Qualitative evaluation of Winter 2009/2010 forecast in Greece based on HNMS Monthly Bulletins

1. Description of winter 2009/2010 weather conditions over Greece

December 2009 was the warmest December in the last ten years for the whole Greek territory. Especially, during the last ten days of the month, the maximum temperature repeatedly exceeded the 20ºC at every part of Greece. Hence, the mean temperature was higher than normal values, all over Greece with the highest positive anomalies (~+4ºC) observed over the northern mainland. Precipitation amounts were much higher than normal values over Central and North Greece and most of the areas in the Aegean Sea. Also, heavy rainfall and thunderstorms were recorded, while snowfall was localized at the mountainous northern-central parts and some low altitude regions of northern mainland.
Figure 1 shows the deviation of the mean temperature and monthly precipitation from their normal values. It is noted that as "normal" mean values are defined the mean values calculated using 30-year records. It is also worth looking at the deviations of the minimum and maximum temperature from their corresponding normal values which both indicate large positive anomalies (Fig 1c,d).

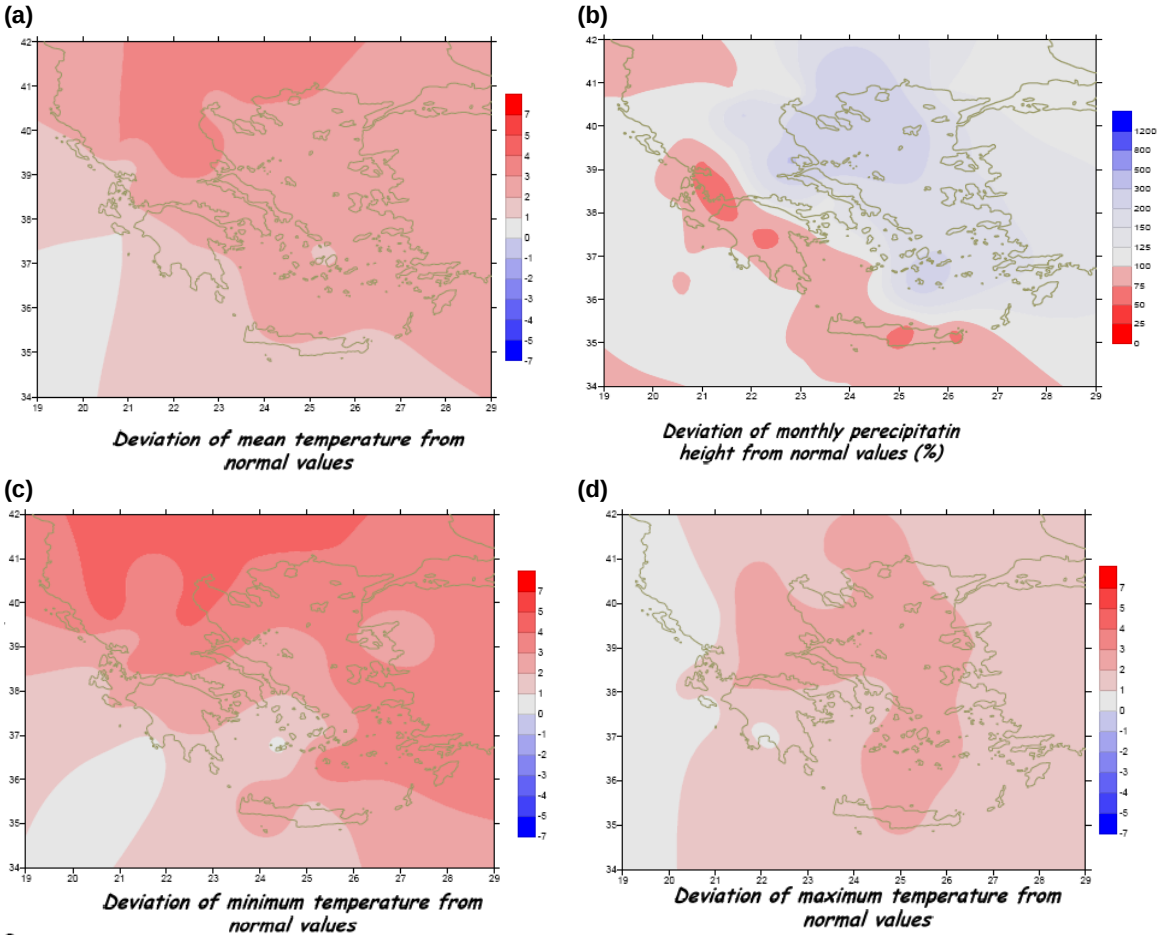

Figure 1. Deviation of the (a) mean temperature, (b) monthly precipitation height, (c) minimum temperature and (d) maximum temperature from the normal values of the period.

January 2010 was on average warmer than the climatic 30-year mean value in most parts of Greece. In particular, it was extremely hot on New Year's Day when the maximum temperatures in several parts of Central-South Greece was close to the corresponding highest values recorded in the last 50 years. On the contrary, towards the end of the month during 23-26/1 total frost was recorded over the northern mainland. Precipitation amounts were higher than normal over most of the Aegean Sea, whilst they were lower than normal over the Northeastern parts. Heavy rainfall and thunderstorms were observed in the mid month causing flash floods mainly in Crete (17-18/1).
Figure 2 illustrates the deviation of the mean temperature and monthly precipitation from their climatic 30-year mean values for the whole month as well as the corresponding fields for the minimum and maximum temperature values. On average, the minimum temperature was higher than normal values apart from a part of the Aegean Sea, while the maximum temperature attained small negative anomaly in some parts of Greece.

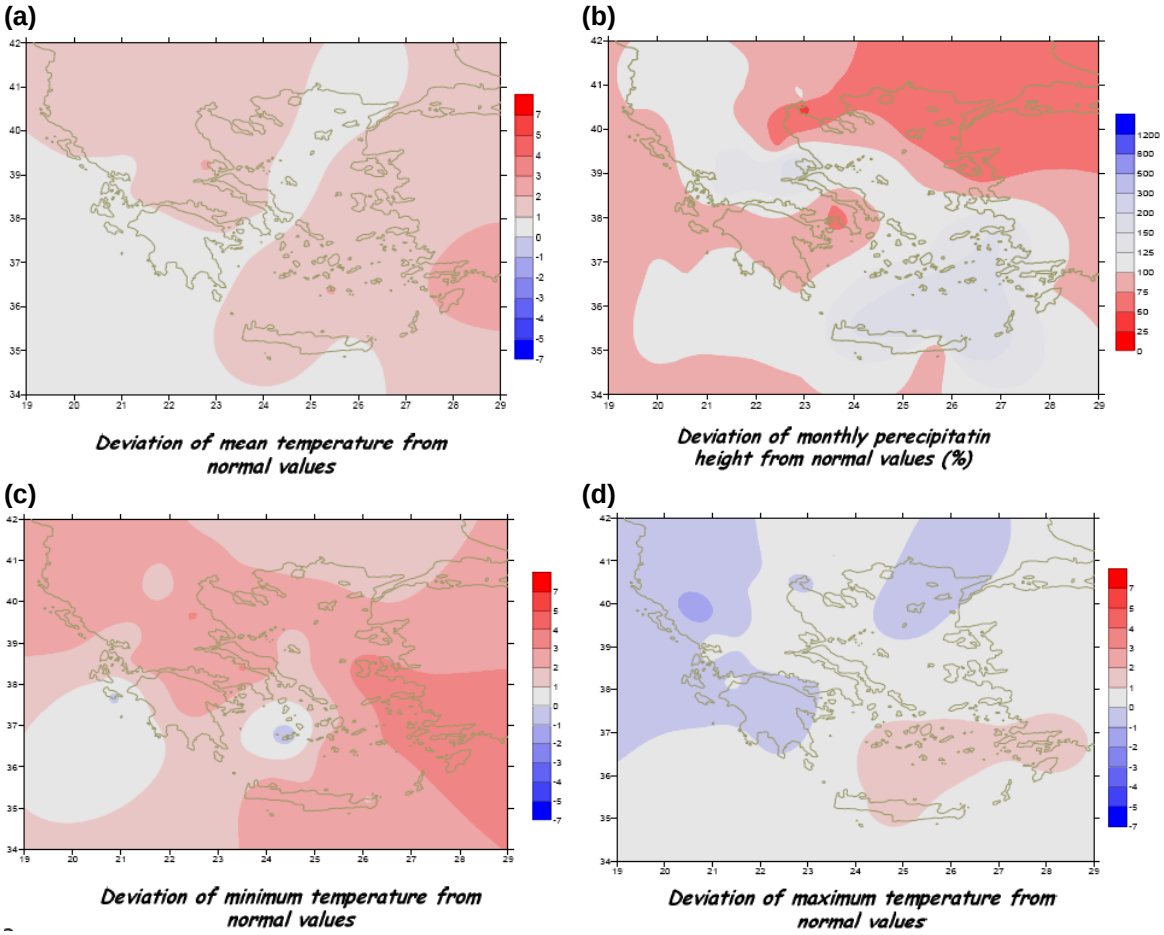

Figure 2. Deviation of the (a) mean temperature, (b) monthly precipitation height, (c) minimum temperature and (d) maximum temperature from the normal values of the period.

February 2010 was characterised by a 3-day period of strong frost in the beginning of the month. The mean temperature was higher than normal over

eastern Greece, particularly in south-eastern islands, while it was lower over north-western parts (Fig. 3a). On average, the minimum temperature was higher than normal values (Fig. 3c), while the maximum temperature attained negative anomaly over north-west Greece (Fig. 3d). The precipitation amounts were higher than normal over northern Greece, mainly over its north-eastern part and floods were recorded. Over the rest of the country precipitation was lower than normal, especially in Crete, south Aegean and Ionian Seas (Fig. 3b). Also, south gale force winds affected the whole country in the middle and the end of the month, while a significant Saharan dust transfer episode was observed at the end of the month with it peak on 20/2.

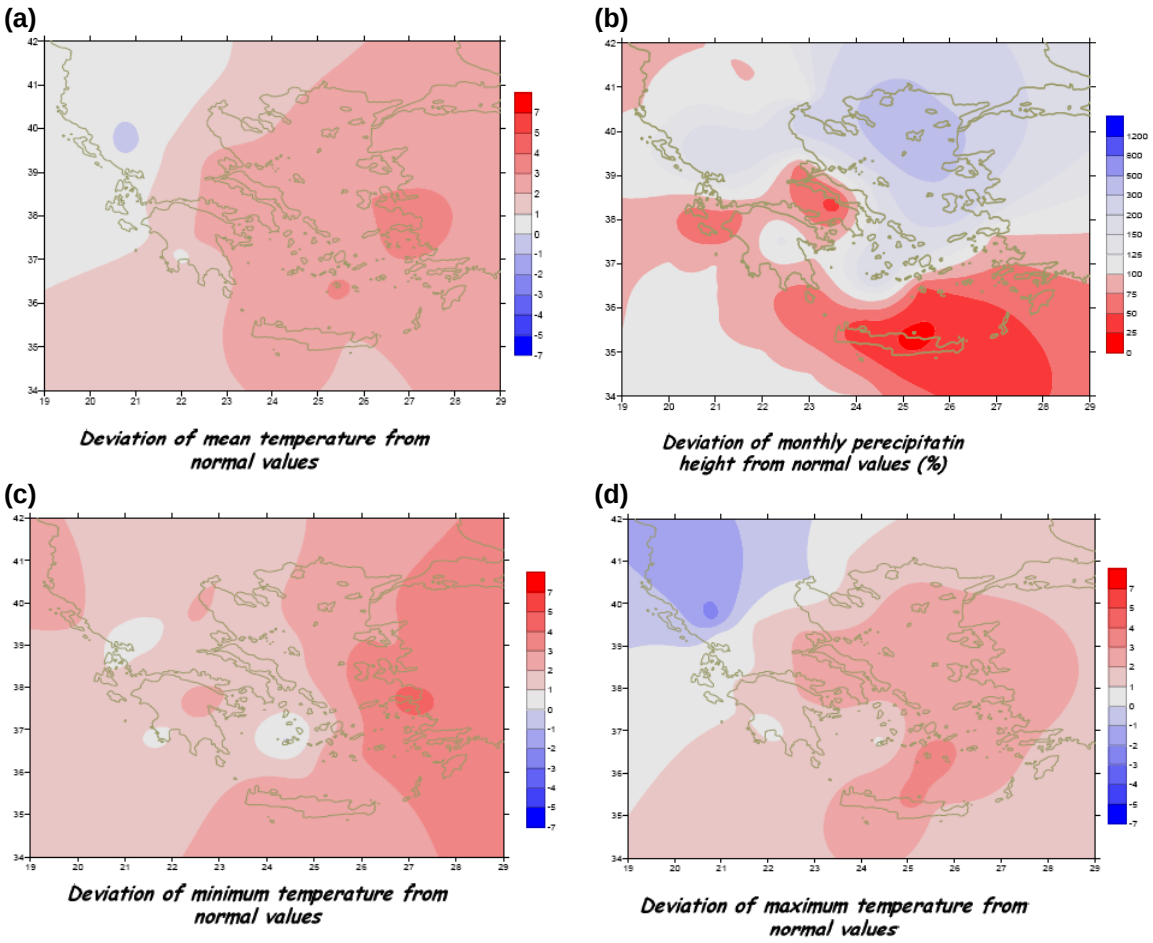

Figure 3. Deviation of the (a) mean temperature, (b) monthly precipitation height, (c) minimum temperature and (d) maximum temperature from the normal values of the period.

Detailed description of the meteorological situation in December 2009, January and February 2010 can be found in the HNMS monthly bulletins (http://www.emy.gr/hnms/english/climatology/climatology_html) .

2. Comparison of winter 2009/2010 weather conditions over Greece with seasonal forecast

The Hellenic National Meteorological Service receives seasonal forecasts from the European Centre for Medium-Range Weather Forecasts (ECMWF). Although HNMS does not disseminate seasonal forecasts to the public, they are used for research reasons.

The ECMWF forecast for winter 2009/2010 based on the model run of November 2009, indicated a positive anomaly of the order of 0.5-1ºC for mean temperature over Greece (Fig. 4a) with respect to the model climatology. Based on the above description of the actual situation occurred it can be concluded that the seasonal forecast gave, qualitatively, the general trend for the mean temperature. Regarding the mean precipitation, the ECMWF seasonal forecast gave a small positive anomaly over south-west Greece, while for the rest of Greece the signal is not apparent, compared to the model climatology (Fig. 4b). Comparing the actual with the forecast situation it seems that in reality there was some positive anomaly for precipitation but mainly for the central-northeast Greece, but it is difficult to make a firm assessment.

These arguments are in accordance with the consensus statement extracted at the end of SEECOF-II meeting.

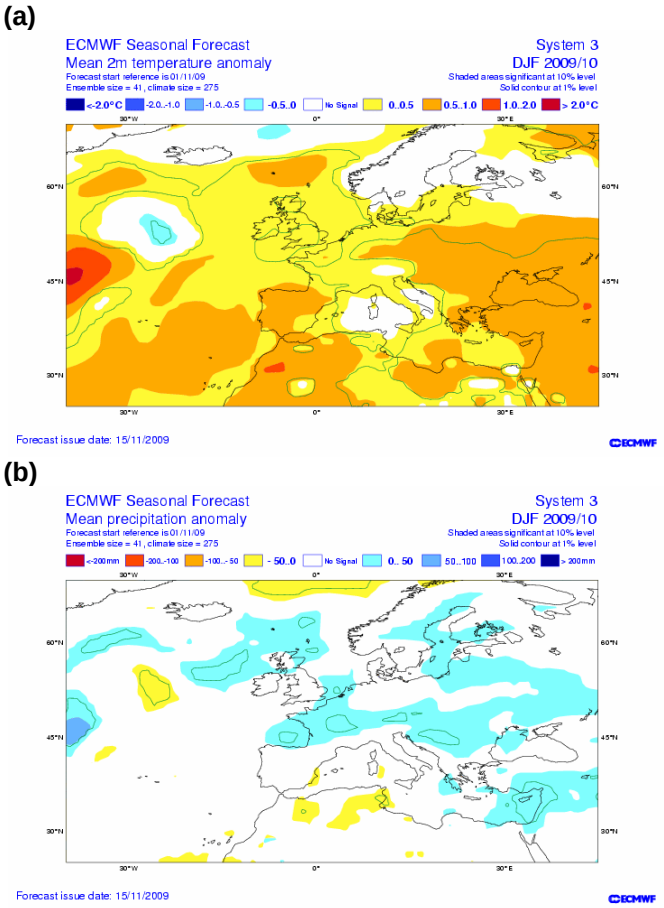

Figure 4. ECMWF seasonal forecast for winter 2009/2010 based on the November 2009 run for (a) mean temperature anomaly and (b) mean precipitation anomaly.