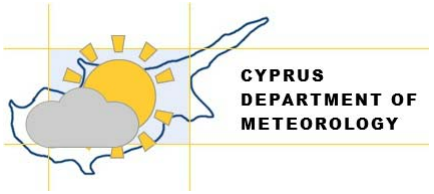
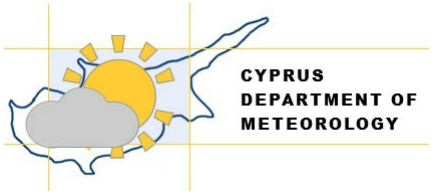


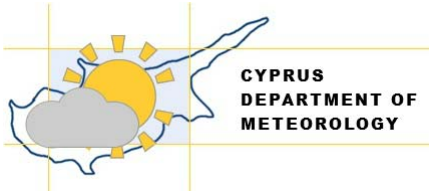
Seasonal Forecast for the area of the east Mediterranean, Products and Perspectives

Dr Kleanthis Nicolaides
Senior Meteorological Officer
Department of Meteorology



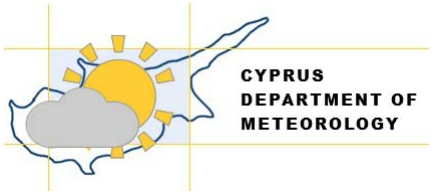
The need for weather forecasts…from where

- Human activities are directly connected with weather
  - The need for more descriptive weather forecasts is increasing now days
  - Modern technology is creating a parallel need for more descriptive weather forecasts
  - Modern technology brings in our hand all sorts of weather information
  - NHMS must take the initiative



Types of weather forecasts

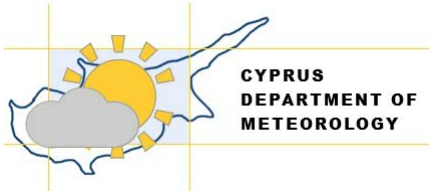
- **Synoptic forecasts** (concerning the next few days)
- **Seasonal forecasts** (concerning the coming season or the next few months)
- **Climatic forecasts** (concerning the prevailling climate from the mid to the end of the century)



Focus on Seasonal forecast

South East European Virtual Climate Change Centre (SEEVCCC http://www.seevccc.rs)

- **S**outh-**E**ast **E**urope **C**limate **O**utlook **F**orum (**SEECOF**)
- **Med**iterranean **C**limate **O**utlook **F**orum (**MedCOF**)
- **Republic of Cyprus** signed an MoU (2013) with **Serbia Hydrometeorological Service** which is hosting **SEEVCCC**



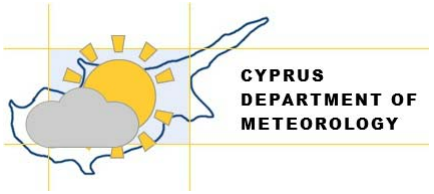
SEVCCC under the umbrella of WMO

SEECOF

- Serbia, Bulgaria, Greece, Cyprus, Israel, Croatia, Italy, Albania, Armenia, Georgia, Hungary, Slovenia, FYROM, Montenegro, Bosnia & Herzegovina, Romania and Turkey
- EU Seasonal Forecasts Providers (ECMWF, FR, UK, GE, SP)

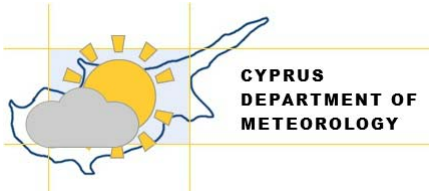
MedCOF

- All SEECOFs members
- Egypt, Jordan, Libya, Morocco, Tunisia and other north Africa Countries
- EU Seasonal Forecasts Providers (ECMWF, FR, UK, GE, SP)



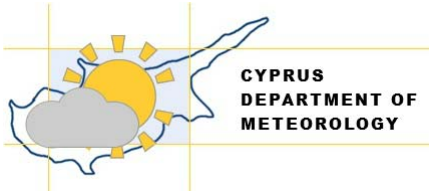
Steering SEECOF and MedCOF

- **Twice per year**
  - teleconferencing in May-June and
  - in an assembly in November
- 10 meetings until today concerning SEECOF
  - The 11th meeting is on the members step door
- 1 meeting until today concerning MedCOF
  - The 2nd meeting is on the members step door



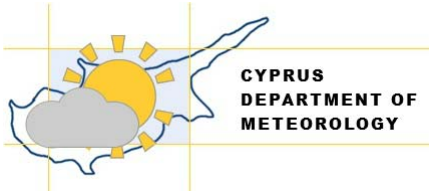
About Seasonal Forecasts

- The scientific approach of Seasonal forecasts is based on the provision of information regarding climate characteristics for several months (or several seasons) ahead
- Seasonal forecast has much in common with numerical weather prediction – synoptic forecasts (NWP) in the sense that both approaches relay on numerical integration of very complex hydrodynamic equations after a very complex parameterization of physical processes
- Seasonal forecast's aim mainly to predict monthly and seasonal anomalies from long term climatology, rather than to provide a day to day forecasts of weather patterns, as it is in the NWP case.



SEEVCCC seasonal forecasts

- SEEVCCC started issuing seasonal forecast for South East Europe region from June 2009
- The system is based on dynamical downscaling of ECMWF seasonal forecast, using a regional atmosphere-ocean coupled model (RCM-SEEVCCC)
- The forecast consists of 41 ensemble members and is issued ones per month, between 15th and 20th of a current month. The forecast is for 7 months ached
- The model has horizontal resolution of 0.25° for atmospheric model and 0.2° for the ocean model. Atmosphere is resolved with 32 and ocean with 21 levels on the vertical
- The connection between the atmospheric model and the ocean model is possible through a coupler that performs the exchange of atmospheric surface fluxes and Sea Surface Temperature after every atmospheric physical time step



SEECOF output and the Department of Meteorology

- Cyprus Department of Meteorology, is uploading (since Nov. 2011) regularly, during the first 10 days of the month, the graphic output of the seasonal weather forecast, associated with relevant comments and analyses, covering a period of three months
- Comments, analyses and comparisons are based on observed values and there relations against the normal ones for a **selection of meteorological stations**
- As normal values the values of the period **1981-2010** must be consider (and not the 1961-1990 period) since this was agreed between SEECOF's members last November

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Normals for 1981-2010 instead of 1961-1990

Normals for 1981-2010

- SEECOF was using **1961-1990** normals
- The output was giving **very strong signs of the climatic change** (but its only a seasonal forecast)
- SEECOFs output are now based on **1981-2010** climatology
- The climatic change sign is very weak

Selection of Met. stations

- Northern coastal areas (**Polis**)
- Easter Coastal areas (**Paralimni**)
- Southern Coastal Areas (**Larnaka**)
- Western Coastal areas (**Paphos**)
- Inland (**Athalassa**)
- Higher mountainous areas (**Prodromos**)

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The structure of the seasonal forecast as uploaded

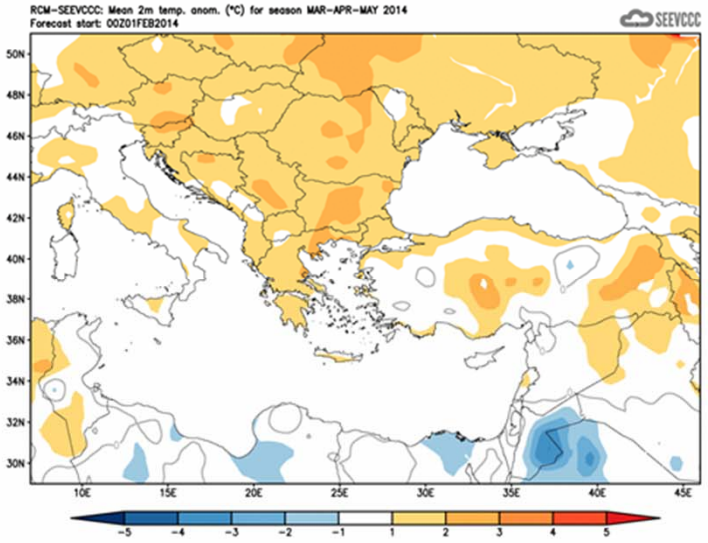
- General comments about SEECOF and Seasonal Forecasts
- A general overview of the weather expected for the next three months
  - Climatological characteristics of the coming three months
  - The anomalies of Temperature and Precipitation are used
- Monthly analyses regarding the expected weather aside with SEECOF's output (based on monthly TT and RR anomalies)
- Presentation of normal values (TT and RR) for a selection of Meteorological stations
- Qualitative Validation-Evaluation of the previous month seasonal forecast by comparing observed values with anomalies

General over view of the weather expected for March, April and **May.**

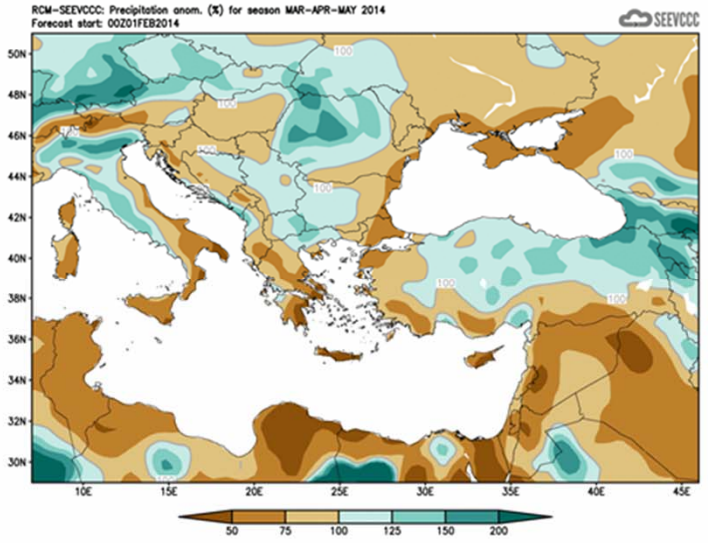
From what it will be generally analyzed below the weather for the following three months namely, **March, April** and **May** will be presented, with respect to temperature, and accumulated precipitation. The next three month period includes the spring (or transitional) months. The normal temperature increases towards the end of the period and the accumulated precipitation declines since barometric systems associated with precipitation are getting very rare, while isolated thundery showers due to thermal instability are more common and frequent.

The expected temperature for **March**, **April** and **May** will be in general normal. The accumulated precipitation is expected to range generally below normal since it will not exceed 50% of normal over the south and east part, and from 50% to 75% inland and over the west.

The previous characteristics are applied over the wider area of the east Mediterranean.

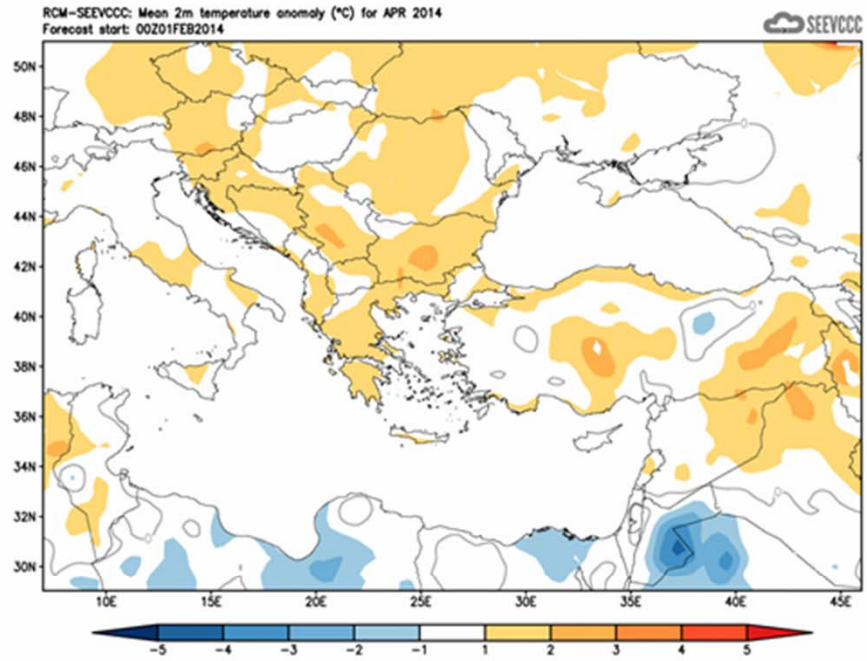


Divergence from the mean seasonal temperature (°C) from normal for March, April and May

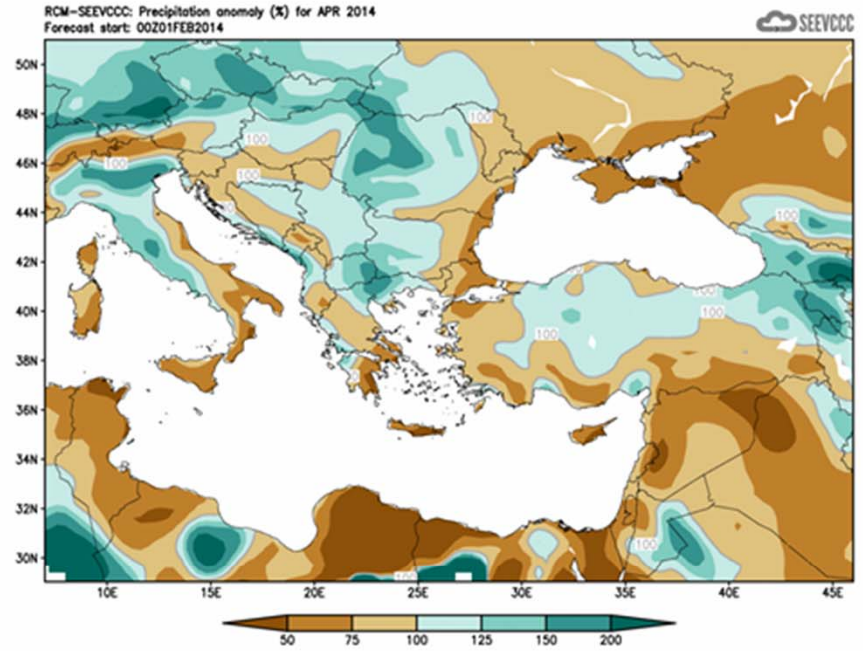


Percentage (%) of the mean seasonal accumulated precipitation compared to the mean normal for March, April and May

April, according to the seasonal forecast, in terms of temperature will be a normal month. Compared with the monthly normal rainfall, the model presents again a negative equilibrium for Cyprus since the accumulated precipitation will range below 50% over the south and east parts of the island and over inland and the west it will range from 50 to 75% of normal.



Divergence of the mean monthly temperature (^{o}C) from normal during April



Percentage of the mean monthly precipitation (%) compared with the normal of April

Normal values of temperature and accumulated precipitation for March, April and May

The normal values of mean maximum, mean minimum temperature and accumulated precipitation are presented below concerning the three months the forecast is covering. It's interesting the change of the temperature inland and over the mountainous areas if compared with the coastal areas.

TEMPERATURE AND PRECIPITATION NORMAL VALUES FOR THE PERIOD 1981-2010									
	MEAN DAILY MAXIMUM TEMPERATURE (°C)			MEAN DAILY MINIMUM TEMPERATURE (°C)			MEAN MONTHLY TOTAL PRECIPITATION (mm)		
Area Name	**Mar**	**Apr**	**May**	**Mar**	**Apr**	**May**	**Mar**	**Apr**	**May**
NORTH COAST	18.3	21.6	25.8	8.3	10.8	14.3	45.7	21.8	7.6
WEST COAST*	18.6	21.5	24.5	8.9	11.5	14.7	34.4	15.2	6.1
MOUNTAINOUS AREAS	10.4	15.5	20.4	2.8	6.6	10.8	92.1	47.2	32.0
INLAND*	19.2	24.4	29.6	6.9	10.4	14.8	31.9	19.1	24.6
SOUTH COAST	19.3	22.7	26.4	8.6	11.8	15.7	35.8	14.2	9.8
EAST COAST**	19.1	23.2	27.4	7.8	10.9	14.9	35.2	19.7	10.7

* West Coast and Inland Values cover the period 1983-2010

** East Coast Temperature Values cover the period 1981-2007

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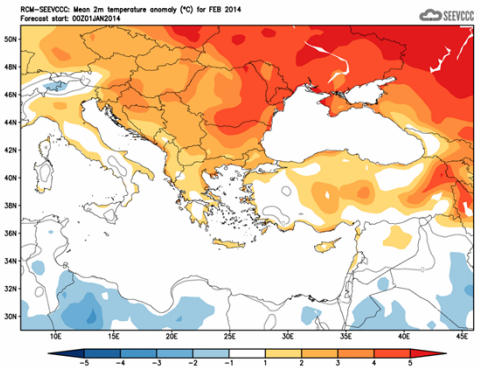
The back desk

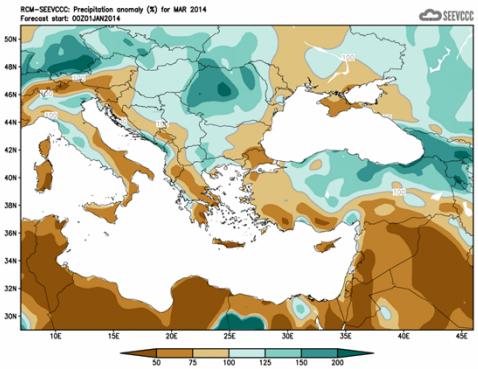
- The preliminary data of TT and RR concerning the previous month, accompanied with any extreme phenomena encountered, are sent to SEECOF for the need of the quantitative evaluation of the models output
- SEECOF is informing members about models score and statistics

Validation of February forecast

February, according to the seasonal forecast, was expected to be relatively warmer than normal, since the model was giving a a positive general deviation of 1 to 2 °C. The balance of the accumulatede precipitation was expected to be negative since, it was expected that the rainfall would have range below 50% of normal over the east, 50 to 75% of normal inland and only over the extreem wester part where the precipitation would have to be up to normal.



Divergence of the mean monthly temperature (°C) from normal during February



Percentage of the mean monthly precipitation (%) compared with the normal of February

From the relevant information, kept in the data base of the Department of Meteorology, and the provisional data recorded during **February 2014**, seems that the model was at least qualitatively performed well. Temperature was above normal with positive deviations of about 2°C as mentioned by the model. Regarding the accumulated precipitation it was well below normal in all areas except the western part as described by the model.

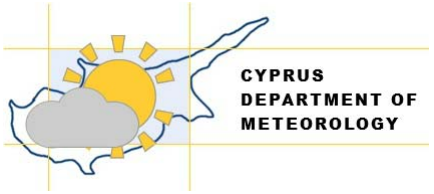
TEMPERATURE AND PRECIPITATION PROVISIONAL DATA FOR FEBRUARY 2014

St. No.	Station Name	Mean Daily Maximum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Highest Daily Maximum Temperature (°C)	Mean Daily Minimum Temperature (°C)	Normal Value (1981-2010)	Difference from Normal Value	Lowest Daily Minimum Temperature (°C)	Monthly Total Precipitation (mm)	Normal Value (1981-2010)	Difference from Normal Value
41	POLIS CHRYSOCHOUS	17.9	16.3	1.6	21.3	7.5	7.3	0.2	3.9	45.1	68.5	-23.4
82*	PAFOS (AIRPORT)	18.9	17.1	1.8	23.4	9.4	8.1	1.3	5.5	61.9	59.8	2.1
225	PRODROMOS (C.F.C.)	10.3	6.7	3.6	19.9	3.2	0.5	2.7	-2.1	57.2	128.7	-71.5
666*	ATHALASSA (RADIOSONDE)	18.9	16.0	2.9	23.4	6.8	5.3	1.5	2.4	22.0	44.5	-22.5
731	LARNAKA (AIRPORT)	18.7	17.0	1.7	21.9	8.7	7.1	1.6	3.9	34.0	50.3	-16.3
800**	ACHNA (DASAKI)	18.4	16.5	1.9	24.3	6.8	6.3	0.5	0.6	17.4	50.7	-33.3

* Pafos' and Athalassa's Station Normal Values cover the period 1983-2010

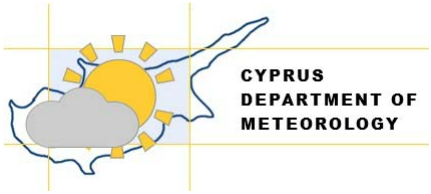
** Achna's Temperature Normal Values cover the period 1981-2007

= VALUES FROM AUTOMATIC WEATHER STATION

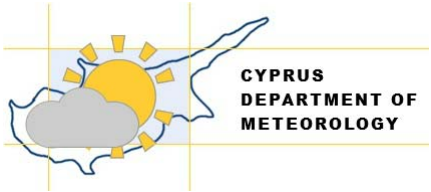


Perspectives… How to use SEECOFs products

- Weather sensitive parts of the economy
  - Water management
  - Energy management
  - Public health management
- **Risk analyses** concerning weather elements for the coming next few months
- At the present little is done towards the above direction
- Related authorities have to start planning, evaluating and analysing risks concerning weather sensitive issues and there impact on society
- The Department of Meteorology is at the position to support with data and the relevant forecasts the process of decision making



Thank you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