Some NWP activities in Bulgaria

Boryana Tsenova and Andrey Bogatchev

National Institute of Meteorology and Hydrology,
Bulgarian Academy of Sciences

cy38t1 became operational in Bulgaria since October, 2014.

Since 2011 a scheme for forecasting of the lightning activity over Bulgaria was developed based on some instability indices calculated using ALADIN outputs for air and dew point temperatures at the main isobaric levels. In the summer of 2014 there were considerably high number of thunderstorms over Bulgaria, it is a suitable year to be used for verification of our scheme with the aim to improve it.

As the scheme includes some instability indices that are calculated based on air and dew point temperatures at 850, 700 and 500 hPa, a comparison between these temperatures from ALADIN-BG and their measured values from the sounding that is performed daily at 12 UTC in Sofia was performed.

Table1. Correlation coefficients between measured from sounding over Sofia at 12 UTC and the mean forecasted by ALADIN over a region with sizes 0.2x0.2 deg with Sofia central aerological observatory as a center for the same time

	R_Tc	R_Td	R_Tc850	R_Td850	R_Tc700	R_Td700	R_Tc500	R_Td500
April	0.99	0.97	0.98	0.87	0.98	0.72	0.98	0.85
May	0.99	0.96	0.97	0.82	0.96	0.79	0.97	0.79
June	0.99	0.96	0.96	0.79	0.95	0.81	0.98	0.70
July	0.99	0.96	0.93	0.58	0.94	0.55	0.94	0.76
August	0.99	0.97	0.96	0.67	0.92	0.84	0.96	0.90
September	0.99	0.96	0.98	0.86	0.99	0.87	0.93	0.80
All	0.99	0.96	0.98	0.89	0.98	0.80	0.99	0.8

April - September, 2014

Days with forecasted high lightning probability

Days with forecasted medium lightning probability

Days with detected flashes by ATDnet

Figure2. Number of days (per grid with sizes 0.2x0.2 deg) with forecasted very high (top panel, left side) and high (top panel, right side) lightning probability based on the developed by us scheme and number of days with detected flashes by ATDnet

Bias of Air Temperature at 850 hPa
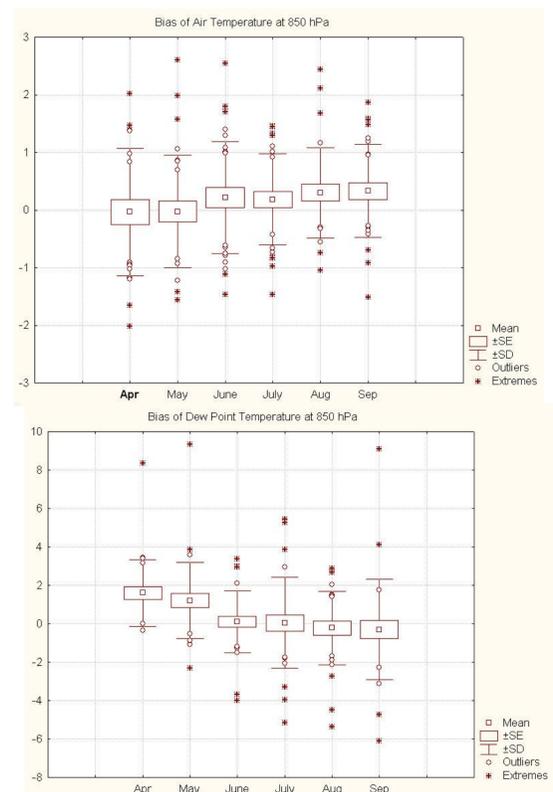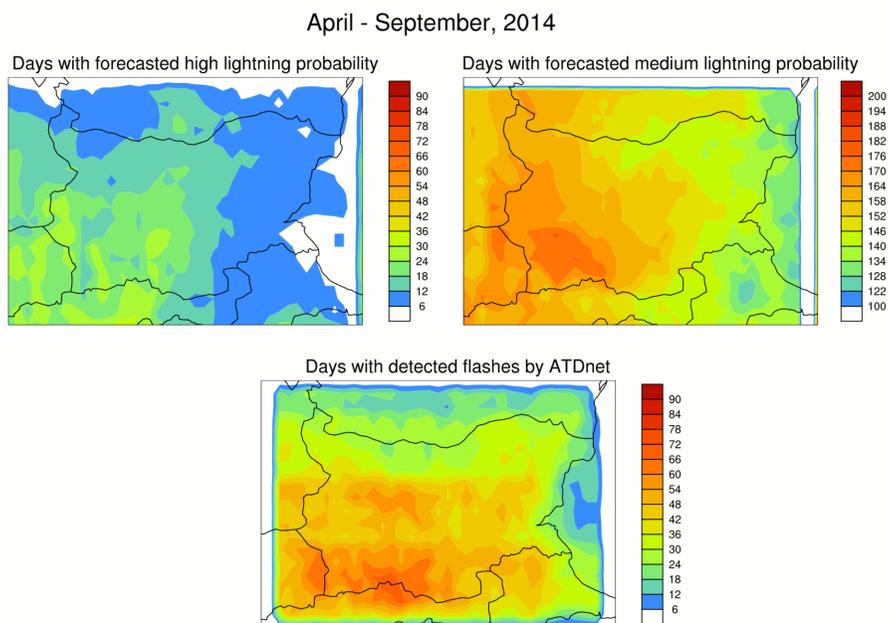
Bias of Dew Point Temperature at 850 hPa

Figure1. Box and whiskers plots of the bias (model values minus measured values) of air (top panel) and dew point (bottom pannel) temprature at 850 hPa for the different months

Flash events detected by ATDnet vs forecasted lightning activity
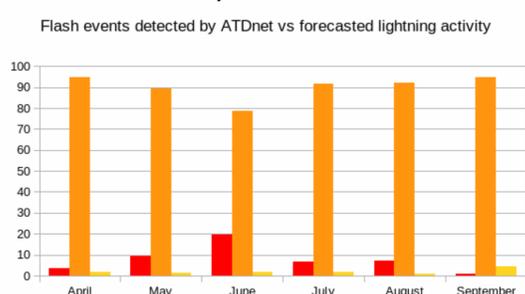
Figure3. Percent of cases with detected flashes by ATDnet forecasted by our scheme with very high (red), high (orange) and low (yellow) lightning probability for the different considered months.
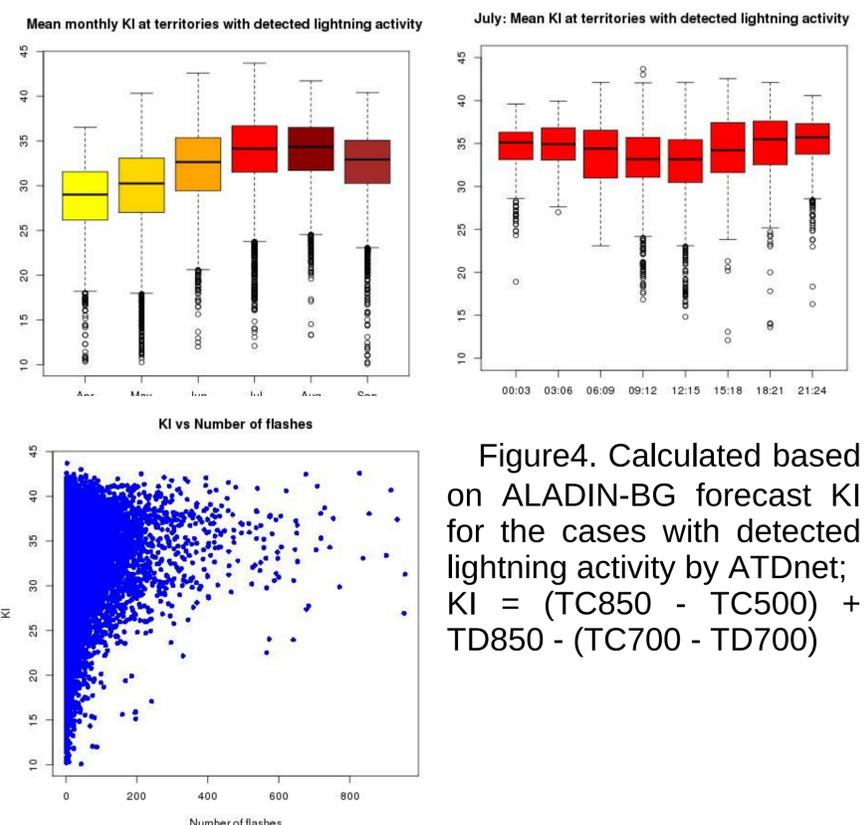

Mean monthly KI at territories with detected lightning activity

July: Mean KI at territories with detected lightning activity

KI vs Number of flashes

Figure4. Calculated based on ALADIN-BG forecast KI for the cases with detected lightning activity by ATDnet; KI = (TC850 - TC500) + TD850 - (TC700 - TD700)