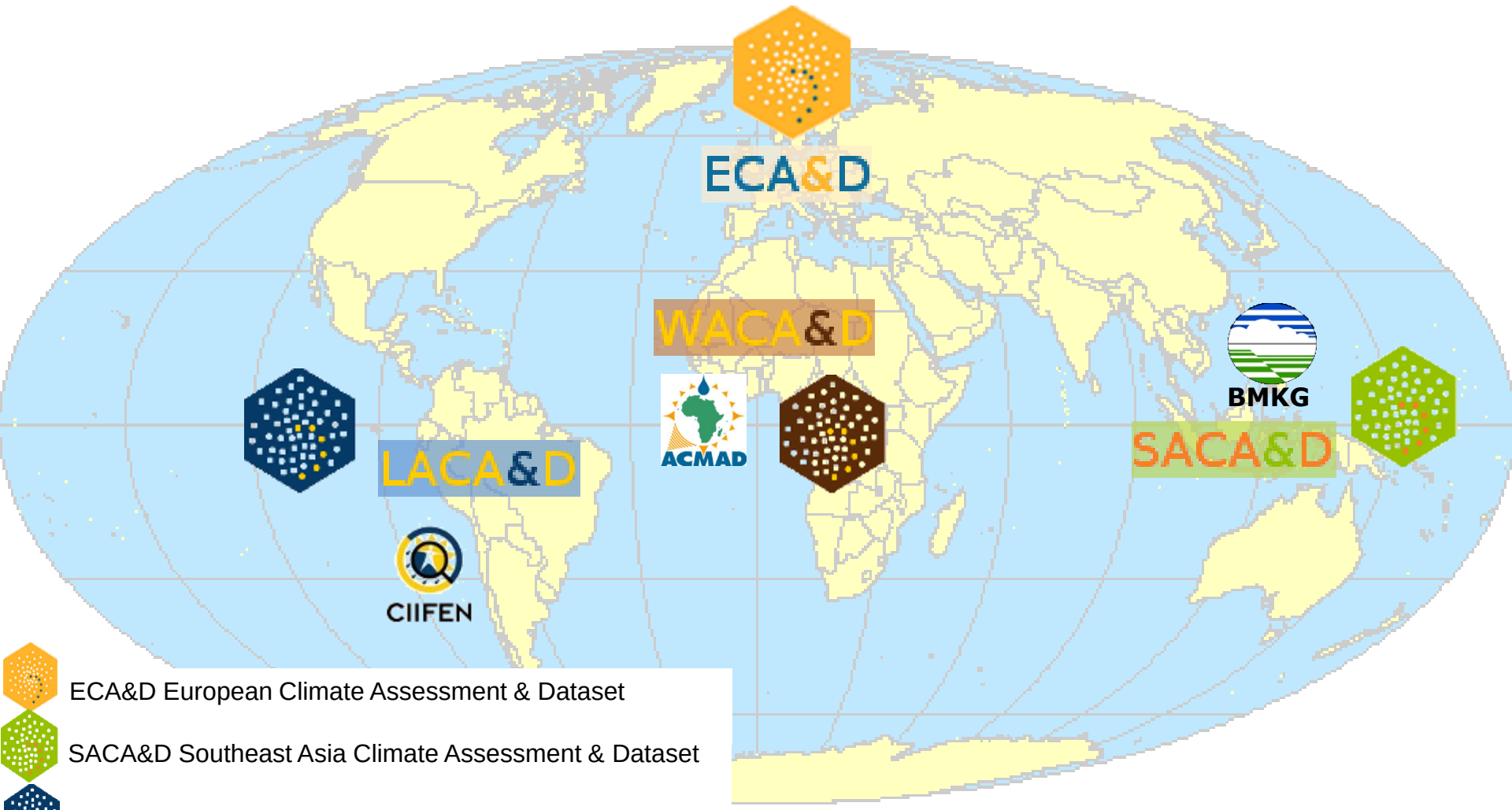






Based on ECA&D/EOBS, vd Schrier et al., 2014

International Climate Assessment & Dataset



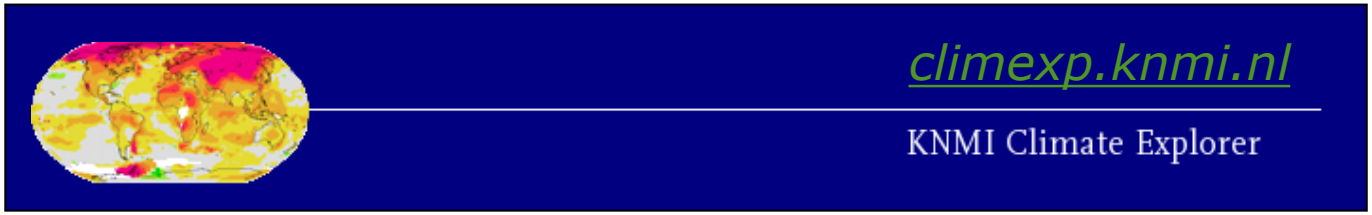
ECA&D European Climate Assessment & Dataset

SACA&D Southeast Asia Climate Assessment & Dataset

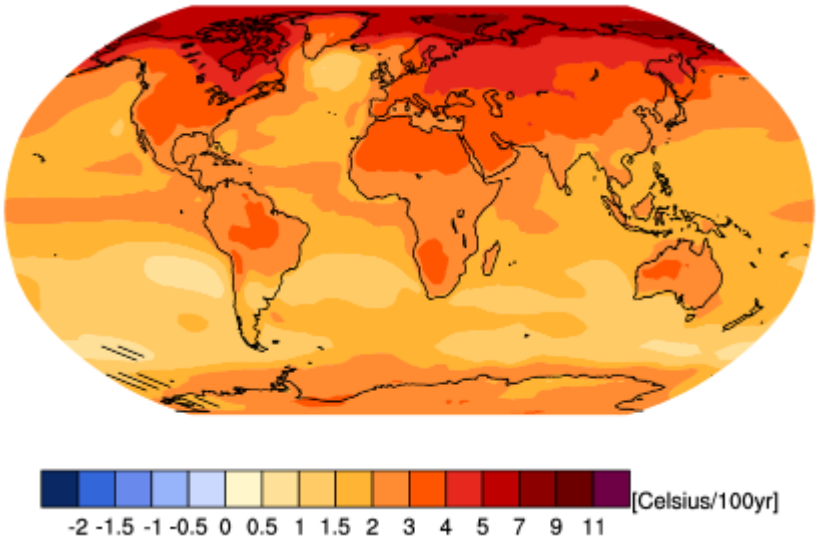
LACA&D Latin American Climate Assessment & Dataset

WACA&D West African Climate Assessment & Dataset

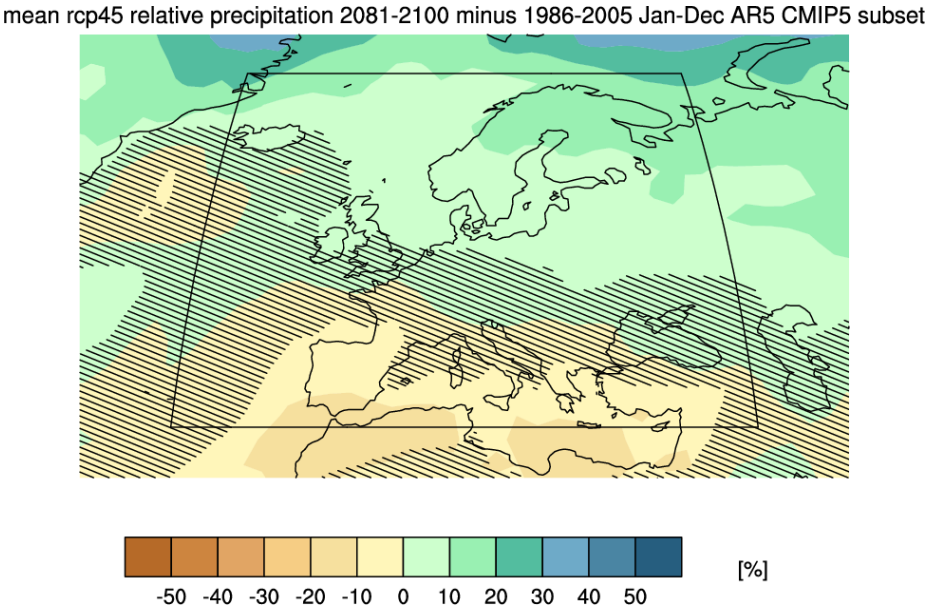
KNMI Climate Explorer – assessment tools & data



Public access • Statistical analysis and visualization tools • Historical data and projections

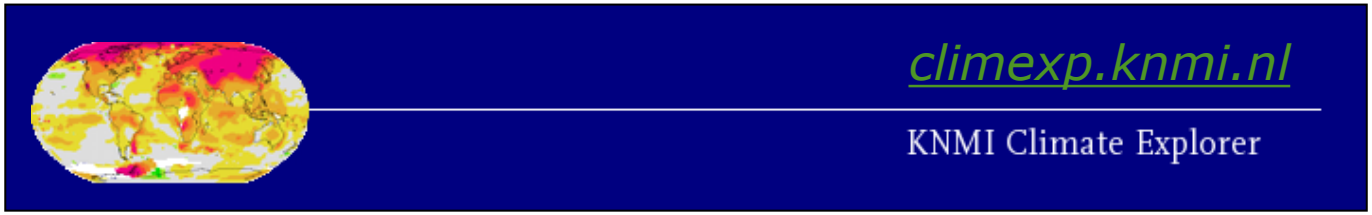


Example 1: 1979-2014 trend in Yearly average temperature (CMIP5)

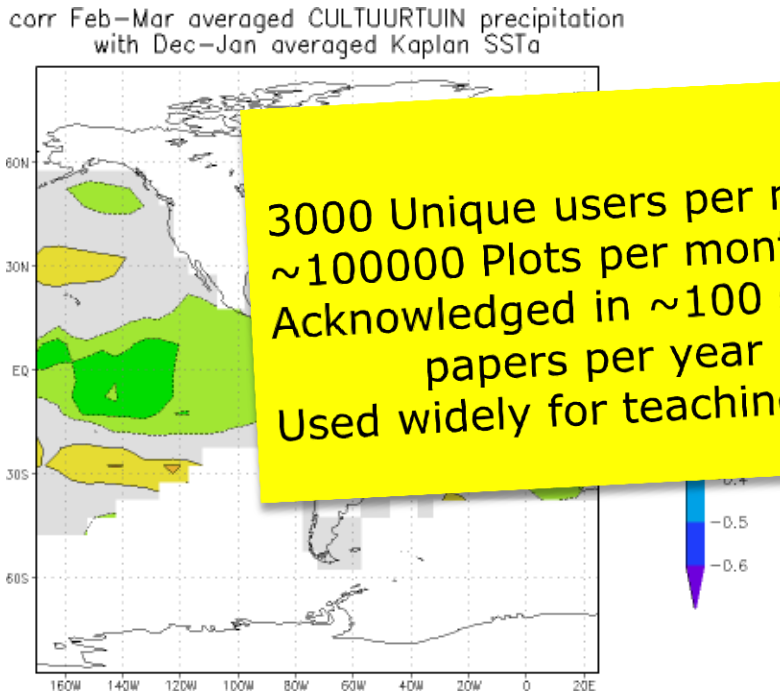


Example 2: Change yearly precipitation

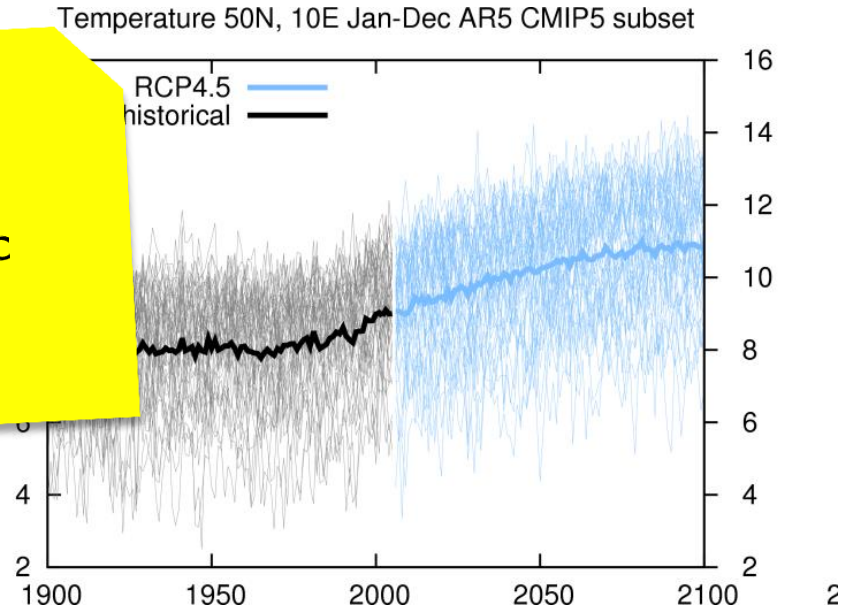
KNMI Climate Explorer – assessment tools & data



Public access • Statistical analysis and visualization tools • Historical data and projections



3000 Unique users per month
~100000 Plots per month
Acknowledged in ~100 scientific papers per year
Used widely for teaching



Example 3: correlation precipitation in Paramaribo (Suriname) vs SST

Example 4: Yearly average temperature

opernicus
The European Earth Observation Programme

Copernicus is an EU Programme aimed at developing European information services
based on satellite Earth Observation and in-situ data analyses.

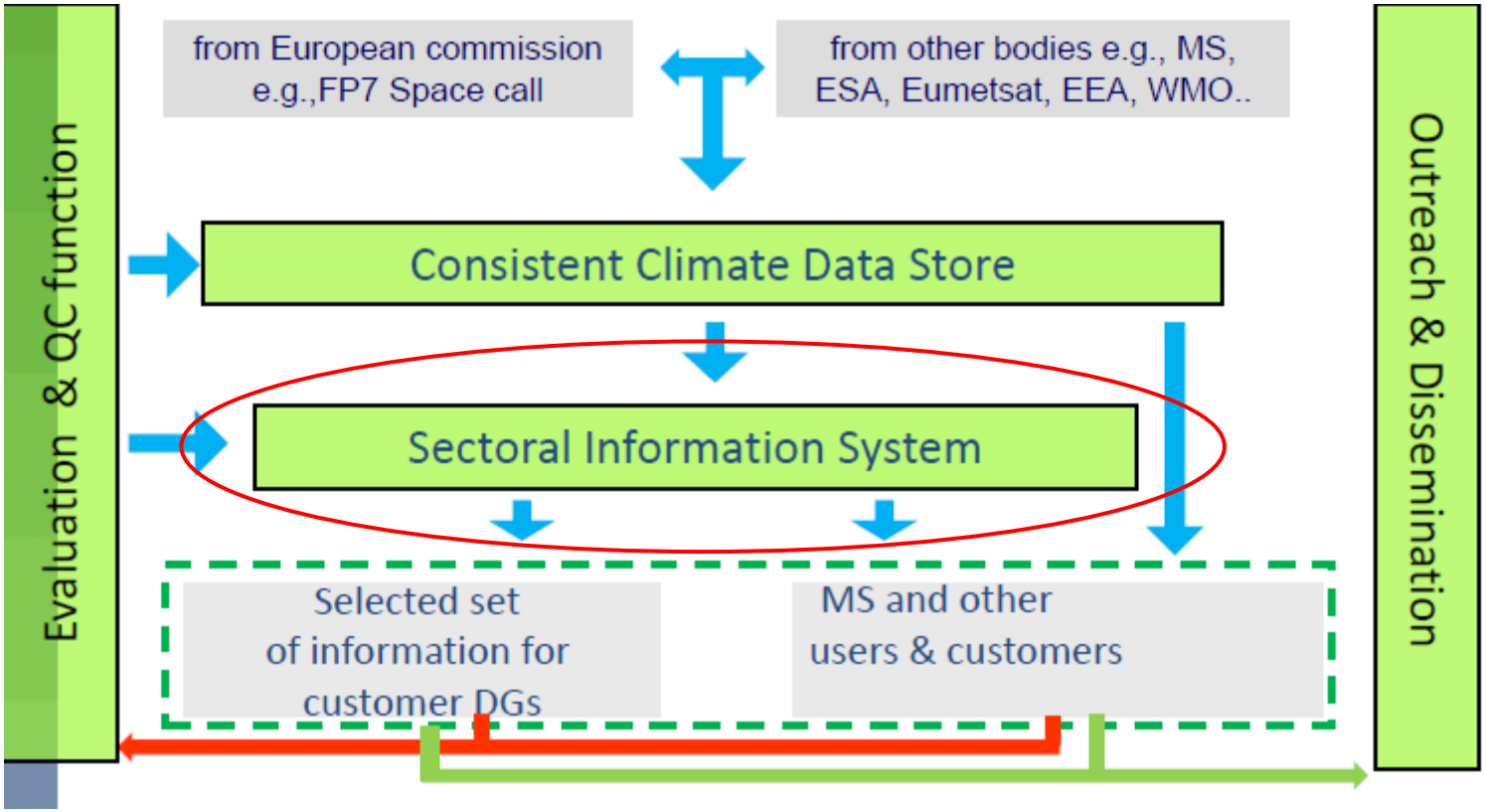
The initiative is headed by the EC, in partnership with ESA and EEA

Budget 2014-2020: 4.3 billion €, of which 3.1 for ESA, -> 200 M€/yr (non-ESA)

Services

- **Land Monitoring Service**: Information on land cover, land use, incl. changes
- **Marine Environment Monitoring Service**: Information about the physical state an dynamics of the ocean and marine ecosystems
- **Atmosphere Monitoring Service**: Monitor the composition of the Earth's atmosphe
- **Climate Change Service**: Monitoring and predicting climate change to support adaptation and mitigation
- **Emergency Management Service**: Alerts related to flood and forest fire risks and r to assess the impact of natural and man-made disasters
- **Security Service**: Information for EU external actions, maritime surveillance and border surveillance.

Copernicus Climate Change Service Architecture



Climate Change Service

opernicus
The European Earth Observation Programme

Sectoral Information Systems:

Thank you for your attention!