

## **Seasonal outlook for winter 2015/16 weather conditions over Greece**

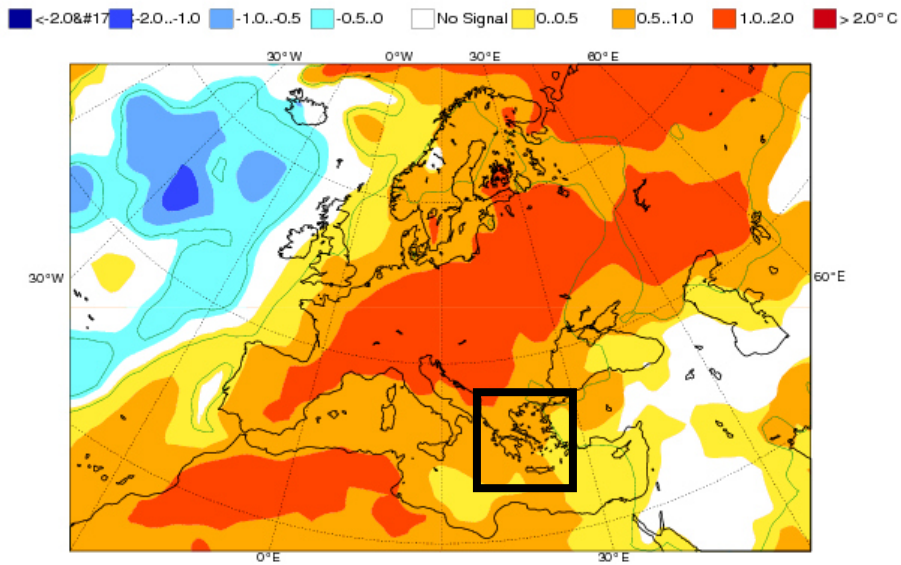
The seasonal outlook for winter 2015/16, namely December, January and February (DJF) provided by Hellenic National Meteorological Service (HNMS) is mainly archived from the European Centre for Medium-Range Weather Forecasts (ECMWF). In addition the forecasts discussed are also from the Met Office global seasonal prediction system version 5, referred to as 'GloSea5' (source:

<http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob>) and the International Research Institute (IRI) experimental Climate Outlook for Europe (source: <http://portal.iri.columbia.edu>). The seasonal outlook of winter for precipitation and temperature based on all three systems, with reference to the 1981-2010 climatology for both ECMWF (IFS model) and IRI and 1996-2009 UK Met Office (GloSea5) are presented in this report.

ECMWF seasonal forecasts of mean 2m temperature anomalies for winter 2015/6, performed on October 2015, are presented in Figure 1. An increasing tendency of 0.5-1°C is evident over the entire country while a lower positive mean 2m temperature anomaly of 0.5°C is also detected. These lower anomaly values for 2m temperature are forecasted over south eastern parts of Greece (mainly SE Aegean islands). Additionally according to Figure 2 illustrating the probability map for 2m temperature to exceed the upper 20<sup>th</sup> percentiles, West Greece, Peloponnese and Attica Peninsula are more likely to have higher than normal 2m temperatures. The probability of these regions to be above climatologically average reaches up to 50%. The IRI multi-model probability forecast also indicates regions whose distribution of likely outcomes is shifted substantially from the climatologically average. The probability map of 2m temperature for winter 2015/16 prepared by IRI (based on October 2015) in Figure 3 shows that the expected probabilities of the seasonal temperatures are at least moderately (45-50%) enhanced for above normal temperature over mainland. Figure 4 illustrates the UK Met Office forecasts based also on October 2015. Probability maps of above, near and below normal 2m temperature presented for winter 2015/16 indicate that temperature will be above normal over the entire country (60-80% probability). This is also in accordance to ECWFMF and IRI outlook. Thus the proposed by HNMS outlook for winter 2015/16 indicates an overall warmer than climatology winter, with higher 2m temperatures most likely to occur over South and South-Western parts of Greece.

ECMWF Seasonal Forecast  
 Mean 2m temperature anomaly  
 Forecast start reference is 01/10/15  
 Ensemble size = 51, climate size = 450

System 4  
 DJF 2015/16  
 Shaded areas significant at 10% level  
 Solid contour at 1% level

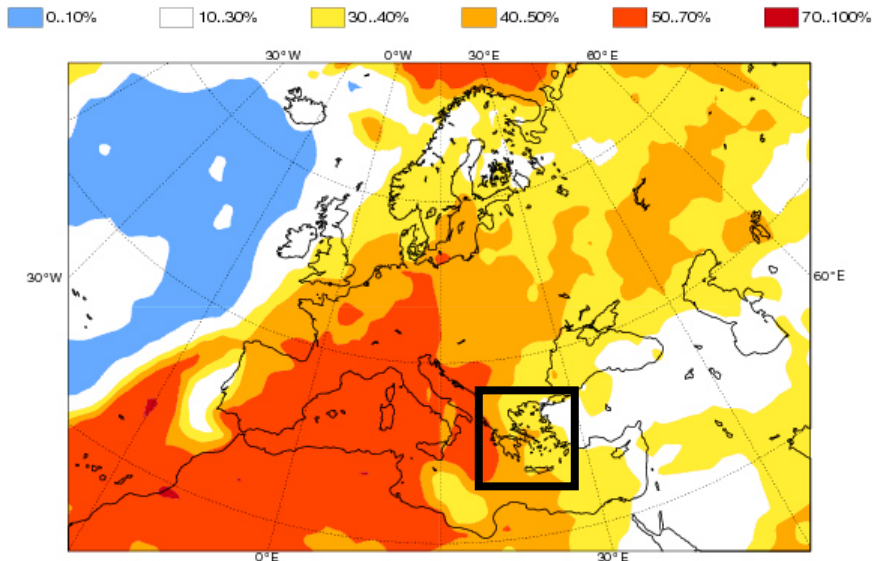


**Figure 1.** ECMWF seasonal forecast for winter 2015/16 for mean temperature anomalies, based on October 2015

Source: [http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal\\_range\\_forecast/](http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/)

ECMWF Seasonal Forecast  
 Prob(highest 20% of climatology) - 2m temperature  
 Forecast start reference is 01/10/15  
 Ensemble size = 51, climate size = 450

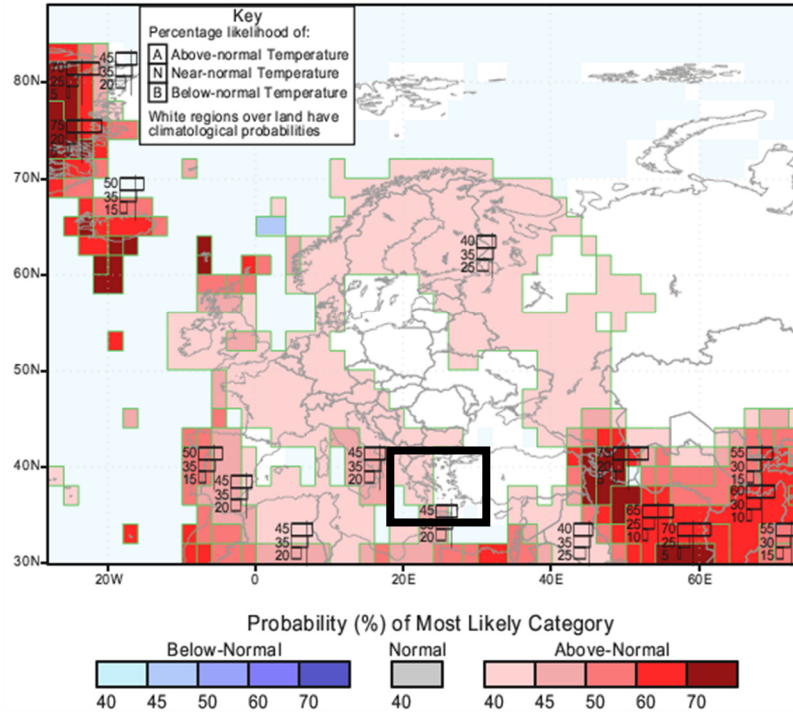
System 4  
 DJF 2015/16



**Figure 2.** ECMWF probability map of 2m temperature at the 20% highest climatology value for winter 2015/16, based on October 2015

Source: [http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal\\_range\\_forecast/](http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/)

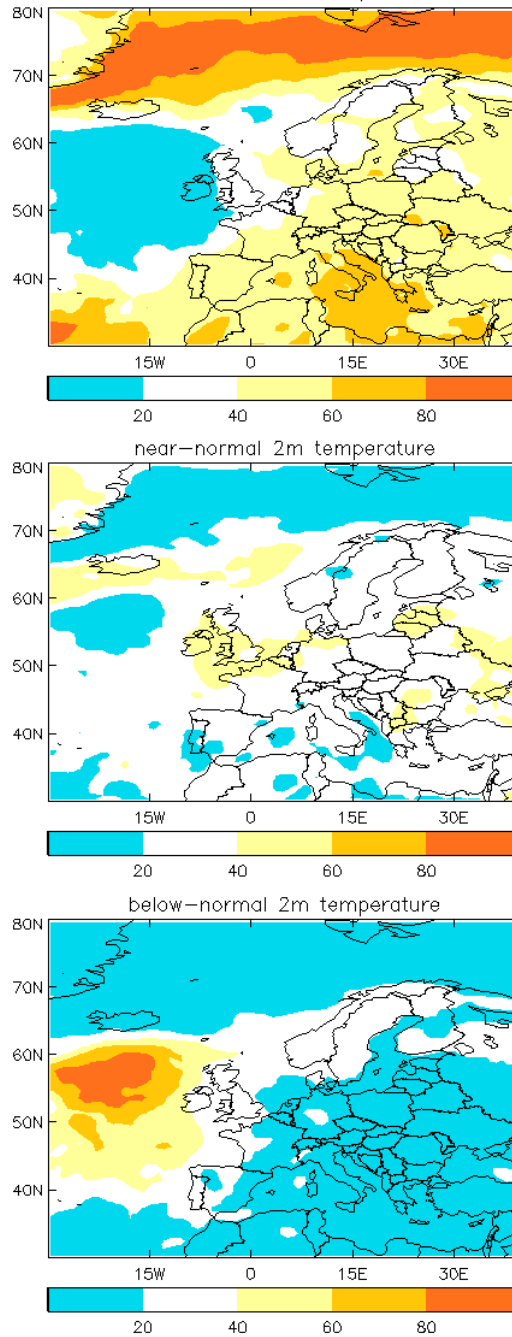
IRI Multi-Model Probability Forecast for Temperature  
for December-January-February 2016, Issued October 2015



**Figure 3.** IRI seasonal forecast for winter 2015/16 issued on October 2015 for the 2m temperature probabilities.

Source: <http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts>

Probability of tercile categories Dec/Jan/Feb Issued Oct 2015  
above-normal 2m temperature

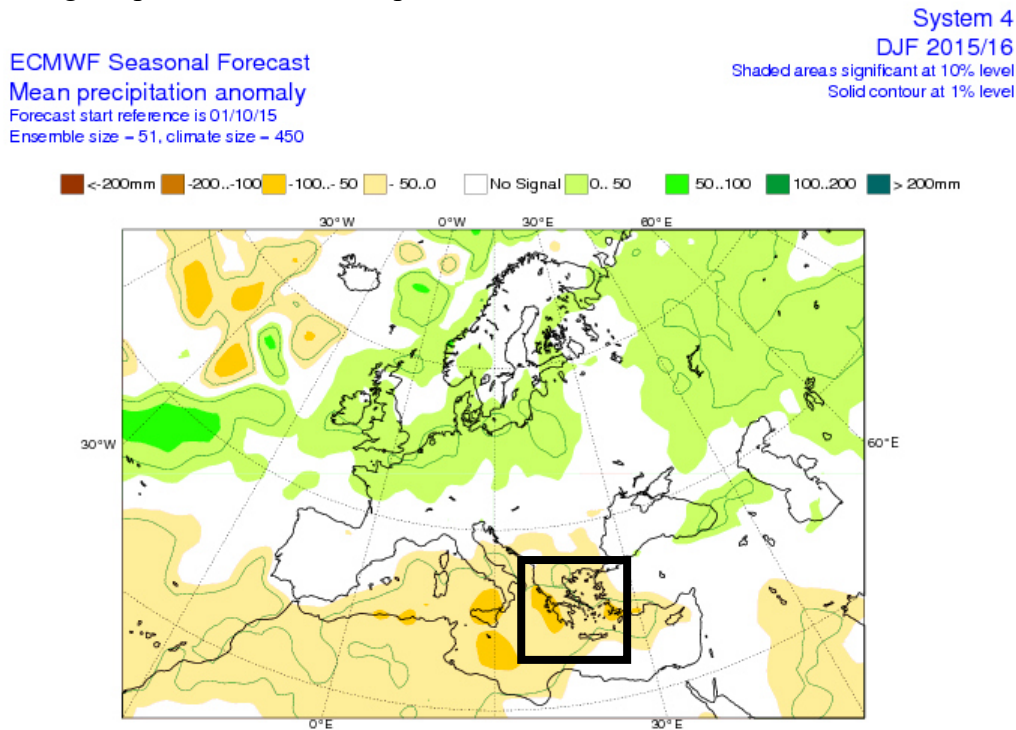


**Figure 4.** UK Met office seasonal forecast of probability for winter 2015/16 for 2m temperature, based on October 2015

Source:<http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob>

Regarding mean precipitation, the ECMWF seasonal forecast illustrated in Figures 5 and 6, the IRI probability maps in Figure 7 as well as the UK Met Office forecasts in Figure 8, a seasonal low is evident. According to ECMWF and UK Met Office forecasts presented,

based on October 2015, it is possible to determine an outlook for precipitation, while IRI probability maps do not determine any specific signal. A small below normal probability (40-60%) is illustrated in Figures 5, 6 and 8 over southern parts compared to model climatology. Therefore it is suggested that precipitation during winter 2015 will be below normal, slightly shifted from climatologically normal values mainly for southern Greece following the presented model outputs.



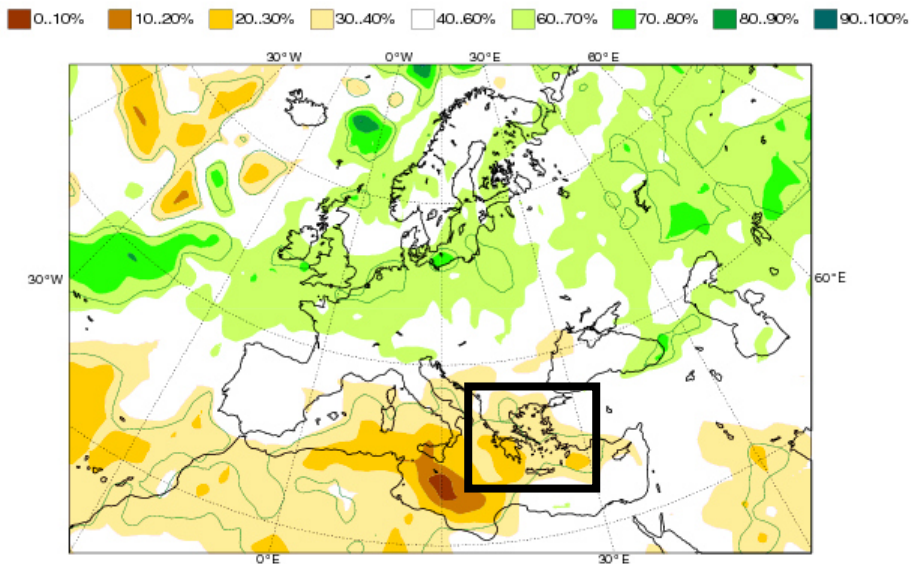
**Figure 5.** ECMWF seasonal forecast for winter 2015/16 for mean precipitation anomalies, based on October 2015

Source:[http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal\\_range\\_forecast/](http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/)



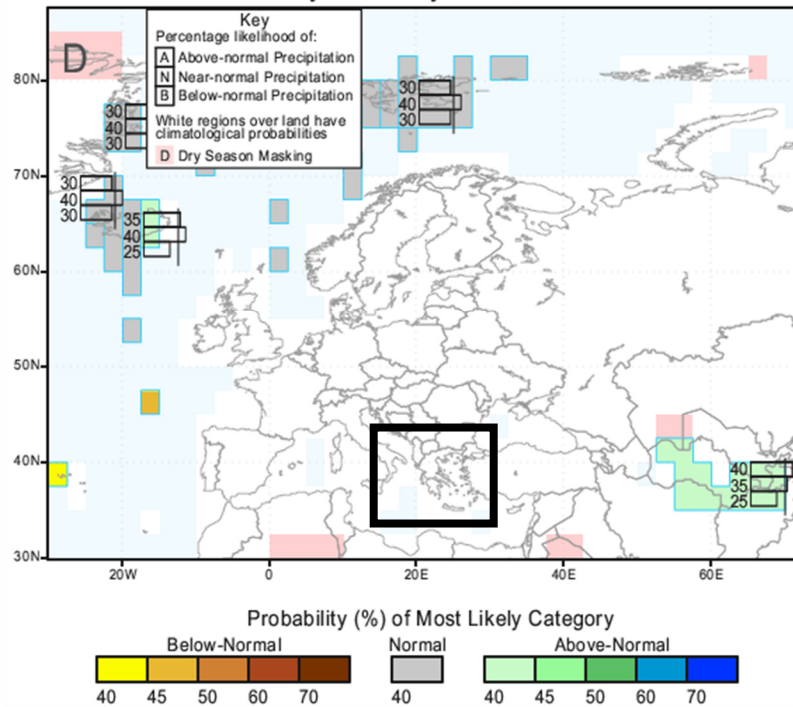
ECMWF Seasonal Forecast  
 Prob(precipitation > median)  
 Forecast start reference is 01/10/15  
 Ensemble size – 51, climate size – 450

System 4  
 DJF 2015/16  
 Solid contour at 1% significance level



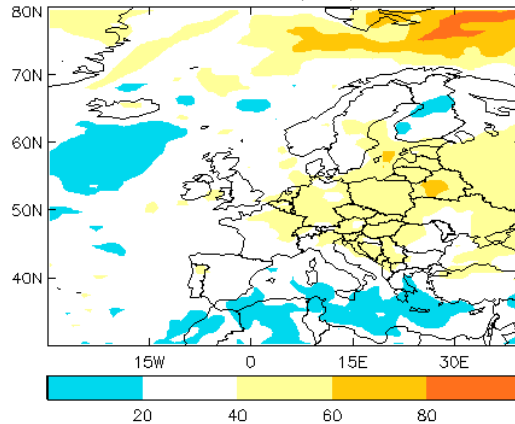
**Figure 6.** ECMWF probability map of most likely category of precipitation (below-above upper tercile) for winter 2015/16, based on October 2015  
 Source: [http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal\\_range\\_forecast/](http://www.ecmwf.int/products/forecasts/d/charts/seasonal/forecast/seasonal_range_forecast/)

IRI Multi-Model Probability Forecast for Precipitation  
 for December-January-February 2016, Issued October 2015

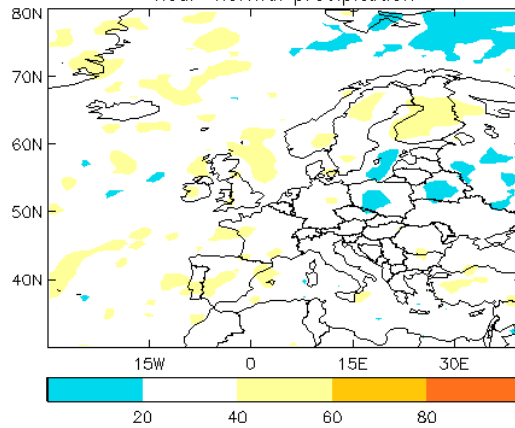


**Figure 7.** IRI seasonal forecast for winter 2015/16 issued on October 2015 run for precipitation probability.  
 Source: <http://iri.columbia.edu/our-expertise/climate/forecasts/seasonal-climate-forecasts>

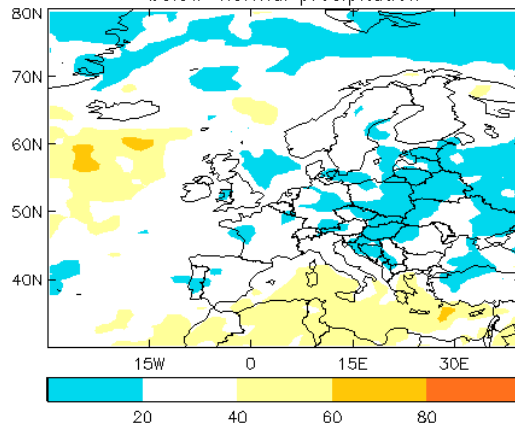
Probability of tercile categories Dec/Jan/Feb Issued Oct 2015  
above-normal precipitation



near-normal precipitation



below-normal precipitation



**Figure 8.** UK Met Office seasonal forecast for winter 2015/16 of probability for mean precipitation, based on October 2015 run.

Source: <http://www.metoffice.gov.uk/research/climate/seasonal-to-decadal/gpc-outlooks/glob-seas-prob>