



European Reanalysis and Observations for Monitoring (EURO4M)

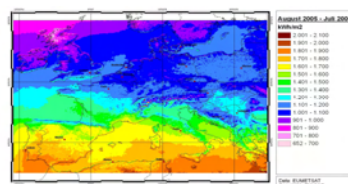
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The EU FP7 project EURO4M (European Reanalysis and Observations for Monitoring, <http://www.euro4m.eu>) develops regional reanalyses of past weather and user-oriented data products for monitoring climate variability and change in Europe. EURO4M addresses the situation of fragmentation and scarcity of long-term climate change monitoring information. It does so by combining seamlessly the comprehensive data sets from model-based regional reanalyses and the Essential Climate Variable (ECV) data sets from satellites and ground-based stations.



The EURO4M project contributes to GMES, the European initiative for the establishment of a European capacity for Earth Observation. The atmospheric in-situ climate variables the project focuses on are air temperature, sea surface temperature, precipitation, snow cover, air pressure, surface radiation, wind speed and direction, and water vapour.



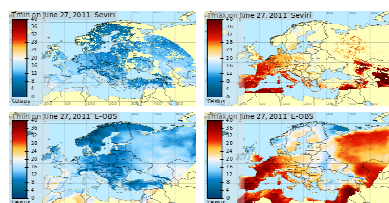
Map of calculated solar energy in a typical year (Source: DWD, EUMETSAT / CM-SAF).

In order to further enhance the resolution of the regional reanalyses to the local scale, 2-dimensional downscaling is performed using the systems MESAN and SAFRAN at ~3 km resolution.

Building Blocks

Climate variability and change can be better understood and predicted using three building blocks to monitor the European climate:

Surface in-situ climate data provide information often with high precision and time resolution. Even in the satellite era, surface observations contain essential information that cannot be provided by other platforms.

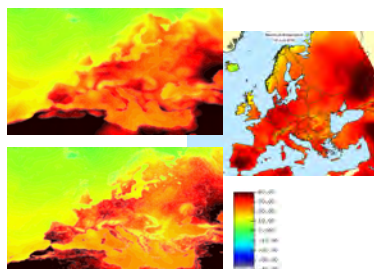


Air temperatures based on in situ observations (lower panels; source KNMI) and Sevir/Meteosat data (upper panels; source UK MetOffice / EUMETSAT CM-SAF).

Satellite-derived monitoring products

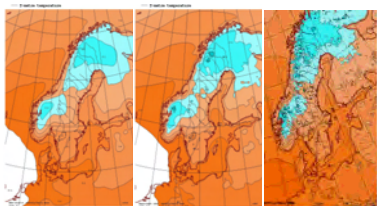
are considered in connection with products derived from surface observations. EURO4M will further develop and integrate the EUMETSAT-SAF (Satellite Application Facility) products and methods for climate monitoring.

EURO4M delivers **high-resolution regional reanalyses** over Europe. The UK Met Office uses the NAE-RCM with 4D Var at 12/36 km resolution.



Max surface Temperatures on July 10, 2010, during the Russian heat wave. Upper-left: ERA-interim; lower-left: NAE at 12 km resolution, Right: E-Obs (Source: UK MetOffice)

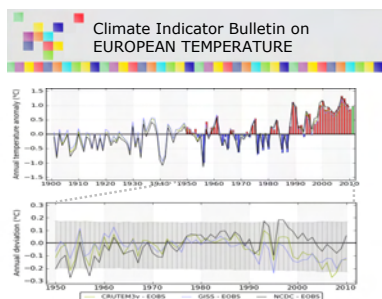
SMHI uses HIRLAM with 3D-Var at 22km resolution.



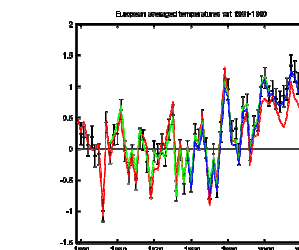
2m Temperatures from ERA-Interim, HIRLAM, and Mesan. (source: SMHI)

Climate Indicator bulletins

EURO4M products are disseminated through regularly issued user-oriented Climate Indicator Bulletins. The topic of the first bulletin is on European land temperature.



Annual mean surface air temperature over European land area, based on EOBS(bars), CRU, GISS, and NCDC. (Source: KNMI)



Comparison of European Temperature anomalies based on E-Obs(+error), ERA40, 20thC, and ERA interim. (Source: KNMI)