WMO RA VI
RCC Network

Deutscher Wetterdienst
Wetter und Klima aus einer Hand
DWD

The European (RA VI) Regional Climate Centre Node on Climate Monitoring

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WMO RA VI Regional Climate Centre (RCC)

Outline

1. Overview of the Regional Climate Centre Network in RA VI (Europe)
2. Climate Monitoring Products of RA VI RCC
3. How to use RCC Climate Monitoring Products for Long Range Forecasting

What are Regional Climate Centres (RCCs)?

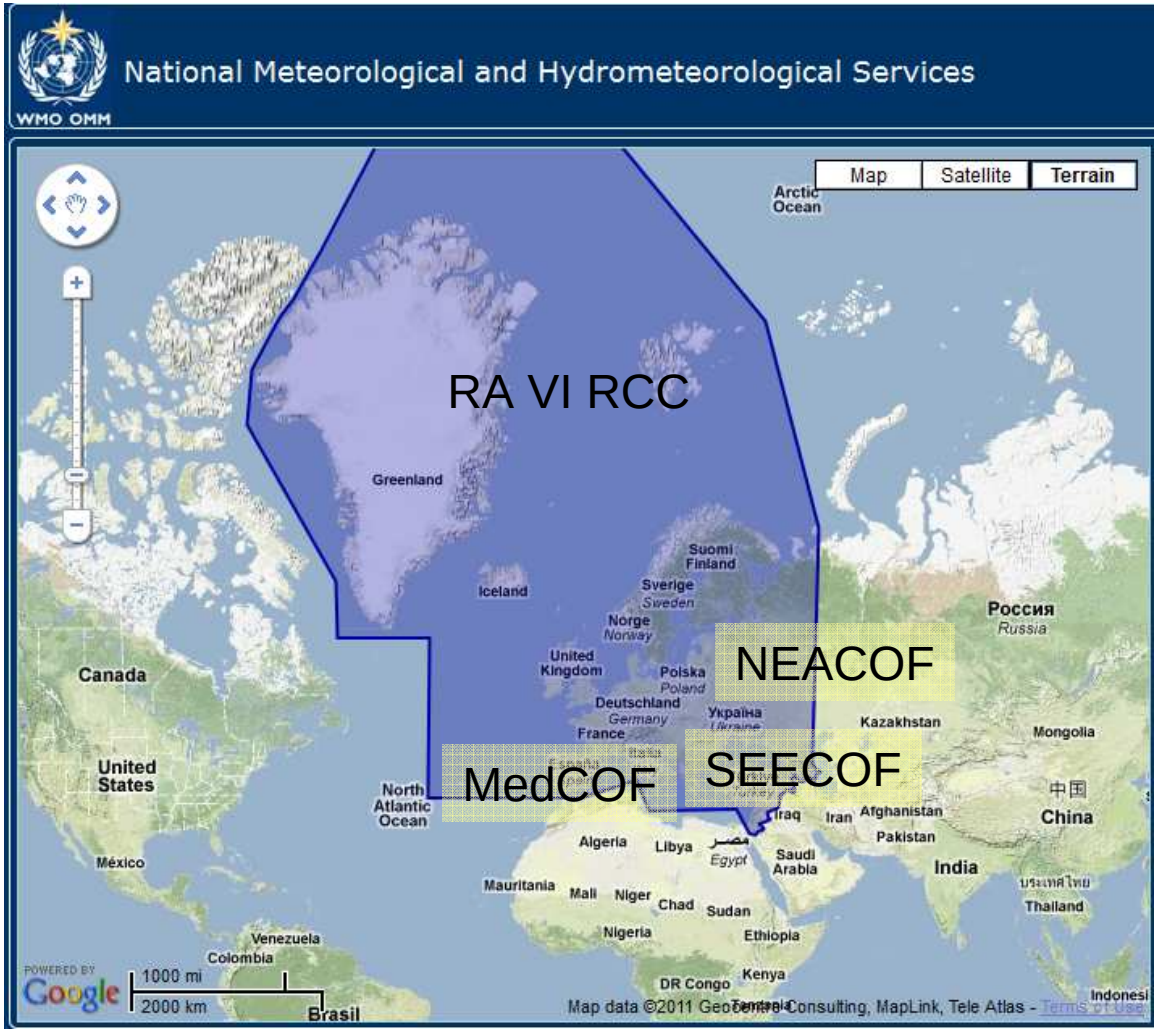
RCCs are **Centres of Excellence** that **assist WMO Members** in a given region to deliver **better climate services and products** including regional long-range forecasts, and to strengthen their capacity to **meet national climate information needs**.

- ➔ WMO-mandated activity
- ➔ Regional component of the Global Framework for Climate Services (GFCS) Climate Service Information System (CSIS)
- ➔ Users: NMHSs, RCOFs and other RCCs (end users are customers of the NHMSs)

RCC in the RA VI:

- ➔ Poll in 2008 led to product portfolio (fixed in the implementation plan)
- ➔ Pilot network 2009-2012; 3 nodes; each node formed by a consortium
- ➔ CBS XV (09/2012): approval of nomination of the pilot RCC network to become the WMO RA VI RCC-Network
- ➔ Resolution 4.3/1 (EC-65) in May 2013 (RCC to be assigned as an RSMC of WMO)

The WMO Region VI (Europe)



RA VI RCC offers services to 3 RCOFS:

- SEECOF (southeast Europe)
- NEACOF (north Eurasia)
- MedCOF (Mediterranean)

RCOFs can concern overlapping Regions (here RA I, II, VI)

WMO RAVI RCC-Network

- RCCs provide regional-scale tailored climate services on
  - Climate Data
  - Climate Monitoring
  - Climate Outlook and projections

Picture from WMO

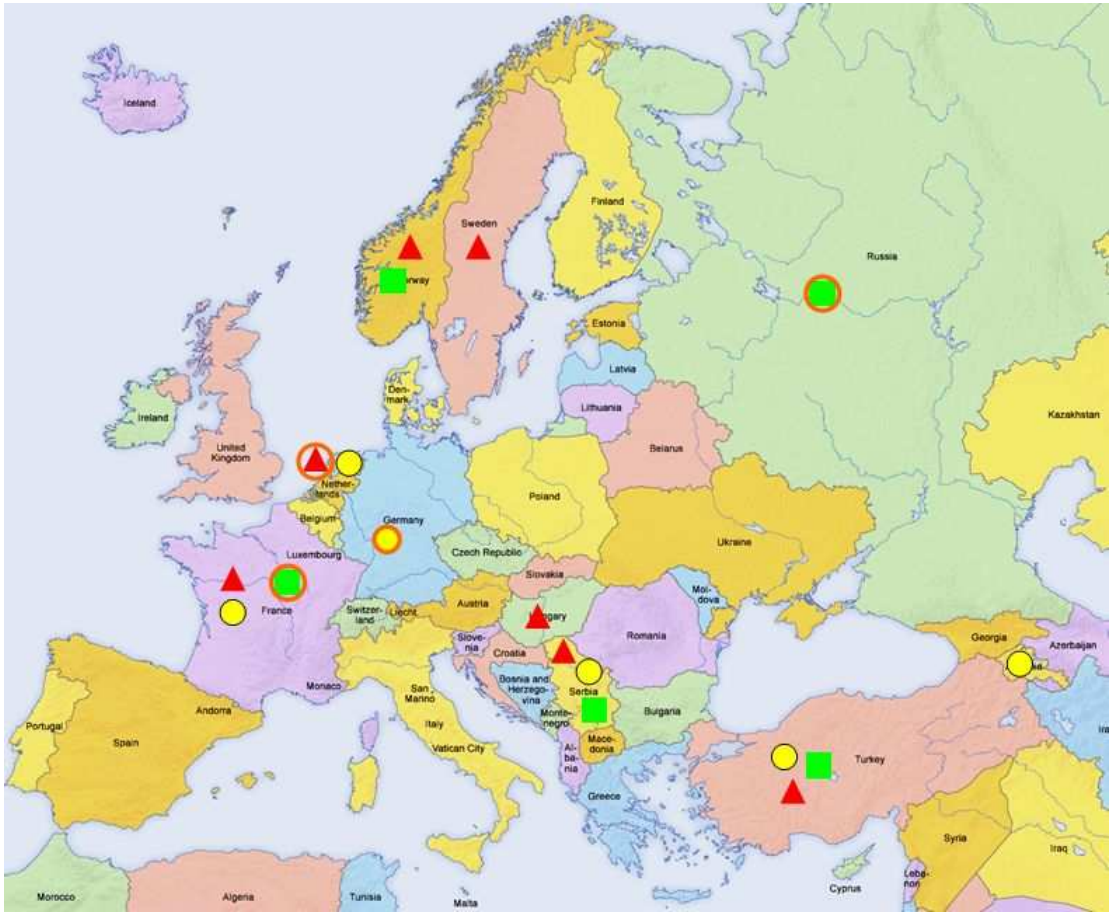
WMO RCC-Network in Europe (http://www.rccra6.org):

RA VI RCC Network

RCC on Climate Data (red):
France, Hungary, Norway, Serbia, Sweden, Turkey;
lead: The Netherlands

RCC on Climate Monitoring (yellow): Armenia, France, The Netherlands, Serbia, Turkey;
lead: Germany

RCC on Long-range Forecasting (green):
Norway, Serbia, Turkey;
lead: France, Russian Federation

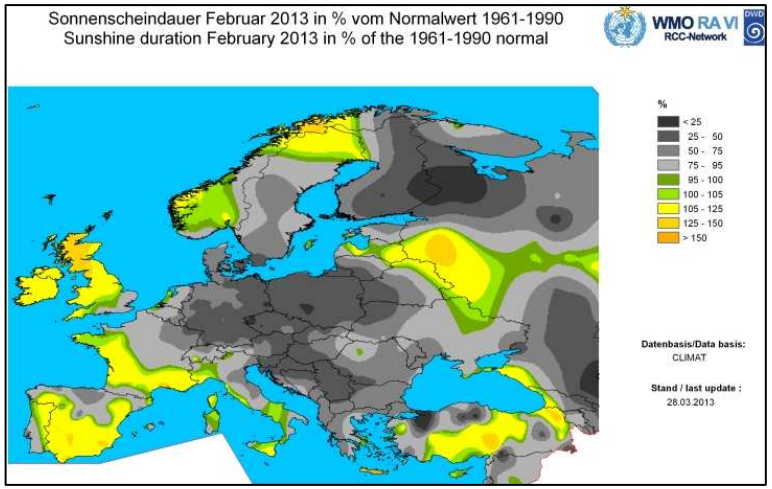


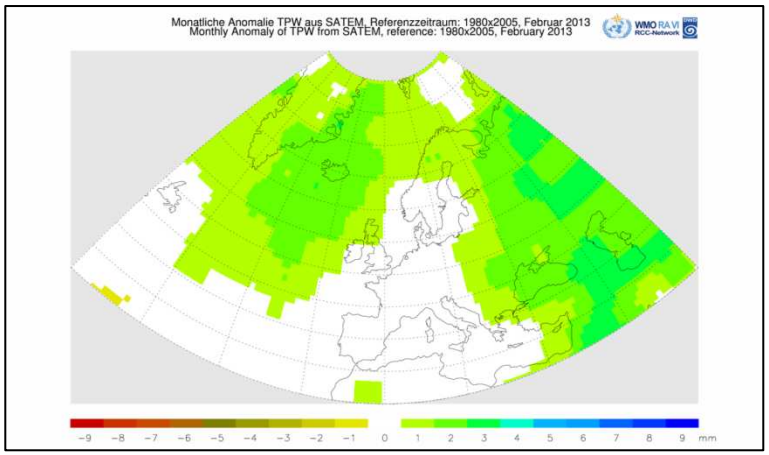
RAVI RCC Product summary

- **RCC node on Climate Data (RCC-CD)**
  - various data sets for Europe, both station data and gridded data (ECA/D, MILLENNIUM, ENSEMBLES, BALTEX, SHARK) and various sub-regional data sets
  - Services: Archiving functions, data management tools
- **RCC node on Climate Monitoring (RCC-CM)**
  - Maps, reference climatologies, anomalies, indices, trends, statistics
  - reports, significant weather event data base, climate watch (advisories on possible future events),
- **RCC node on Long-Range Forecasting** (seasonal forecasts, **RCC-LRF**)
  - Seasonal forecast bulletins, maps and graphs on model performance, seasonal outlooks, consensus statements, model verification

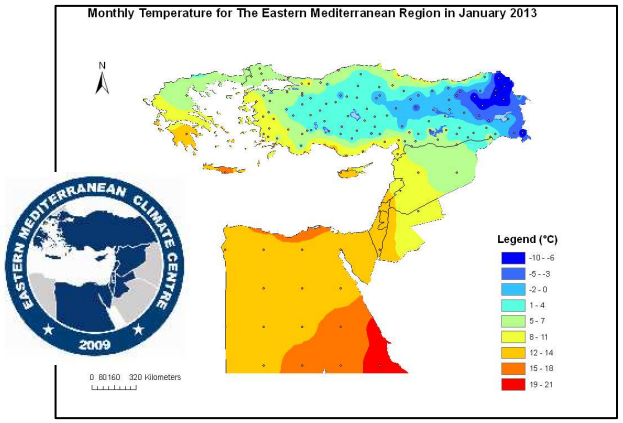
RCC-CM products in general:

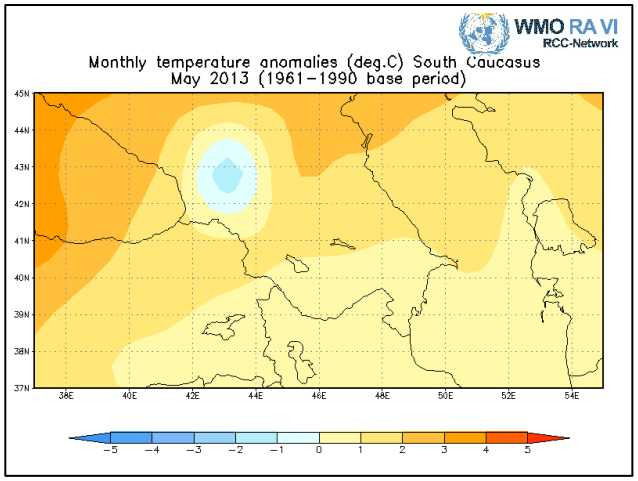
- Maps, including from satellites
- Gridded data sets for download (members)
- Documentation of significant events
- Monthly, seasonal and annual reports
- Climate watches (early warning)



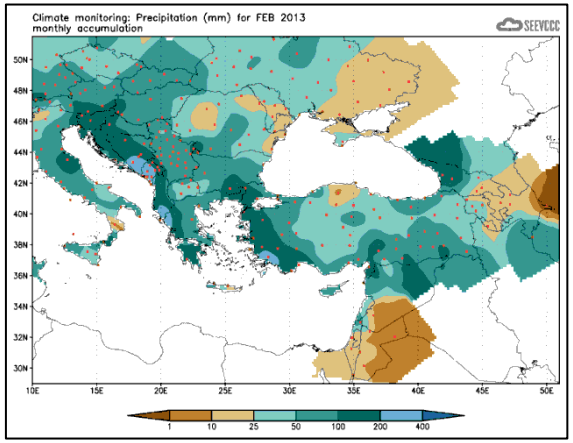


RCC-CM – products from members of the consortiums:

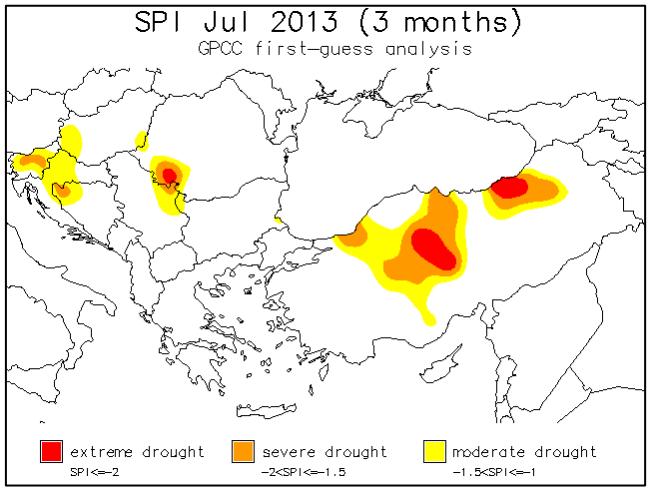




Armstatehydromet



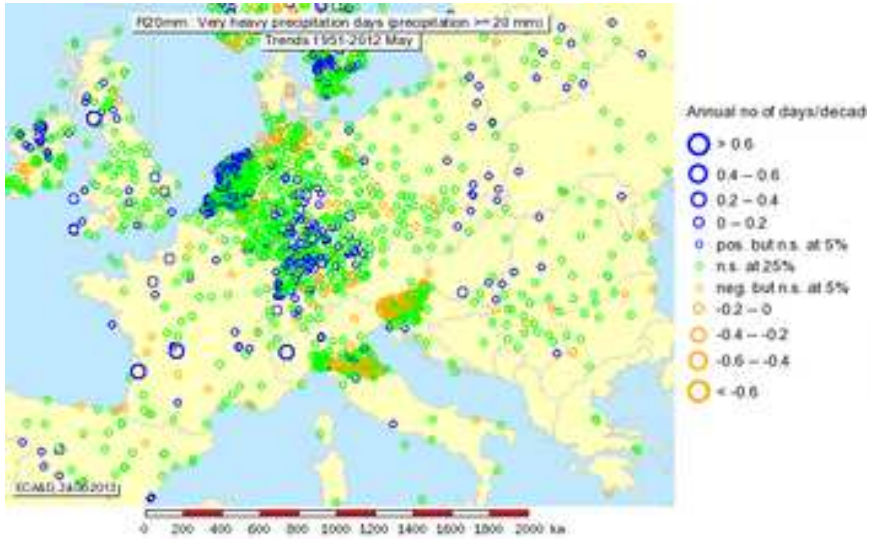
SEEVCCC – South East European Virtual Climate Change Center



DMCSEE – Drought Management Centre for Southeastern Europe

RCC-CM – products from members of the consortiums:

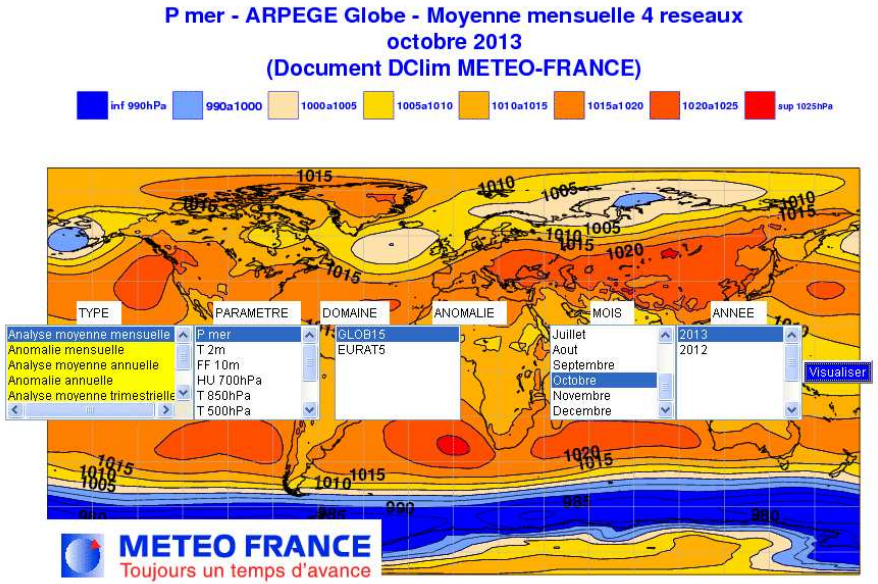
http://www.ecad.eu



ECA&D: European Climate Assessment & Dataset

Example: Trend maps of very heavy precipitation days >20mm in May

http://www.meteo.fr/special/CLIM/clim_model.html



Example: Sea level pressure October 2013

Monthly event calendar

2013 oktober show

Selected Significant Events

for the year: 2013 and the month: October

last udated: Mon Nov 4 09:50:29 UTC 2013

- **Storm depression Christian demanded 14 fatalities and caused damages and traffic problems**

Storm depression 'Christian' went from the British Isles over northern France, the Netherlands and Belgium, over northern Germany to Denmark, Sweden (where it is named 'Simone') and further into the Baltic states. It was a typical autumn storm though late October is relatively early for the autumn storm season. Very high wind gusts occurred (40 m/s or more at several stations). The highest wind gust was registered by a Danish station with 53.5 m/s. In UK was the highest value 50.9 m/s. The highest German windgust was 47.8 m/s. The Netherlands reporte 42.2 m/s, France 40.8 m/s, Sweden 42 m/s, Estonia 33 m/s. The lowest sea level air pressure was 968 hPa, observed at Aalborg, Denmark. The storm caused overall 14 fatalities (mostly by fallen trees) and some damage to the traffic (railway and streets) and to buildings.

DMI: Da oktoberorkanen slog til mod Danmark

KNMI: Zeer zware storm op 28 oktober

DWD: 28.10.2013: Orkantief "Christian"

DWD: 29.10.2013: Das Orkantief "Christian"- Ein neuer Rekord?

DWD, 31.10.2013: Orkantief CHRISTIAN am 28. Oktober 2013

UK MetOffice: Major Atlantic storm wind speeds and rainfall totals

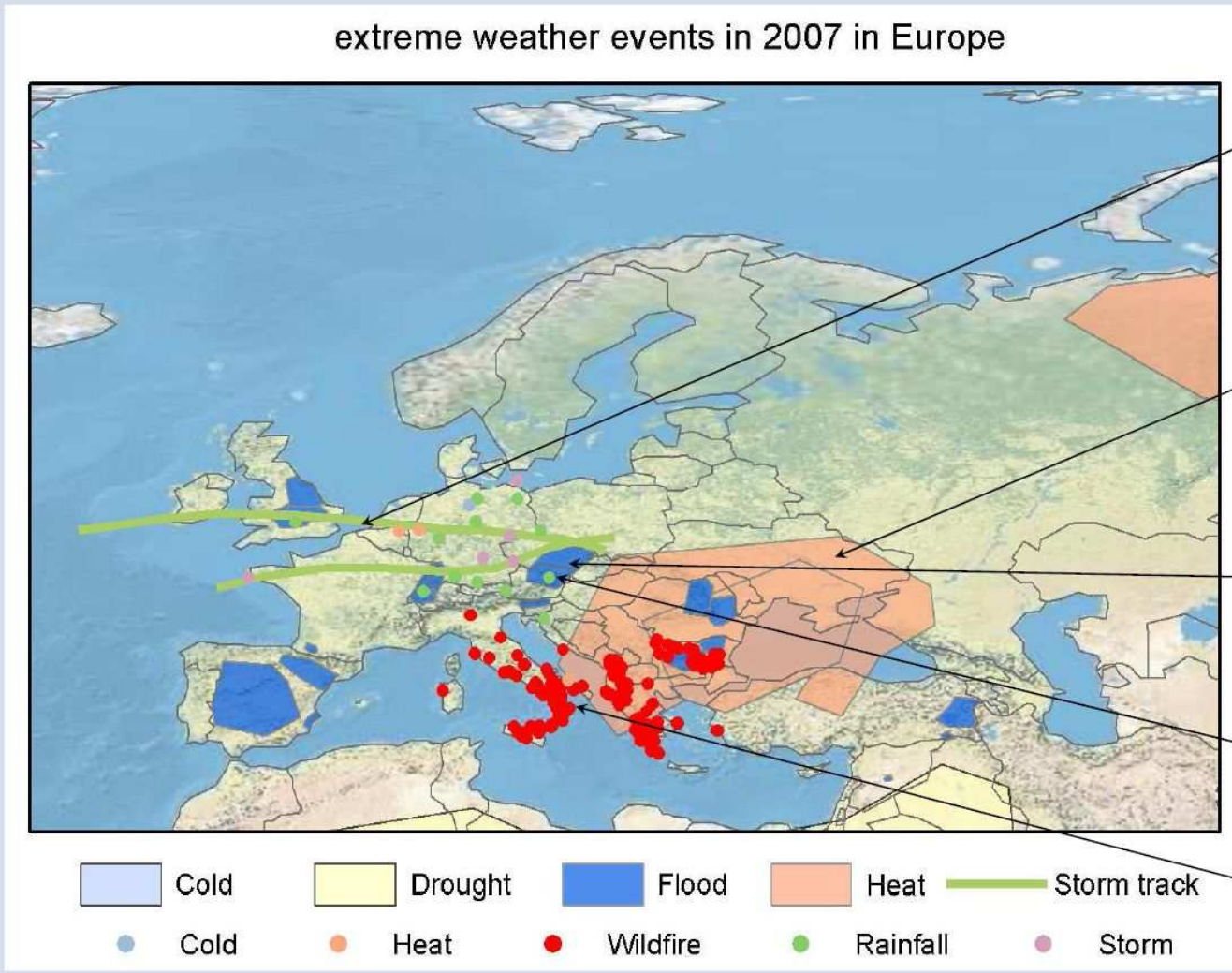
MeteoFrance:28/10/2013: Première tempête automnale sur l'Ouest et le Nord de la France

LHMT: 2013-10-29: Vejuota antradienio naktis

SMHI: Simone drabbade främst sydligaste Sverige

EMHI: 30.10.2013: 28.-29. oktoobri tormi järelkaja

RCC-CM products: The Climate Knowledge Database



field	value
category	storm
begin	2007-01-17
end	2007-01-19
killed	46
damage (Million US$)	9,010
cyclone	Kyrill
source	EM-DAT
affected countries	NL, PL, SI, DK, AT, BY, BE, FR, DE, CH, GB, DE, CZ, UA

field	value
category	heat
begin	2007-07-01
end	2007-07-31
killed	506
source	EM-DAT
affected countries	MK, RS, SK, AL, AT, BA, HU

field	value
category	flood
begin	2007-09-06
end	2007-09-10
source	DFO
affected countries	CZ

field	value
category	rainfall
begin	2007-09-05
end	2007-09-08
source	KIT
cyclone	Xaver
affected countries	AT

field	value
category	wildfire
begin	2007-07-01
end	2007-08-31
source	EM-DAT
killed	11
affected countries	IT

Access to RCC network products - overview

- **Internet: http://www.rccra6.org**
  - Recommended by implementation plan
  - Should include product catalogue for each node as PDF including examples for products
  - **Access without restriction**
    - Most products of RCC-CD and RCC-CM
  - **Access with restriction**
    - For RCC-LRF products and gridded data from RCC-CM
    - Through the respective NMHS
    - User and password authorised by host of RCC node
- **Via one of the WMO Global Information System Centres (GISCs)**
  - Additional access option
  - Also offers search for RCC products (if smart keywords used)

RCC on Climate Monitoring (http://www.dwd.de/rcc-cm):

RCC-CM

[Close]

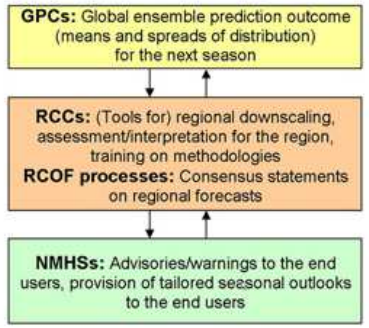
- **Overview**
- News
- Members
- Products
- Documents
- Links
- Meetings
- Contact

The new WMO RA VI Regional Climate Centre on Climate Monitoring (Europe and Middle East)

Regional Climate Centres (RCCs) are institutions with the capacity and mandate by WMO within the Global Framework for Climate Services (GFCS) to develop high quality regional-scale products using global products and incorporating regional information. Recently a network of three RCC consortia was established for the WMO region RA VI (Europe and Middle East):

RCC node on climate data,
RCC node on climate monitoring,
RCC node on long-range forecasting.

RCCs provide online access to their products and services to national meteorological and hydrological services and to other regional users. Vice versa, RCCs receive data, products, know-how and feedbacks from the meteorological services as a main source for regional information. By the same time, they provide regional data, products and feedbacks to Global Production Centres and Lead Centres for respective verification and product optimisation of the global-scale information.



For more details about the WMO RA VI RCC Network see the RCC Site

The WMO RA VI Regional Climate Centre on Climate Monitoring (RCC-CM) will perform basic functions covering the domain of climate monitoring:

- Annual and monthly climate diagnostic bulletins,
- Monthly monitoring maps: global, RAVI, Eastern Mediterranean, South Caucasus,
- Reference climatologies and trend maps,
- RA VI climate monitoring WebPortal,
- Climate watches,
- Training; Research and Development (R&D).

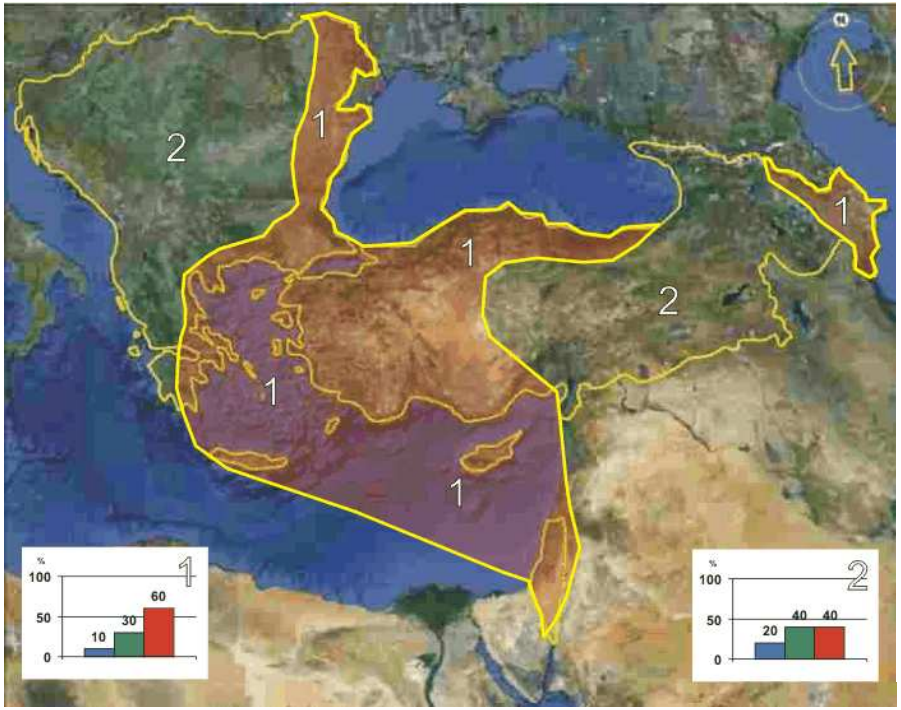
RCC-CM provides products for the following climate variables:

- temperature
- precipitation
- sunshine duration
- drought
- surface air pressure
- cloud cover
- water vapour content (precipitable water)

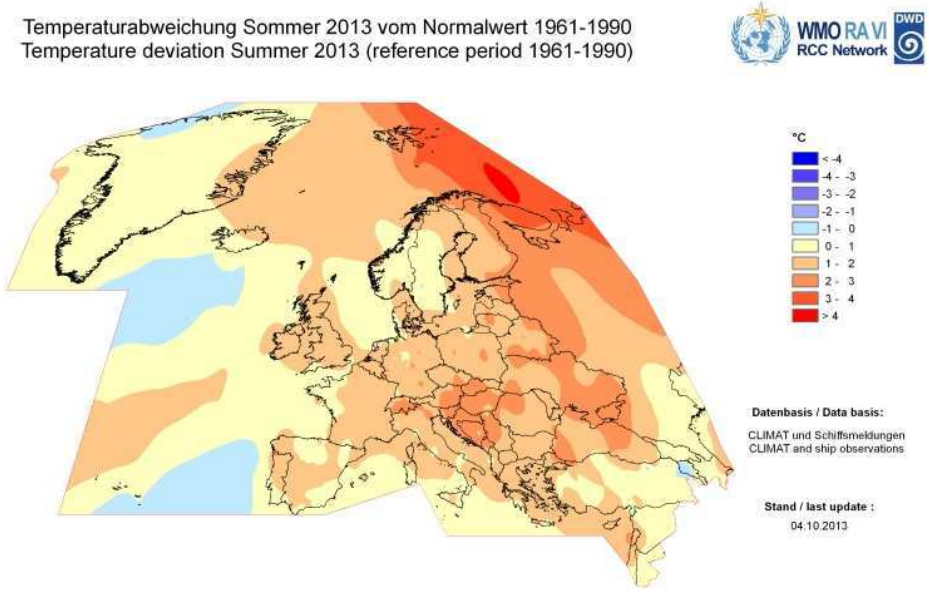
How to use RCC-CM Products for LRF

- **Verification: compare previous forecasts to monitoring results**
  - Compare maps: spatial distribution of anomalies
  - Look at extreme events: did they have much impact on seasonal averages?
  - Be careful:
    - Different reference periods
    - Forecast probabilities to be compared to one deterministic analysis
- **Analysis of initial (recent past / present) conditions**
  - What has happened until now (mean anomalies, extremes, circulation)
  - Do the forecasts indicate a continuation of the present large-scale state or rather a shift to a new state? If yes, why (circulation changes, ENSO events, teleconnections, ocean temperature etc.)

Example 1: Verification in SEECOF-10 (summer 2013)



Consensus Forecast:
Region 1: 60% warmer than normal
Region 2: 40% warmer than normal



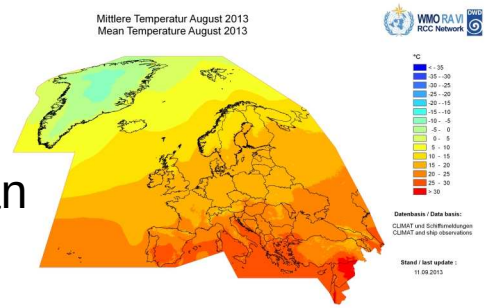
Analysis:
Both regions nearly completely warmer than normal, but anomalies are different.

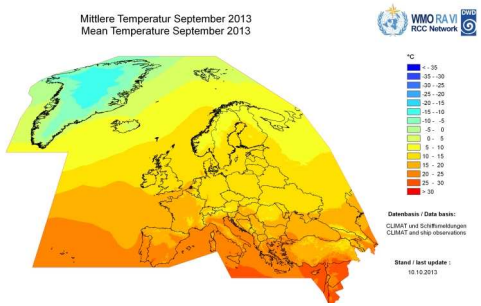
Verification – aspects to be considered

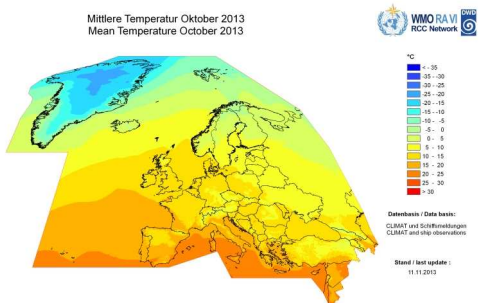
- RCC-CM provides products for the whole RA VI Region, but they do not have all the data of the NMHSs. (There are national data networks, which are not all accessible for RCC-CM).
- For that reason, NMHSs can provide far more detailed results for their own country.
- Verification has to be done in 2 steps:
  - Large-scale structure -> RCC-CM
  - More detailed results -> NMHSs (done in SEECOF)
  - Too many (local) details are hard to forecast, so verification can also be not too detailed.
- Additional products needed for verification (e.g. terciles, percentiles, standardized anomalies) ? Feedback to RCC-CM welcome!

Example 2: Analysis of the recent past / present state

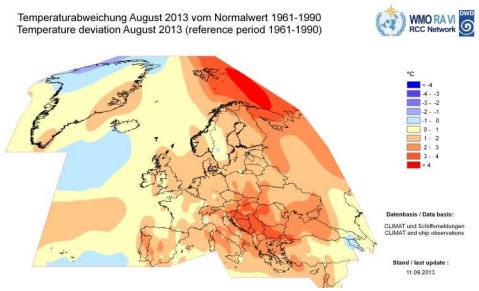
Tmean

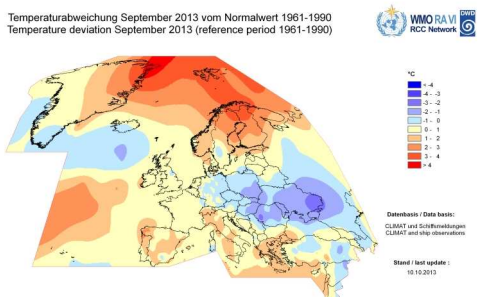


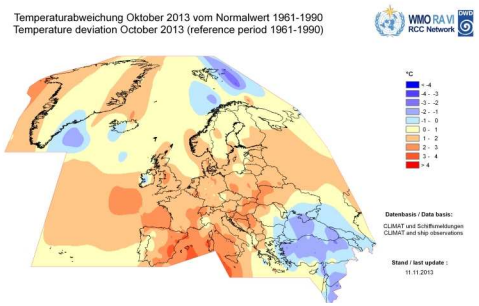




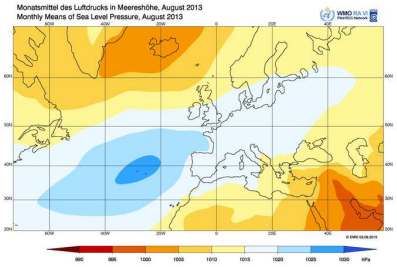
Tano

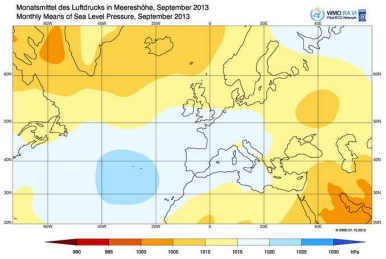


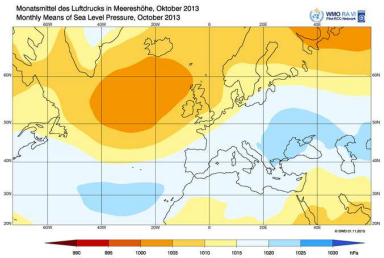




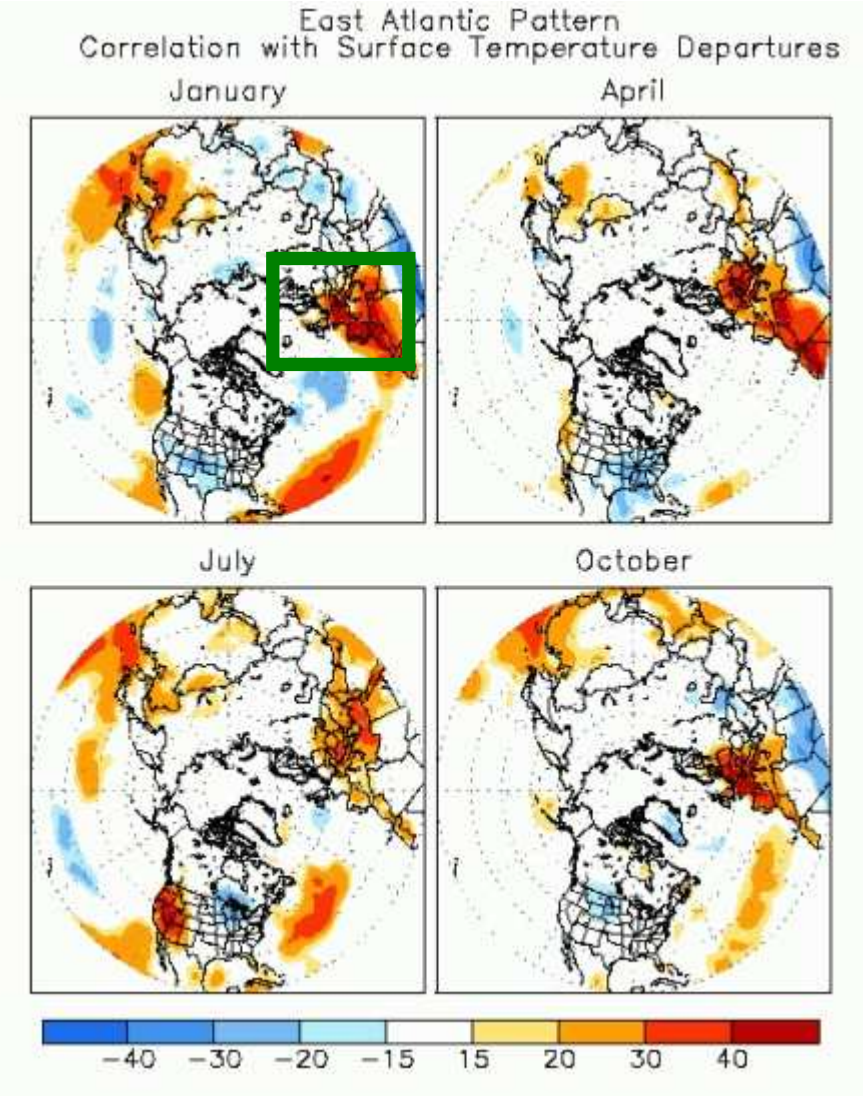
SLP

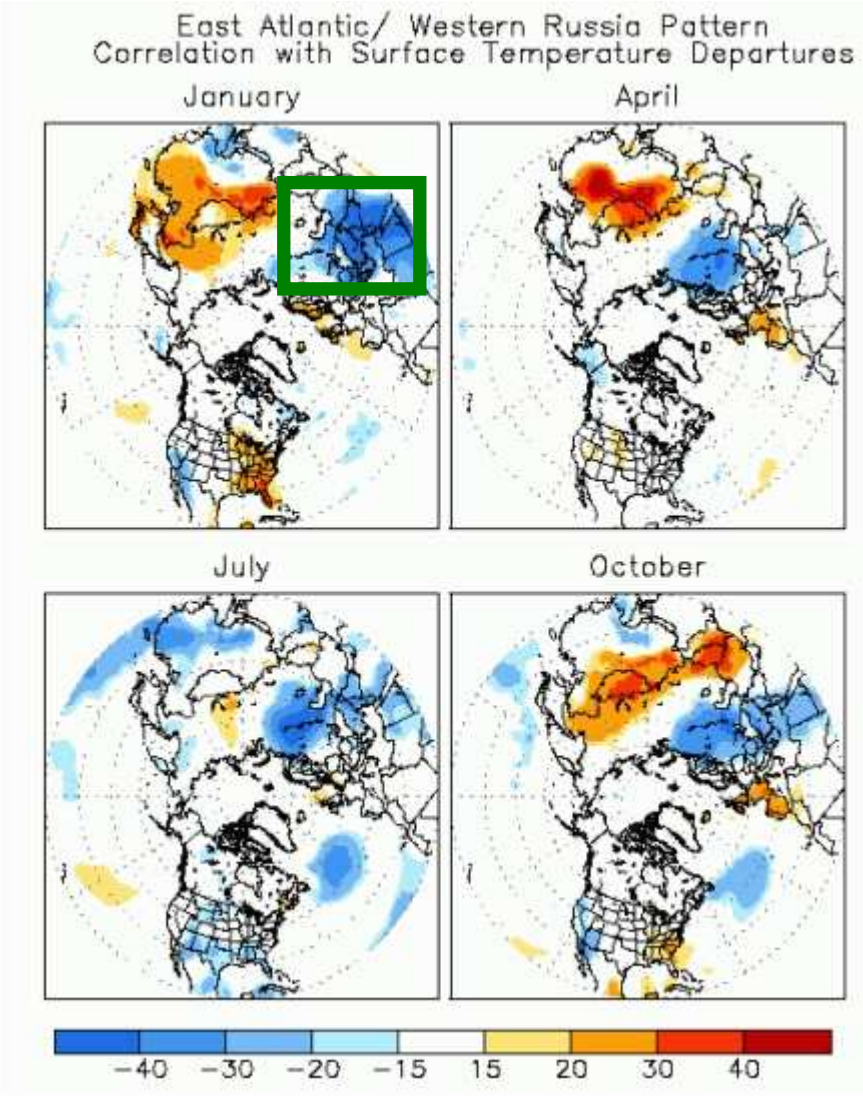






Circulation patterns of CPC





From NOAA CPC: http://www.cpc.ncep.noaa.gov/data/teledoc/telecontents.shtml

Summary

- RA VI RCC-CM supports regional, subregional and national climate services by climate monitoring products (RCC-CD by climate data and RCC-LRF by long-range forecast products as well)
- RA VI RCC is organized as a network, a consortium sharing the work
- RCOFs are important users of the RCC network
- RCC-CM can provide climate monitoring products for
  - Verification
  - Climate analysis, including diagnostic using circulation parameters
- Feedback for additional products welcome!

WMO RCC PRODUCTS AND SERVICES

WMO RCCs shall perform the following minimum set of mandatory functions covering the domains of long-range forecasting (LRF), climate monitoring, data services and training:

- Interpret and assess LRF products from GPCs, including the exchange of basic forecasts and hindcast data
- Generate regional tailored products, including seasonal outlooks
- Provide online access to RCC products
- Perform regional climate diagnostics
- Develop regional climate datasets
- Establish a regional historical reference climatology
- Provide climate archiving services
- Implement a regional Climate Watch
- Coordinate training for RCC users
- Provide information on RCC products and guidance on their use

In addition, depending on a region's specific requirements, WMO RCCs should perform "highly recommended functions" in the areas of climate predictions and projections, data services, research and development, coordination, training, and capacity-building.

Asian RCC Network Web portal
www.rccra2.org

WMO RCC PRODUCTS AND SERVICES

A multifunctional centre that fulfils all the required functions of an RCC for the entire region, or for a sub-region to be defined by the regional association, may be designated by WMO as a WMO Regional Climate Centre (WMO RCC). A group of centres performing climate-related activities that collectively fulfil all the required functions of an RCC may be designated by WMO as a WMO Regional Climate Centre Network. Each centre in a designated WMO RCC Network will be referred to as a Node. A Node will perform, for the region or subregion defined by the regional association, one or several of the mandatory RCC activities, for example, long-range forecasting, climate monitoring, climate data services, and training.

GLOBAL FRAMEWORK FOR CLIMATE SERVICES

WMO, in cooperation with other United Nations agencies, governments and the private sector, organized the World Climate Conference-3 (WCC-3) in Geneva, from 31 August to 4 September 2009. WCC-3 established the Global Framework for Climate Services, an international framework to guide the development of climate services. This framework links science-based climate predictions and information with climate risk management and adaptation to climate variability and change throughout the world. WMO RCCs form an integral component of this framework.

WMO Regional Climate Centres (RCC) at a glance:

Serving National Meteorological Services in enhancing climate services

For more information:
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World Meteorological Organization
Weather · Climate · Water

More general information on RCCs:
http://www.wmo.int/pages/prog/dra/eur/documents/RCC%20Network/RCC_flyer_April2010_EN.pdf


Thank you for your attention !
Have a nice time
in Belgrade!