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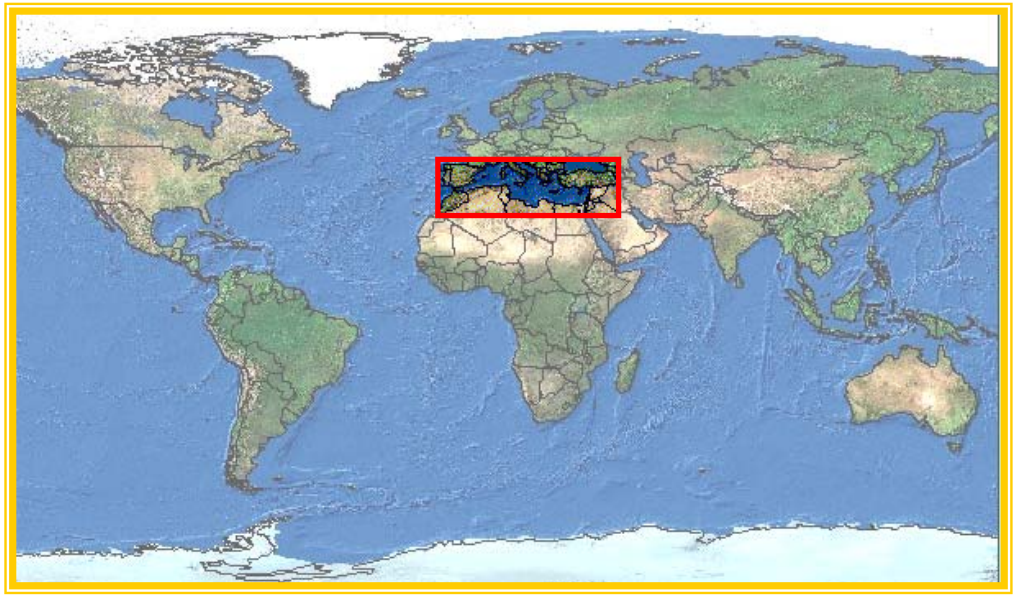
MARS – FOOD sector

Bulletin № 5, 2004

CROP MONITORING for FOOD SECURITY

South and East Mediterranean Countries

Situation at the End of November 2004
Agro-meteorological overview for winter crops

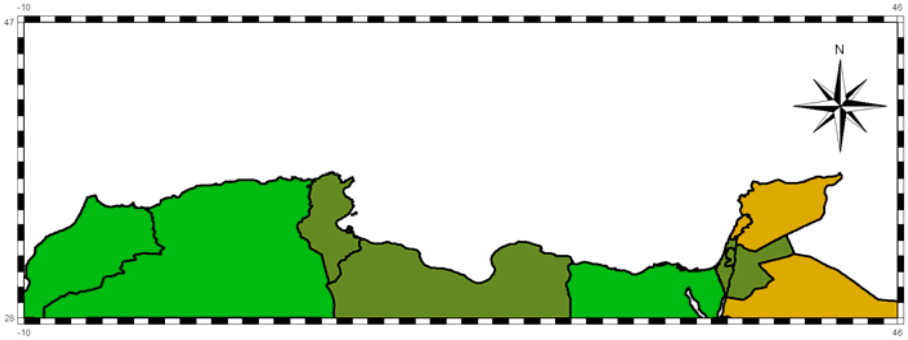


MARS-FOOD
Crop Monitoring for Food Security

Introduction

The present Bulletin is dedicated to the analysis of the agro-meteorological situation in the non-European countries of the Mediterranean basin during the period from the beginning of October 2004 to the end of November 2004. This is a period for winter crops sowing, and emergence in most countries of the region. Practically in all countries wheat and barley are the main winter crops. Additionally, sugar beets are cultivated in winter in Tunisia and Israel, as well as potatoes in Morocco. The main part of winter crops is cultivated in rain-fed conditions. In Israel, Libya and Syria about 20-30% of winter cereal crops and in Egypt and Saudi Arabia practically all crops are irrigated. The present Bulletin is devoted to the analysis of the meteorological conditions only for winter cereals.

The monitoring of the agro-meteorological situation is based on the analysis of the following dekadal data: minimal, maximal and average air temperature, sums of precipitation and global radiation, dekadal values of the climatic water balance, dekadal maps of the Normalized Difference Vegetation Indexes (NDVI), dekadal maps of the Dry Matter Production. Meteorological data are derived from the outputs of the numerical meteorological model from ECMWF (UK), and were prepared for analysis by METEOCONSULT (NL). SPOT-VEGETATION data were used as a basis for calculation of the remote sensing indicators of crop growth. Data were preprocessed by VITO (BE). After that, dekadal maximal NDVI values were weighted for pixels within which winter crops are cultivated, and then – were weighted again at country level. Thus, weighted NDVI values were used as an indicator of crop status. Dry Matter Production maps were calculated by VITO based on SPOT-VEGETATION data and information about global radiation, applying the Monteith approach.
The Bulletin has the following structure. The first pages contain the main results of the analysis. The following pages are dedicated to the analysis of separate indicators of the crop growth during the period of analysis.



***Winter crop status**: green – after emergence, olive-green – emergence, gold – sowing-emergence (based on long-term average data, and on the analysis of Remote Sensing data).*

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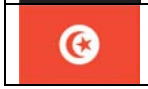
Highlights

Meteorological conditions during October-November 2004 were favorable for winter crop sowing and emergence in the countries of the region. Only in Morocco and Algeria the conditions were worse comparing with the previous year, but close to normal.

Country by Country

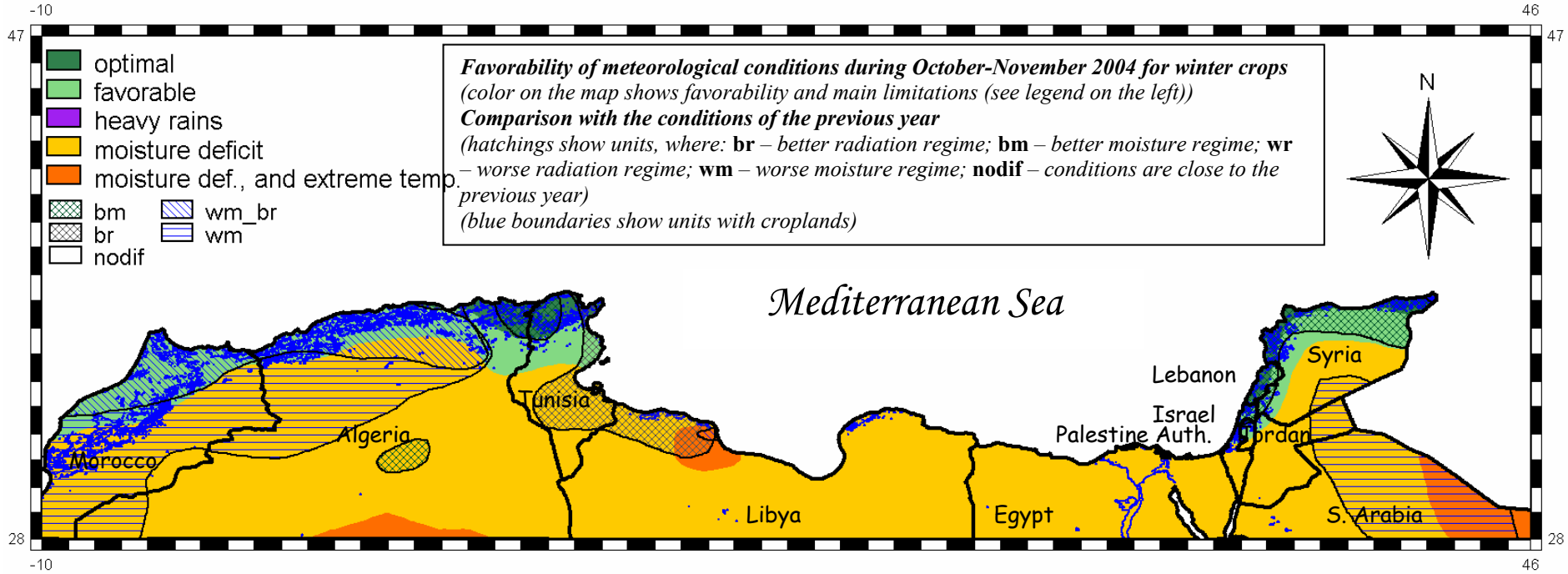
	**Algeria**	The meteorological conditions during October-November 2004 were favorable for winter crops sowing and emergence, but worse than in the previous year. The winter crop status at the end of November was close to the previous year.
	**Egypt**	The meteorological conditions during October-November 2004 were close to the previous year. The winter crop status at the end of November was close to the previous year.
	**Israel**	The meteorological conditions during October-November 2004 were favorable for winter crop sowing and emergence, and better than in the previous year. The winter crop status at the end of November was close to the previous year.
	**Jordan**	The meteorological conditions during October-November 2004 were favorable for winter crop sowing and emergence, and better than in the previous year. The winter crop status at the end of November was better comparing with the previous year.
	**Lebanon**	The meteorological conditions during October-November 2004 were favorable for winter crop sowing, and better than in the previous year. The winter crop didn't achieve emergence status at the end of November.
	**Libya**	The meteorological conditions during October-November 2004 were unfavorable for winter crop sowing and emergence due to lack of precipitation, but they were better than in the previous year. The winter crop status at the end of November was better comparing with the previous year.
	**Morocco**	The meteorological conditions during October-November 2004 were favorable for winter crops sowing and emergence, but worse than in the previous year. The winter crop status at the end of November was worse than in the previous year.
	**Palestine Auth.**	The meteorological conditions during October-November 2004 were close to the previous year. The winter crop status at the end of November was close to the previous year.
	**Saudi Arabia**	The meteorological conditions during October-November 2004 were close to the previous year. The winter crop didn't achieve emergence status at the end of November.
	**Syria**	The meteorological conditions during October-November 2004 were favorable for winter crop sowing, and better than in the previous year. The winter crop didn't achieve emergence status at the end of November.
	**Tunisia**	The meteorological conditions during October-November 2004 were favorable for winter crop sowing and emergence, and better than in the previous year. The winter crop status at the end of November was close to the previous year.

The situation is detailed in the following pages.

Results of the analysis

The meteorological conditions during October-November 2004 were favorable for winter crops sowing and emergence in the main cropping areas of the region. Amount of precipitation was unfavorable for rain-fed winter crops only in Libya, southern Morocco, and Saudi Arabia. Extreme hot air temperatures took place only in Libya, and at eastern Saudi Arabia.
In general, the moisture regime during October-November 2004 was better as compared with the previous year in Tunisia, Libya, Syria, Lebanon, Israel, and northern Jordan. Worse moisture regime was observed in Morocco, Algeria and eastern Saudi Arabia. The moisture regime in the other countries of the region was close to the previous year.
It seems possible to conclude, that in general the meteorological situation during the beginning of the current vegetative season was favorable for rain-fed winter crops sowing and emergence in all countries of the region, excluding Egypt, Saudi Arabia, and Libya. But the situation in Libya was better than in previous year, and the situation in Morocco and Algeria was worse.
The analysis of crop growth indicators shows that the winter crop status at the end of November 2004 seems to be better than in the previous year in Jordan and Libya, and seems to be worse in Morocco. The NDVI curve behavior shows that the winter crop development in Algeria and Morocco is close to the season 2001/2002 with normal yield of winter crops, and in Tunisia is similar to the season 2002/2003 with bumper yield. Remote sensing indicators show that crops in Lebanon, Syria, and Saudi Arabia had not emergence before the end of November 2004.
A summary of the analysis of meteorological conditions for winter cereals is given in the Table.

Comparing with previous season		
Country	***Meteorological conditions during October-November***	***Crop status at the end of November 2004***
Algeria	-	=
Egypt	=	=
Israel	+	=
Jordan	+	+
Lebanon	+	
Libya	+	+
Morocco	-	-
Palestine Auth.	=	=
Saudi Arabia	=	
Syria	+	
Tunisia	+	=



Global Radiation and Air Temperature

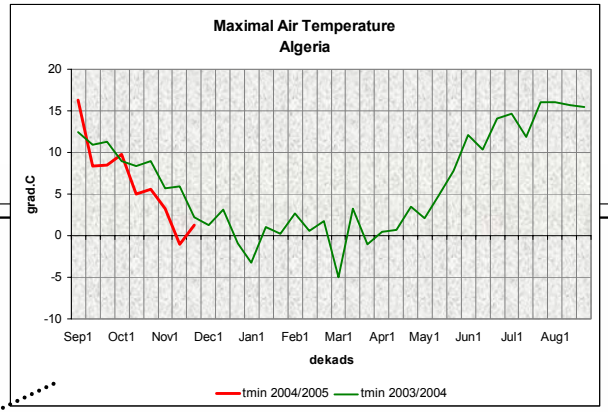
The amount of radiation was near long-term average values in all countries of the region, and close to the optimal for winter crops. The cumulated radiation during October-November was close to the previous year in most countries of the region, excluding Morocco, Algeria, Tunisia, and Libya where radiation sum was higher comparing with previous year.

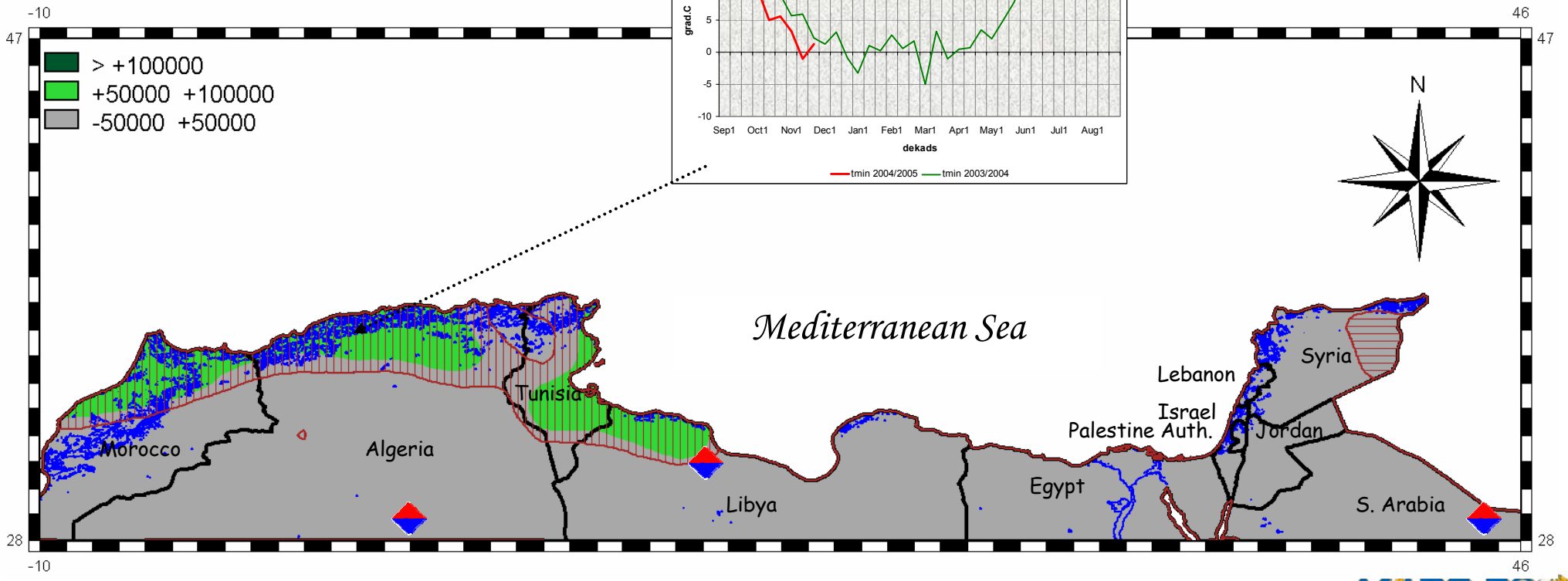
Average daily temperature was near +5+15^{0}C practically in all countries of the region. Tmin was higher than +5^{0}C practically everywhere. Only at the end of November Tmin was near 0^{0}C in some regions of Syria, Lebanon, Algeria and Morocco. Tmax was extreme and near +40^{0}C during the period under analysis only in cropping areas of Libya. The air temperature in general was lower than in previous year in Maghreb countries and close to the previous year in other countries of the region. The beginning of November 2004 was colder than normal in Maghreb countries, and the end of the month in the eastern half of the region.

Global radiation (October-November)	Comparing with previous season *difference in %*
Algeria	**+5 +15**
Egypt	**0 +2**
Israel	**0 +2**
Jordan	**0 +1**
Lebanon	**+1 +2**
Libya	**-1 +7**
Morocco	**0 +16**
Palestine Auth.	**+1 +2**
Saudi Arabia	**+1 +3**
Syria	**-5 +2**
Tunisia	**+5 +10**

Difference in Global Radiation Sum (kJ/m^2) between current and previous seasons (October-November). Vertical hatching shows regions, where this difference was higher than 5%, and horizontal hatching – lower than 5%. (blue boundaries show units with croplands)

extreme air temperature





Precipitation Sum

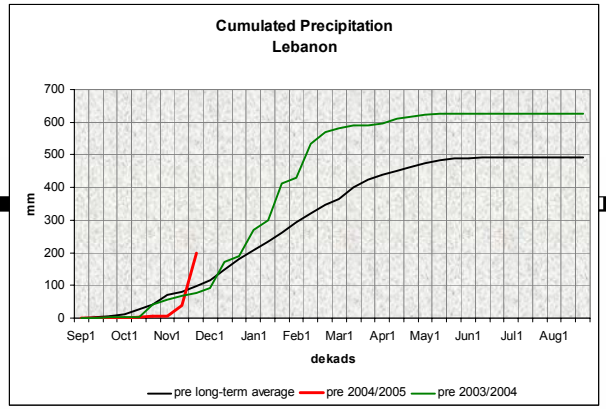
Rains were very scarce during October-November 2004 in eastern Libya, Egypt, and Saudi Arabia. Main part of precipitation took place in all countries in November. The heavy rains didn't take place within the region under analysis.

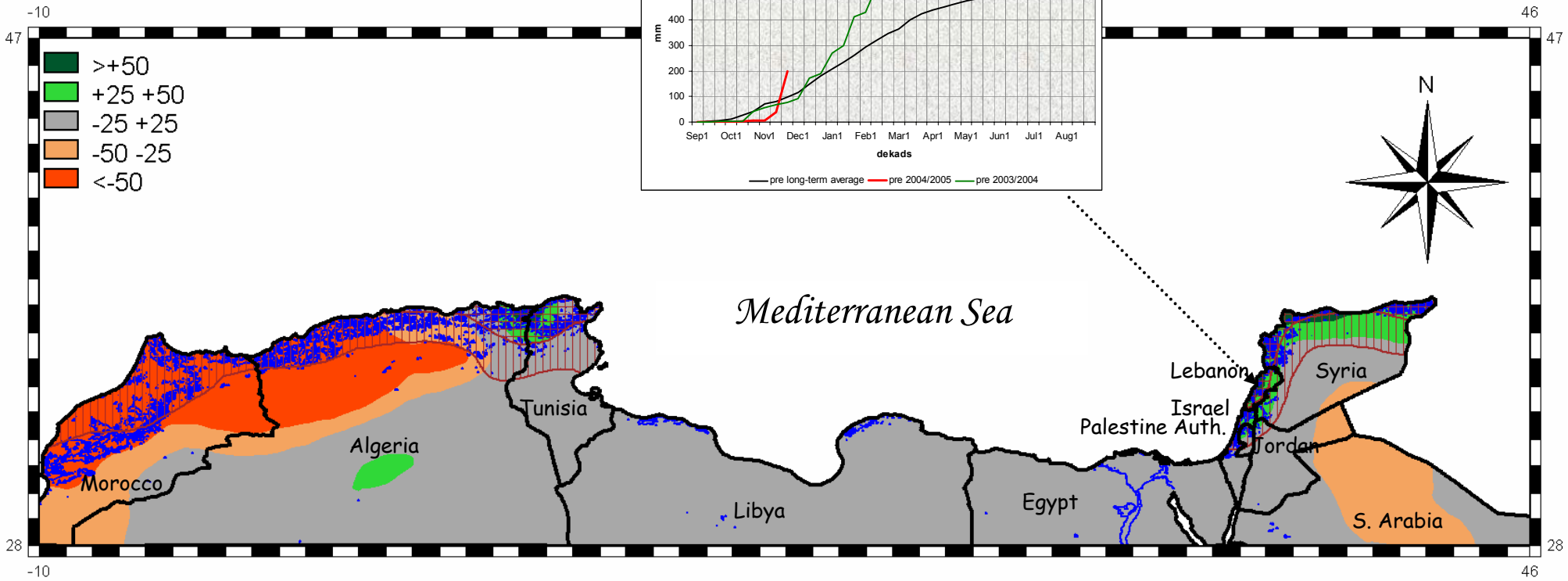
In general, the amount of precipitation during October-November 2004 was higher than normal in Tunisia, Morocco, Syria, Lebanon, Jordan, and Israel and slightly lower in Saudi Arabia, Libya, and Egypt. The biggest difference was observed during last dekads of November.

The amount of precipitation during the period under analysis was higher comparing with the previous year in the most countries of the region, except Algeria and Morocco, where it was lower, and Egypt, Libya and Saudi Arabia where it was close to the previous year.

Precipitation for rain-fed winter crops (October-November)	Comparing with previous season
Algeria	-
Egypt	=
Israel	+
Jordan	+
Lebanon	+
Libya	=
Morocco	-
Palestine Auth.	+
Saudi Arabia	=
Syria	+
Tunisia	+

Difference in Precipitation Sum (mm) between current and previous seasons (October-November). Cross hatching shows regions with amount of precipitation more than 120 mm during the period October-November 2004, vertical hatching – with 60-120 mm of precipitation . (blue boundaries show units with croplands).



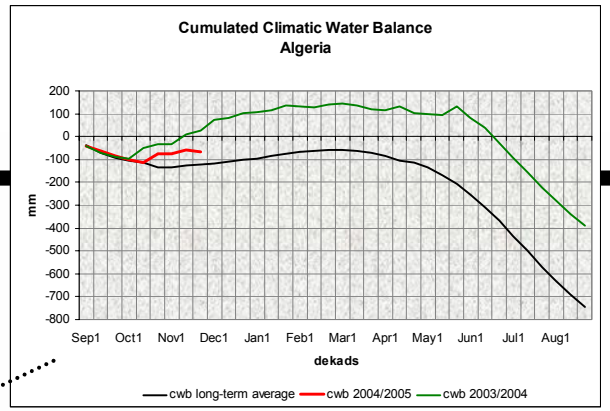


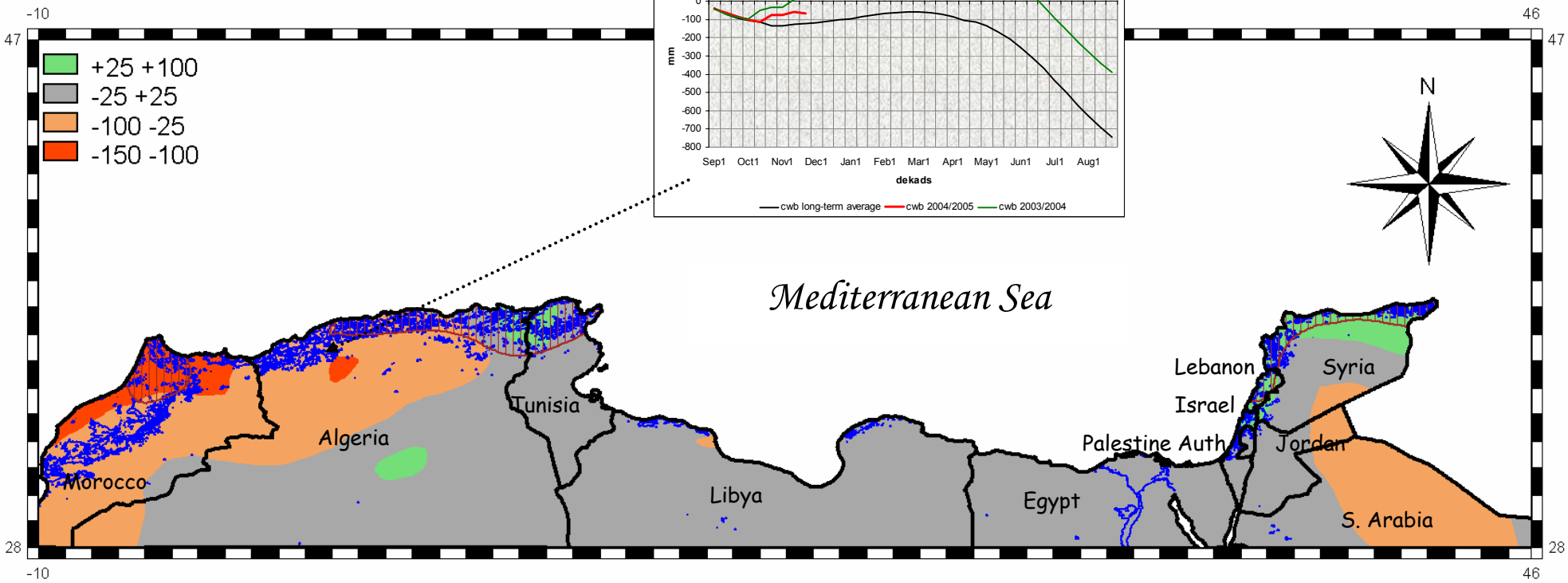
Climatic Water Balance

Dekads with negative climatic water balance (CWB) values were dominant during October-November 2004 in all countries of the region. The dekadal CWB became positive since the last dekad of October in Maghreb countries, and since the second dekad of November in the East Mediterranean countries. As a result, cumulative climatic water balance for the period under analysis was positive only for croplands in Syria, Lebanon, Tunisia, and in some regions of Algeria and Morocco.
The climatic water balance situation during October-November was better than long-term average data for croplands in the most countries of the region, except Saudi Arabia where it was worse, and Libya – where it was close to normal.
The CWB in October-November 2004 was better than in the previous year in Tunisia, Syria, Israel and Lebanon, and it was worse in Algeria, and especially in Morocco.

Climatic Water Balance for rain-fed winter crops (October-November)	Comparing with previous season
Algeria	-
Egypt	=
Israel	+
Jordan	=
Lebanon	+
Libya	=
Morocco	-
Palestine Auth.	=
Saudi Arabia	=
Syria	+
Tunisia	+

Difference in Climatic Water Balance (mm) for the period October-November 2004 and 2003.Vertical hatching shows regions with positive Climatic Water Balance.
(blue boundaries show units with croplands)





Remote Sensing Indicators and Dry Matter Production modeling

The NDVI curves demonstrate that the winter crop had emergence before the end of November in all countries of the region, except Lebanon, Saudi Arabia, and Syria.
The analysis of the NDVI profile's behavior shows that the crop status in current season was better comparing with previous season in Jordan and Libya, and was worse in Morocco and Tunisia.
The NDVI curves behavior shows that the winter crop development in Algeria and Morocco is close to the season 2001/2002 with the yield of winter crops close to normal, and in Tunisia is similar to the season 2002/2003 with the bumper yield.
Dry matter production modeling shows better situation during October-November 2004 than in previous year in Egypt and Libya, and slightly worse situation in Israel and Tunisia.

Remote sensing indicators of winter crops status (current season)	Comparing with previous year	
	NDVI for winter wheat	Dry Matter Production modeling
Algeria	=	=
Egypt	=	+
Israel	=	-
Jordan	+	=
Lebanon		
Libya	+	+
Morocco	-	=
Palestine Auth.	=	=
Saudi Arabia		
Syria		
Tunisia	-	-

Examples of weighted NDVI profiles for areas with winter wheat and for country level (blue color on the map indicates croplands)