



# **Climate related activities in RAVI (Europe)**

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*Meeting of the EC Expert Group on Water Scarcity and Drought  
13-14 October, 2011, Venice, Italy*



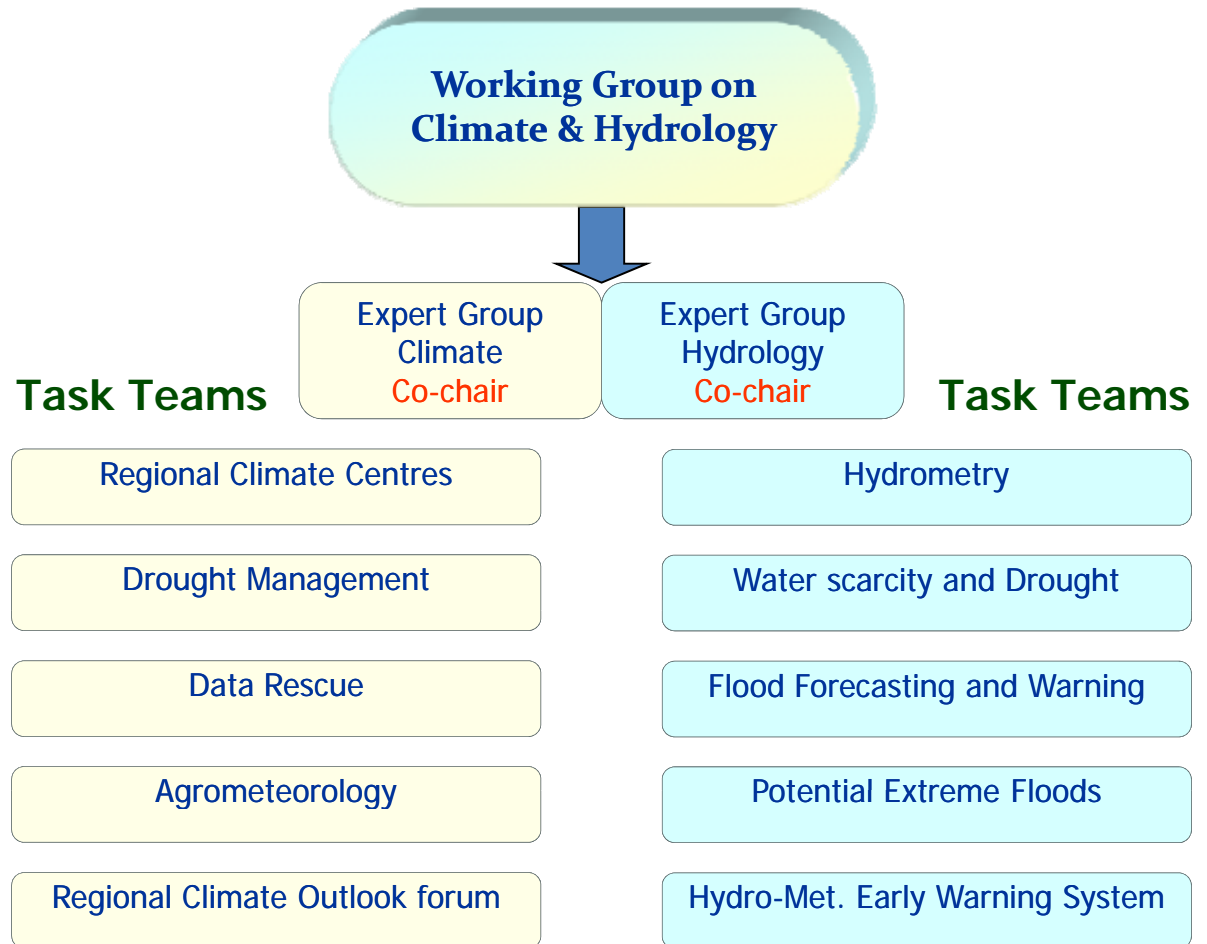
## ***Working Group on Climate and Hydrology: Expert Group for Climate***

- Guide and assist the full implementation of the RA VI Network of Regional Climate Centres (RCC);
- Facilitate the implementation of Regional Climate Outlook Forums (RCOF) mechanism in the Region;
- Coordinate integrated drought management in the close cooperation between meteorological and hydrological services at national and regional level;
- Assist in mobilizing resources and providing guidance on the data rescue efforts based on the identified needs of the Members in the Region;
- Coordinate the evaluation of current agrometeorological products/services regarding their user acceptance, economic impact and future challenges related to climate change, technological development



# Working Group: structure

- The new structure of the Group is aligned with WMO and RA VI strategies, and allows stronger integration between different disciplines and activities.
- It opens better opportunities to integrate climate activities with hydrology and agrometeorology issues, as well as with technology and service delivery activities.





## Regional Climate Centres: the concept

- Following years of research and development, it is that WMO designated a number of **Global Producing Centres for Long-range Forecasts (GPCs)**, after a careful assessment of needs, capabilities and optimal designation criteria.
- WMO Members have proposed development of **Regional Climate Centres (RCCs)** to help fulfill the need for more regionally focused climate services.



## **Regional Climate Centres**

WMO RCCs are centres of excellence that create regional products including long-range forecasts that support regional and national climate activities, and thereby strengthen the capacity of WMO Members in a given region to deliver better climate services to national users, and to strengthen their capacity to meet national climate information needs

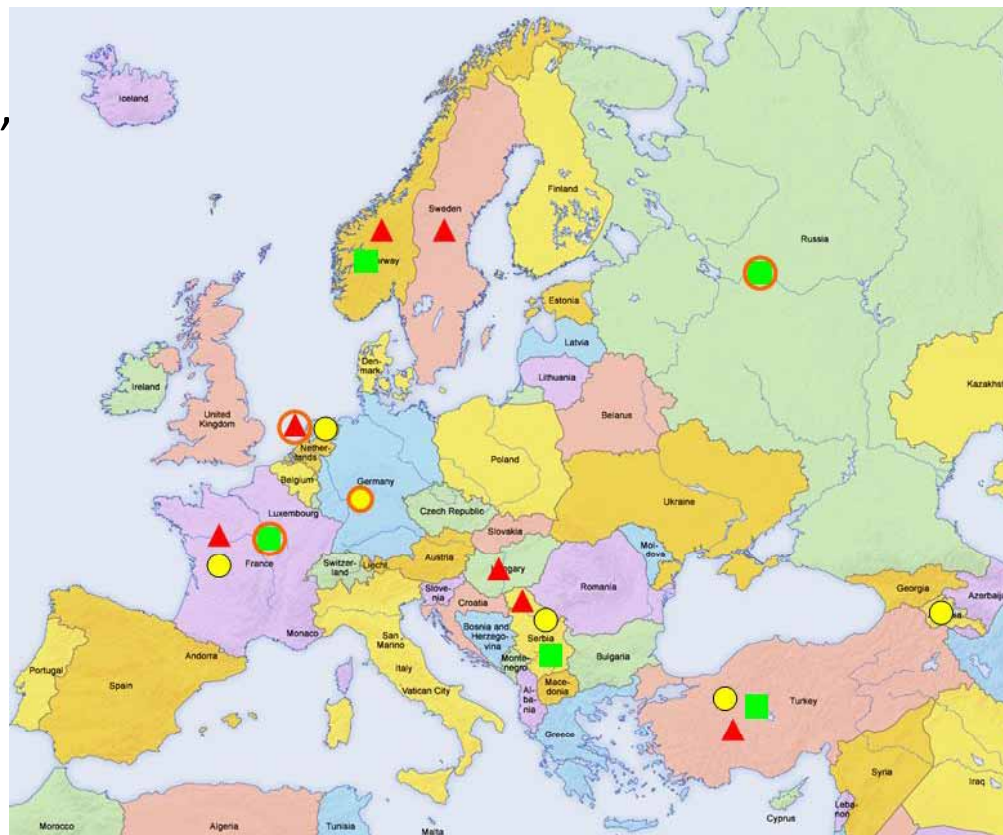


# WMO Pilot RCC Network in Europe

▲ RA VI RCC node on climate data:  
**The Netherlands (lead)**, France, Hungary, Norway, Serbia, Sweden, Turkey

● RA VI RCC node on climate monitoring:  
**Germany (lead)**, Armenia, France, The Netherlands, Serbia, Turkey

■ RA VI RCC node on Long-range Forecasting:  
**France and Russian Federation (joint lead)**, Norway, Serbia, Turkey.  
**Overall coordination – DWD, Germany**



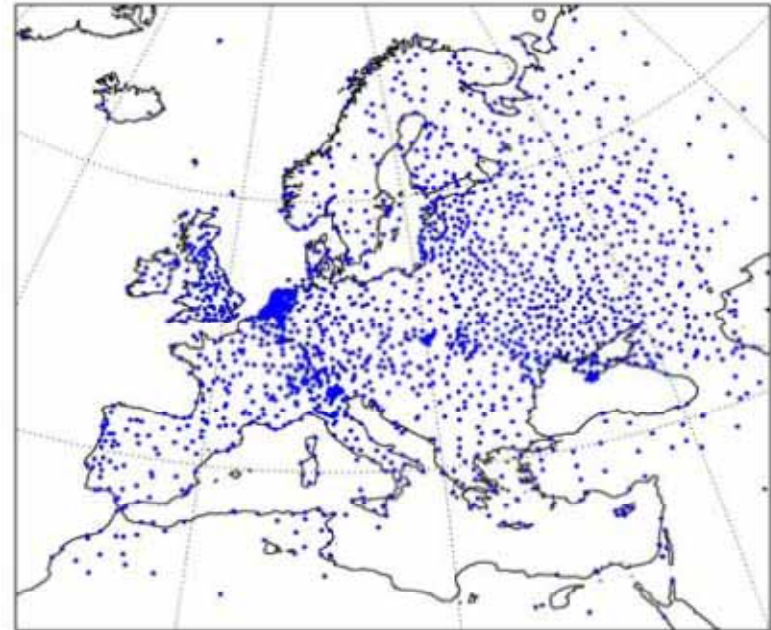


# RCC Node on Climate Data:

ECA&D,  
MILLENIUM,  
ENSEMBLES,  
SEE Gridded model,  
Eastern Mediterranean, BALTEX-  
and SHARK-datasets

Storage services and data  
management toolkits

Guidance on homogenisation,  
interpolation, QC procedures,  
use of climate indices, DARE,  
R&D



Example: ECA/D  
appr. 10.000 time series from 2700  
stations, QC, monthly updated,  
incl. high-quality time series and a  
set of 42 climate extremes indices

<http://eca.knmi.nl>



# RCC/ECA&D



*62 countries*

*25269 series*

*12 elements*

*4641 stations*

*46% of the data is  
publicly available*

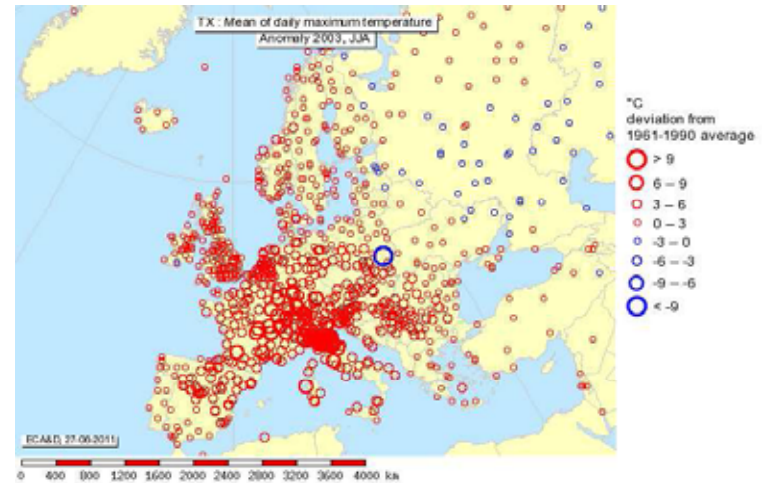
**<http://eca.knmi.nl/>**





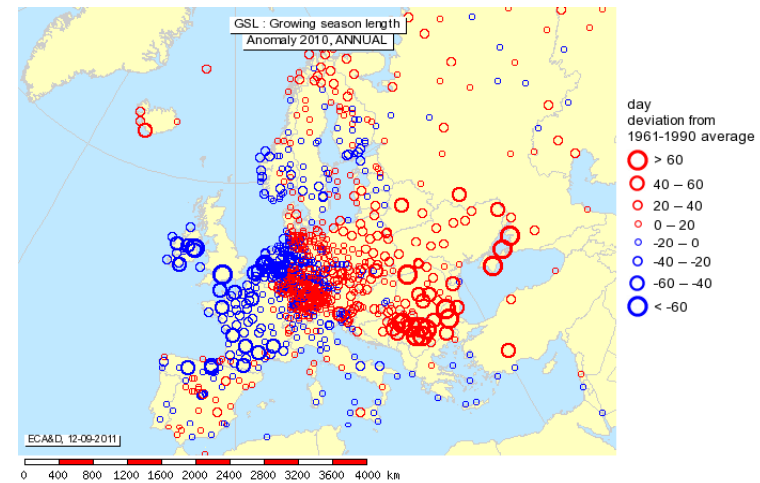
# Indices of extremes

70 impact relevant indices:  
Mean of daily max.  
temperature



Growing Season Length

Number of Cold & Dry days  
Consecutive Dry Days



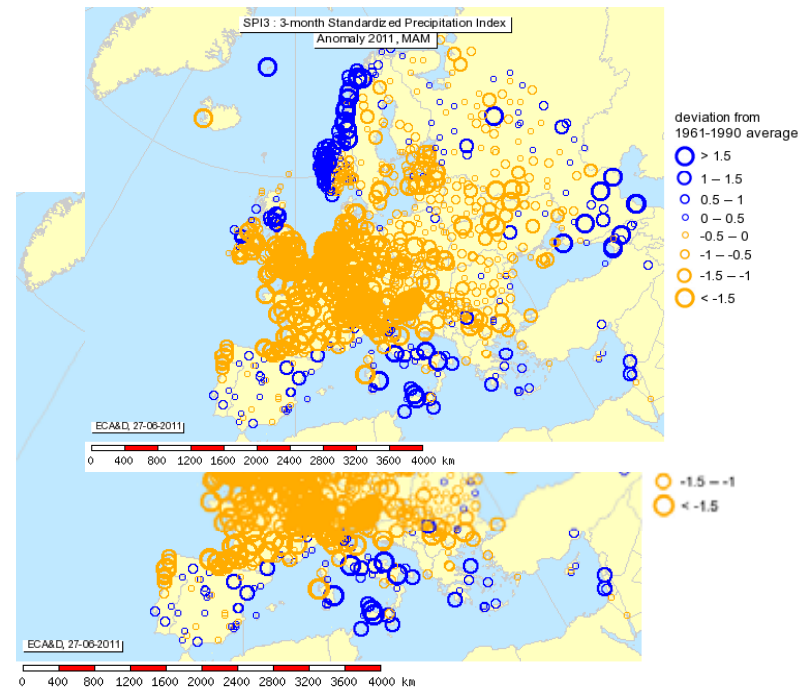


# Indices of extremes

Anomaly maps:  
Standardized Precipitation  
Index, spring 2011

Trend maps:  
Standardized Precipitation  
Index, spring 1951-2010

Potential  
EvapoTranspiration  
spring 1951-2010





# RCC Node on Climate monitoring

Annual and monthly climate diagnostic bulletins;

Monthly monitoring maps:  
global, RAVI,  
Eastern Mediterranean,  
South Caucasus, national;

Reference climatologies and trend maps;

RA VI climate monitoring WebPortal;

Climate Watches

temperature

precipitation

sunshine duration

drought

surface air pressure

cloud cover

water vapour content (precipitable water)

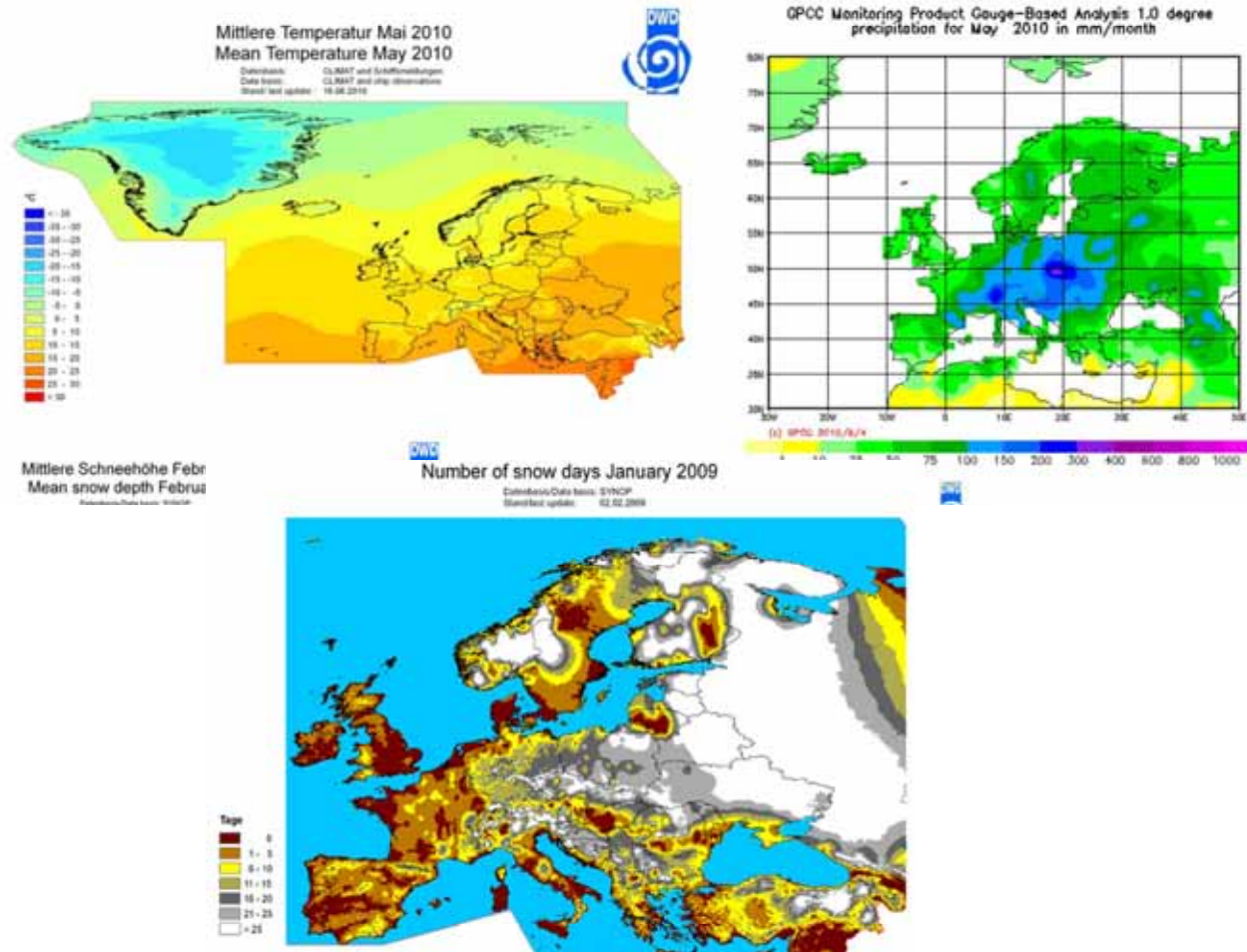
radiation

snow

**<http://www.dwd.de/rcc-cm>**

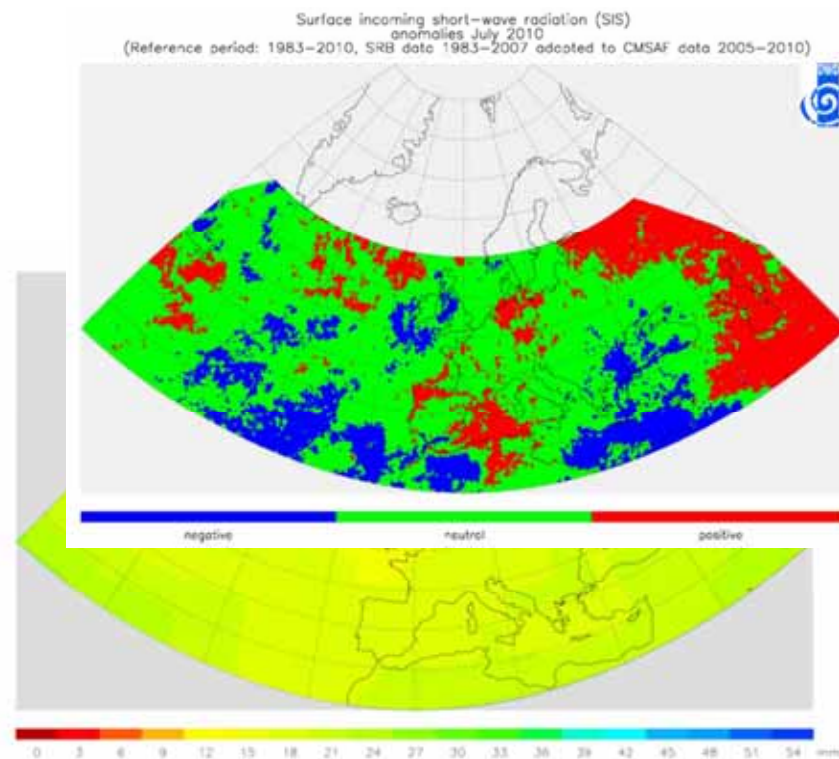
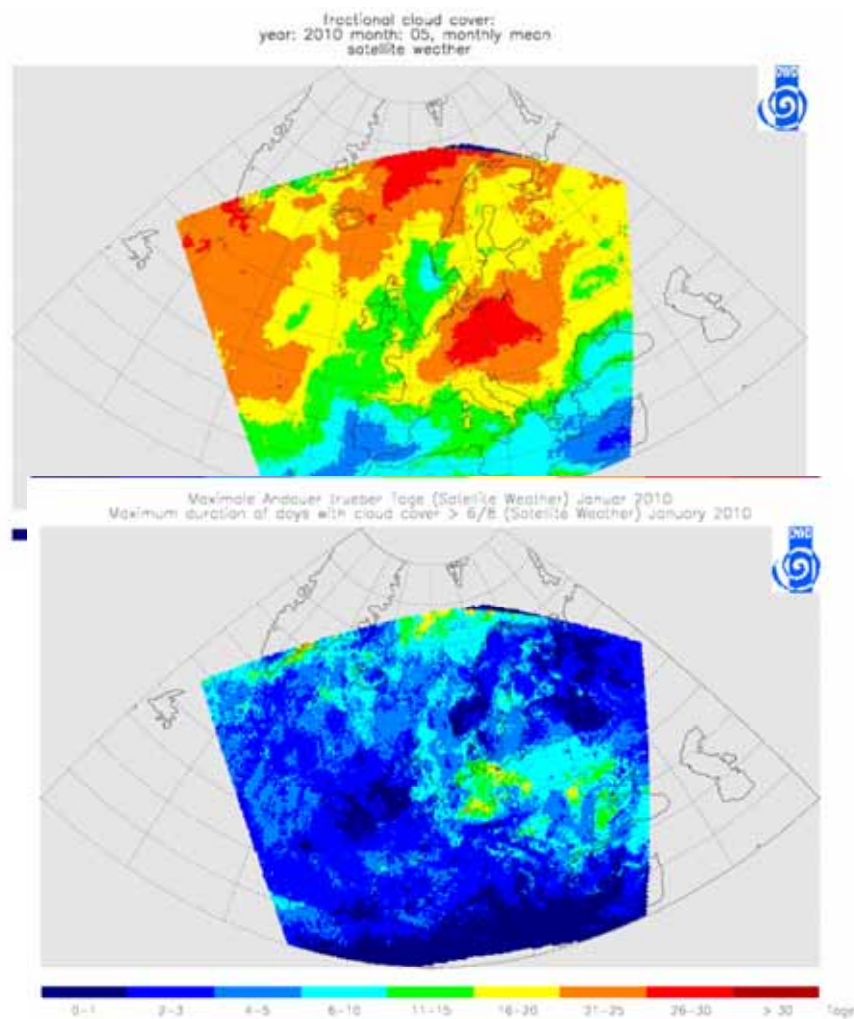


# RA VI maps based on **in situ data** and **spatial interpolation (DWD)**





# RA VI maps based on satellite + in situ data





# RCC Node on LRF services

## MeteoFrance, NEACC

Analyses and interpretation of GPC products: Global, RA VI, South-eastern Europe (SEEVCCC), Eastern Mediterranean (Turkey)

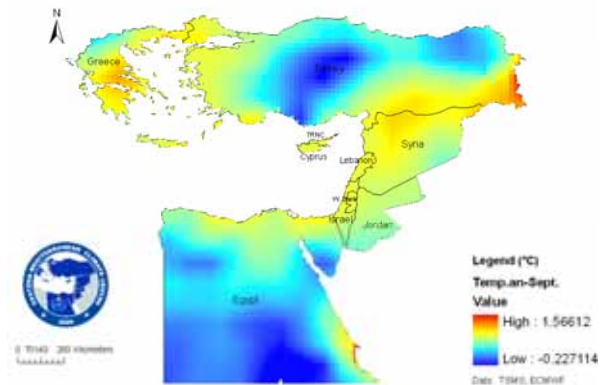
Seasonal outlooks: RA VI, Western Europe, Northwest Europe

Verification datasets

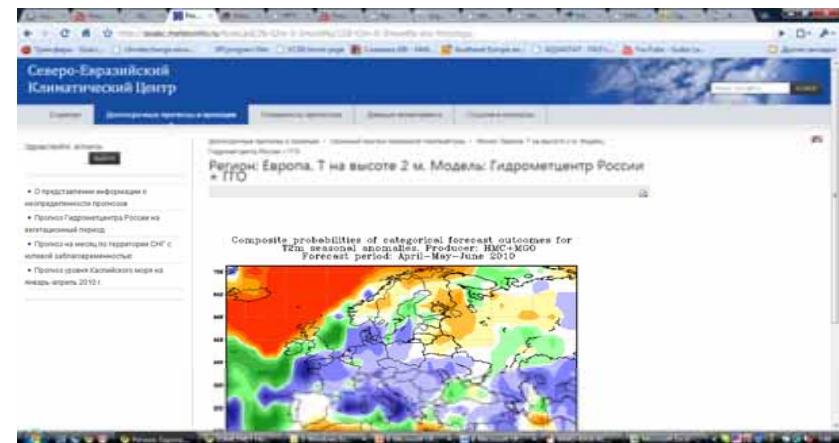
User feedback reports

Training and R&D / (RCOF-support)

2m Temperature anomaly for The Eastern Mediterranean Region in September 2009



2m temperature anomaly forecast for the Eastern Mediterranean region <http://emcc.dmi.gov.tr>





# Climate Watch System

The “**Climate Watch**” is the advisory/alert, which will serve as a mechanism to heighten awareness in the user community that a significant climate anomaly exists or might develop and that preparedness measures should be initiated.

CWS builds on existing weather early warning systems by adding advisories on climate extreme events such as heat waves, cold waves, extended heavy precipitations leading to flooding, rainfall / soil moisture deficiency leading to drought conditions, severe wind storms extending beyond weather scales, extended snowfall, etc.

[http://www.wmo.int/pages/publications/showcase/documents/CWS\\_EN\\_v1.pdf](http://www.wmo.int/pages/publications/showcase/documents/CWS_EN_v1.pdf)



# Elements of Climate Watch

**Climate Watch System shall be based on all the ongoing climate related activities**

- Real time meteorological observations;
- Ongoing climate monitoring;
- Assessment of regional climate anomalies, including their relationship to large-scale climate variability;
- Development of a long-range forecasting system or using publicly available LRFs provided by Global Producers of LRF or Regional Climate Centers;
- Consultation with prospective end users on the development of indices, criteria and policies for issuing Climate Watches;
- Development of a system for dissemination of the Climate Watches in consultation with the user community;
- Evaluation of the Climate Watches and their effectiveness in meeting the needs of the users.

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# CWS workshop in Europe (Offenbach 2010)

**Format, content & dissemination of climate advisories (climate watches)**

**User aspects of (national) climate watches**

**Consider basic infrastructure requirements and needs for (national) climate watch**

- Show case implementation in Finland, Serbia, Turkey

**WMO TD No. 1565**

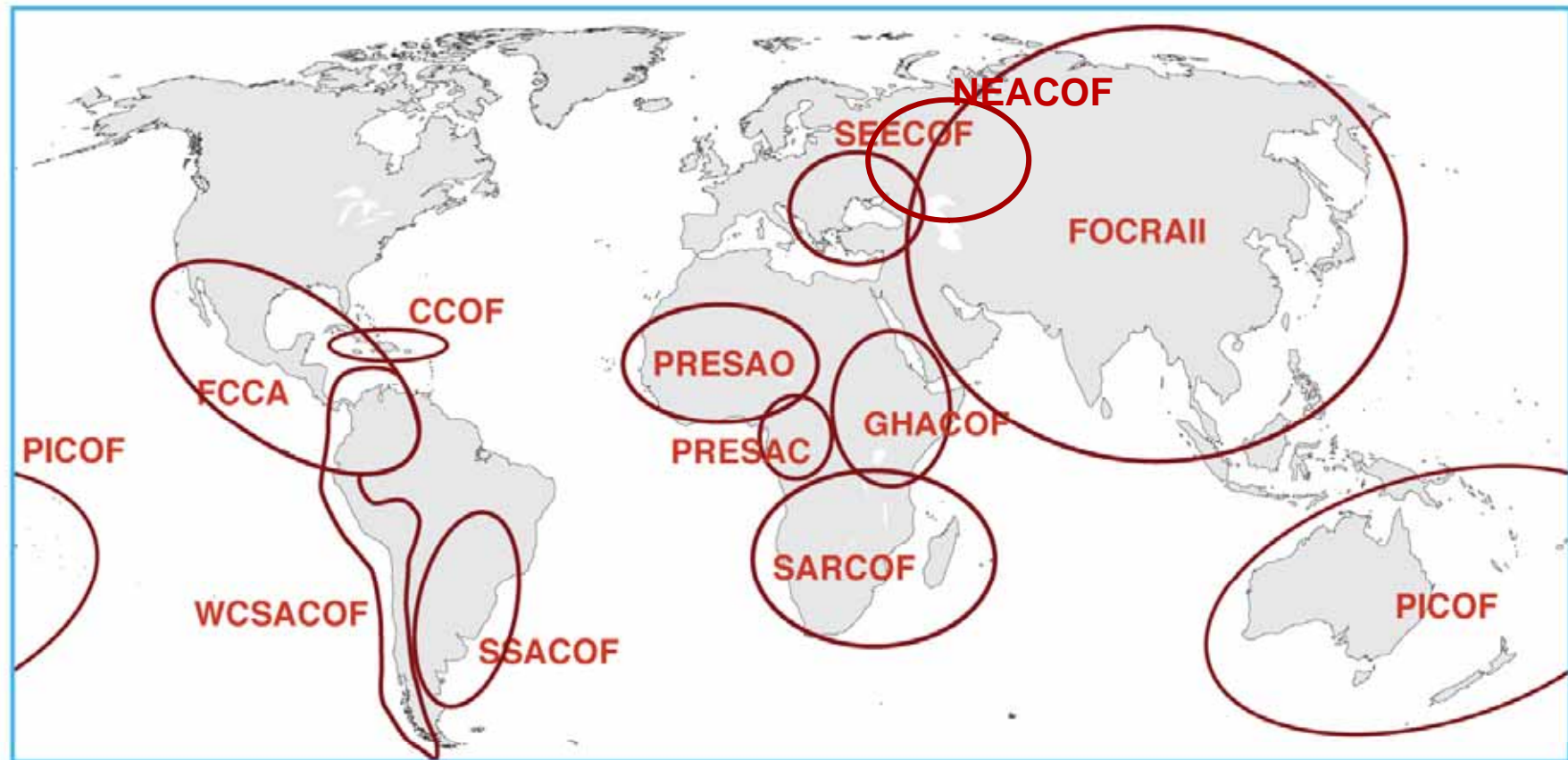


# Regional Climate Outlook Forum

- RCOFs bring together national, regional and international climate experts, on an operational basis, to produce regional climate outlooks based on input from NMHSs, regional institutions, Regional Climate Centres (RCCs) and Global Producing Centres of long range forecasts (GPCs) and other climate prediction centres.
- Through interaction with sectoral users, extension agencies and policy makers, RCOFs assess the likely implications of the outlooks on the most vulnerable socio-economic sectors in the given region and explore the ways in which these outlooks could be made use of
- The RCOFs then lead to national forums to develop detailed national-scale climate outlooks and risk information including warnings for communication to decision-makers and the public.



# Existing RCOFs





- The RCOF process has facilitated a better understanding of the links between the climate system and socio-economic activities.
- An increasing demand for climate services has been recorded in many parts of the world as a result of these developments.
- Awareness has been created that climate information, including short-range climate predictions, is an essential element in mitigating against the impacts of climate variations.
- RCOFs have fostered interactions and exchange of information between the climate scientists and users of climate information



# Southeast European Climate Outlook Forum (SEECOF)

The South-East European Climate Outlook Forum (SEECOF) mechanism covers mainly countries of South East Europe and Caucasus.

SEECOF I - June 08, Zagreb/Croatia, :

SEECOF II – November 2009, Budapest/  
Hungary,

SEECOF III – Online COF

SEECOF IV – November 2010, Belgrade, Serbia

SEECOF V – Online COF

SEECOF VI – November 2011, Belgrade, Serbia

**North EurAsian COF (NEACOF) May 2011**



Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Georgia, Greece, Hungary, Israel, The FYR of Macedonia, Moldova, Montenegro, Romania, Slovenia, Serbia, Turkey



# Drought management (TT DM)

Provide a coordinated RA VI approach on operational drought monitoring and assessment,

taking into consideration recommendations and conclusions reached at the Lincoln workshop,

taking the advantage of the RCC product suit and RCOF mechanisms in the Region.

Apply integrated approaches to meteorological, hydrological and agricultural droughts.



# Regional Drought Workshop (Proposed for 2012)

- To discuss drought management and drought risk management issues in NMHSs of the region;
- utilization of various drought indices for drought risk identification;
- different aspect of drought, involving various vulnerable users;
- different definitions of droughts ;
- possibility of implementation of Climate Watch System for drought in the countries of the region;
- To develop a mechanism for integration of climate, hydrology and agrometeorology practices for assessing and predicting drought

# Targeted audience

- Climate, hydrology and agrometeorology experts from NMHSs of the region;
- Representatives from agriculture, food security, water management and other relevant sectors;
- Representatives from European Drought Observatory, DMCSEE, etc.
- WMO Technical Departments, Technical Commissions (CAgM, CCI, CHy)
- Others?



Thank You