

Recent seasonal forecasting in Bulgaria

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1. Introduction

1.1 Regular seasonal forecast

The National institute of meteorology and hydrology (NIMH) is the national weather service of Bulgaria. We have been producing regular seasonal forecast for our country since 2005. It is updated once a month at the end of the month as soon as all forecast materials become available. It is based on subjective analysis of the map products from the numerical climate prediction models of the following centers:

European center for medium range weather forecast, Reading, UK;

MetOffice, Exeter, UK;

National center for environmental prediction, USA;

International research institute, Columbia University, USA;

Beijing climate center, China;

Tokyo climate center, Japan;

and the statistical prediction model of the Italian institute of biometeorology Ibimet. All these materials are available on the websites of the centers.

1.2 Special winter forecast

We also produce a special winter forecast. It is based on subjective analysis of the map products of the above given center. Additionally, the special winter forecast takes into account the forecast products of ECMWF, MetOffice, and NCEP for the phase of the ENSO (El Niño/La Niña); and the special forecast of the MetOffice for the winter NAO. The later forecast is issued in July. The ENSO forecast for the forthcoming winter is also available in July. The numerical forecast products of NCEP and BCC cover up to 8 months and therefore can be used as early as July to foresee something for the coming winter. The consideration of the forecast of the phase of ENSO and NAO is based on some statistical analysis that reveals the relationship between the seasonal mean temperature and the seasonal amount of precipitation in Bulgaria and the phase of ENSO and NAO in the winter season.

1.3 Explanations

The categories “above normal”, “around normal”, and “below normal” by definition have an equal probability of occurrence of 33.3%. The aim of the seasonal forecast is to favor one or two of the three categories based on the analysis of all available forecast materials and assessment of the evolution of large climate structures for the upcoming months. We

December									
January									
February									
March									

Figure 3: Special forecast for season December 2009 – February 2010, issued in November 2009.

Issue, Nov 2009	Temperature					Precipitation				
	10-days	Month	DJF	JFM	FMA	10-days	Month	DJA	JFM	FMA
December	01-10					01-10				
	11-20					11-20				
	21-31					21-31				
January										
February										
March										
April										

Below we provide maps of the departure of the monthly mean temperature from the norm (1961-1990) (left) and monthly amount of precipitation in percent of normal (1961-1990) (right) for the winter months December 2009 (Fig.4), January 2010 (Fig.5), and February 2010 (Fig.6).

Figure 4: Departure of the monthly mean temperature from the norm (1961-1990) (left) and monthly amount of precipitation in percent of normal (1961-1990) (right) for December 2009.

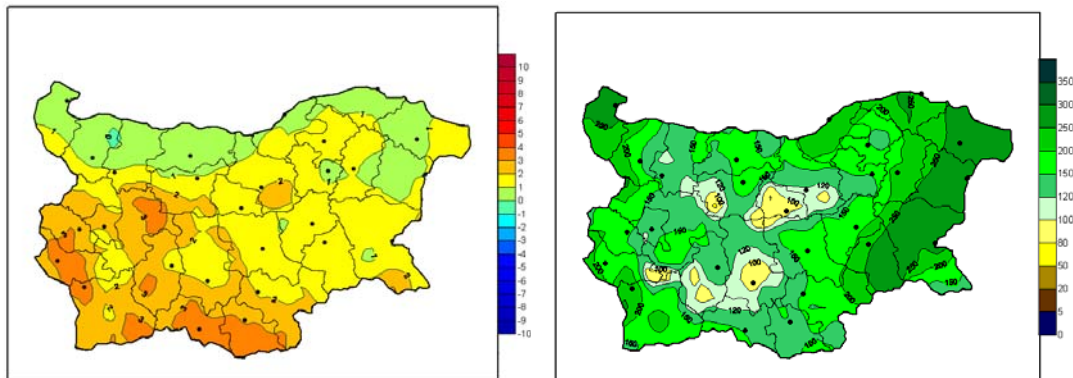


Figure 5: Departure of the monthly mean temperature from the norm (1961-1990) (left) and monthly amount of precipitation in percent of normal (1961-1990) (right) for January 2010.

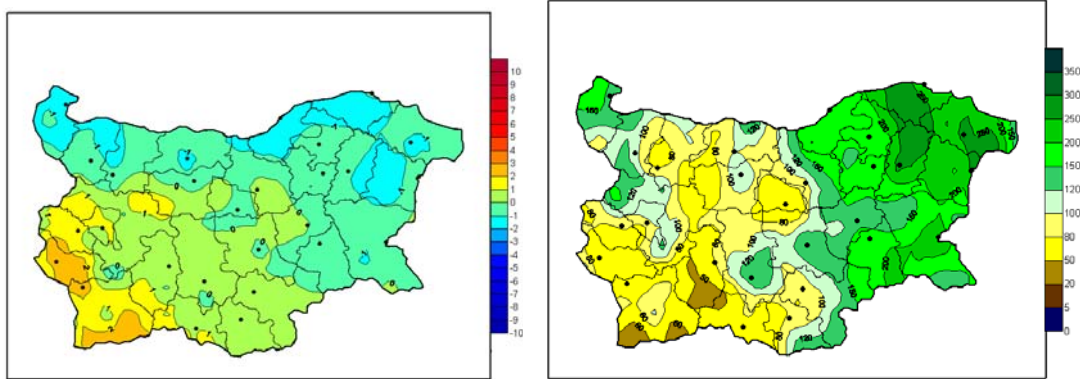
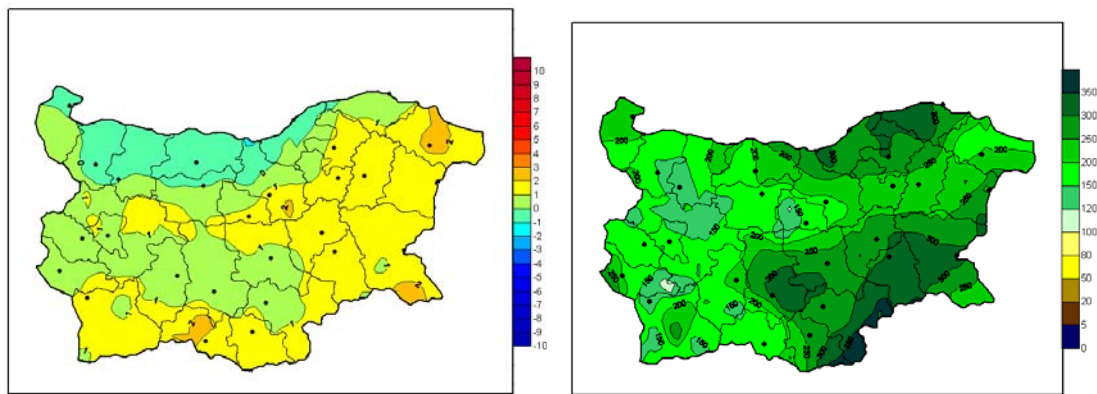


Figure 6: Departure of the monthly mean temperature from the norm (1961-1990) (left) and monthly amount of precipitation in percent of normal (1961-1990) (right) for February 2010.



As one can see from the maps, the winter in Bulgaria was cold to normal in the Danube plane in the north of the country, relatively warm in the mountainous southwest, and rather normal in the east part of the country. Overall the winter was normal to warm in Bulgaria with respect to the norm 1961-1990. The winter was wet everywhere although to a lesser degree in the west part of the country.

We have studied the volatility of the winter thermal comfort conditions and it turned out that the last winter was among the most volatile in Bulgaria since 1991 in terms of thermal comfort conditions. The study was based on the wind-chill index. In late January there were extreme thermal comfort conditions in the northeast of the country with wind-chill index as low as level "frost bite within 30min" which is rare (Gospodinov and Tzenkova-Bratoeva, 2010). There was also unusually late long snow period in the first half of March (See Monthly Bulletin of the NIMH, March 2010).

3. Summer forecast

We do not have a special forecast for the summer season. What we provide below is our latest regular seasonal forecast for Bulgaria which covers the upcoming summer season.

Figure 7: Latest regular seasonal forecast for Bulgaria issued at the end of April 2010.

Issue, Apr 2010	Temperature					Precipitation				
	10-days	Month	MJJ	JJA	JAS	10-days	Month	MJJ	JJA	JAS
May	01-10					01-10				
	11-20					11-20				
	21-31					21-31				
June										
July										
August										
September										

4. Final remarks

The products described in this paper should be regarded as an attempt to summarize all seasonal forecast materials available on the web that cover the region of Bulgaria. This effort is supposed to provide to the Bulgarian public a comprehensive expert view on forecast materials that are otherwise rather hard to be found and complex to be understood by the general public.

References:

Gospodinov, I. and Tzenkova-Bratoeva, A., 2010: Spatial and temporal variability of the rate of change of the winter thermal comfort conditions in Bulgaria. Pp. 195-200, *Proceedings of the 7th conference on Biometeorology*, Albert-Ludwigs-University of Freiburg, Germany 12-14 April 2010.

<http://www.mif.uni-freiburg.de/biomet/bm7/report20.pdf>

Gospodinov, I. and Tzenkova-Bratoeva, A., 2010: Winter thermal comfort conditions in Bulgaria. *Bulgarian Journal of Meteorology and Hydrology*, **15**, № 3 (accepted).

<http://global-change.meteo.bg/bjmh.htm>

Monthly bulletin of the National institute of meteorology and hydrology, Sofia, Bulgaria. Latest issue available online (<http://www.meteo.bg/issues/buletin/Bulletin.pdf>) and older issues available on demand.