

Status of Numerical Weather Prediction with ALADIN in Bulgaria

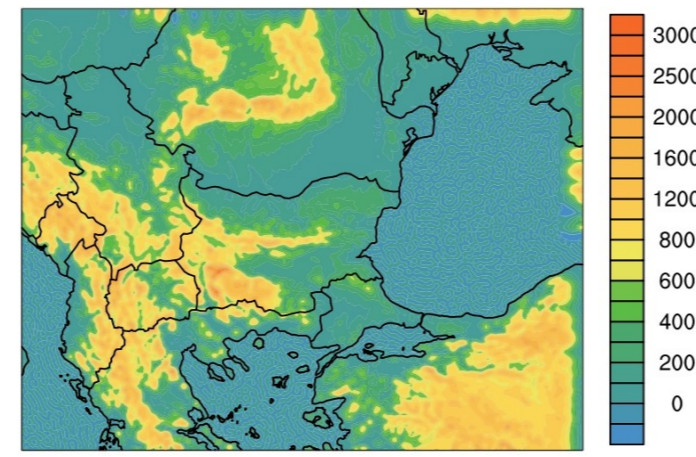
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ALADIN Canonical Model Configurations in Bulgaria

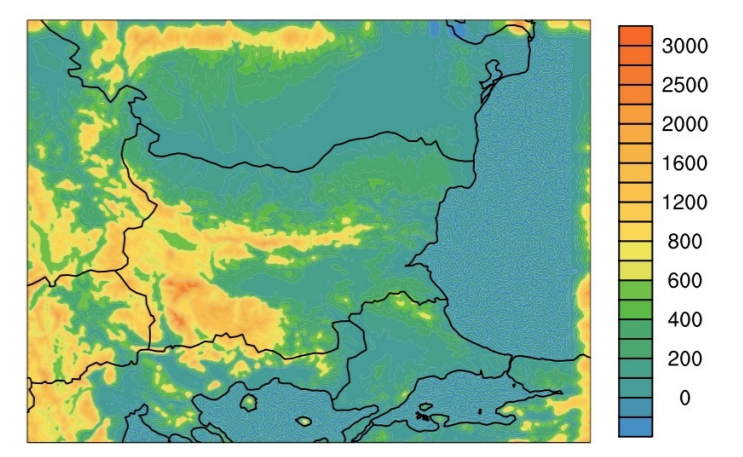
ALADIN-BG (5/105):

- horizontal resolution - 5 km (256x200 points)
- vertical levels - 105 (32 below 3 km)
- time step - 300 s
- forecast range - 72 h
- initial and boundary conditions from ARPEGE

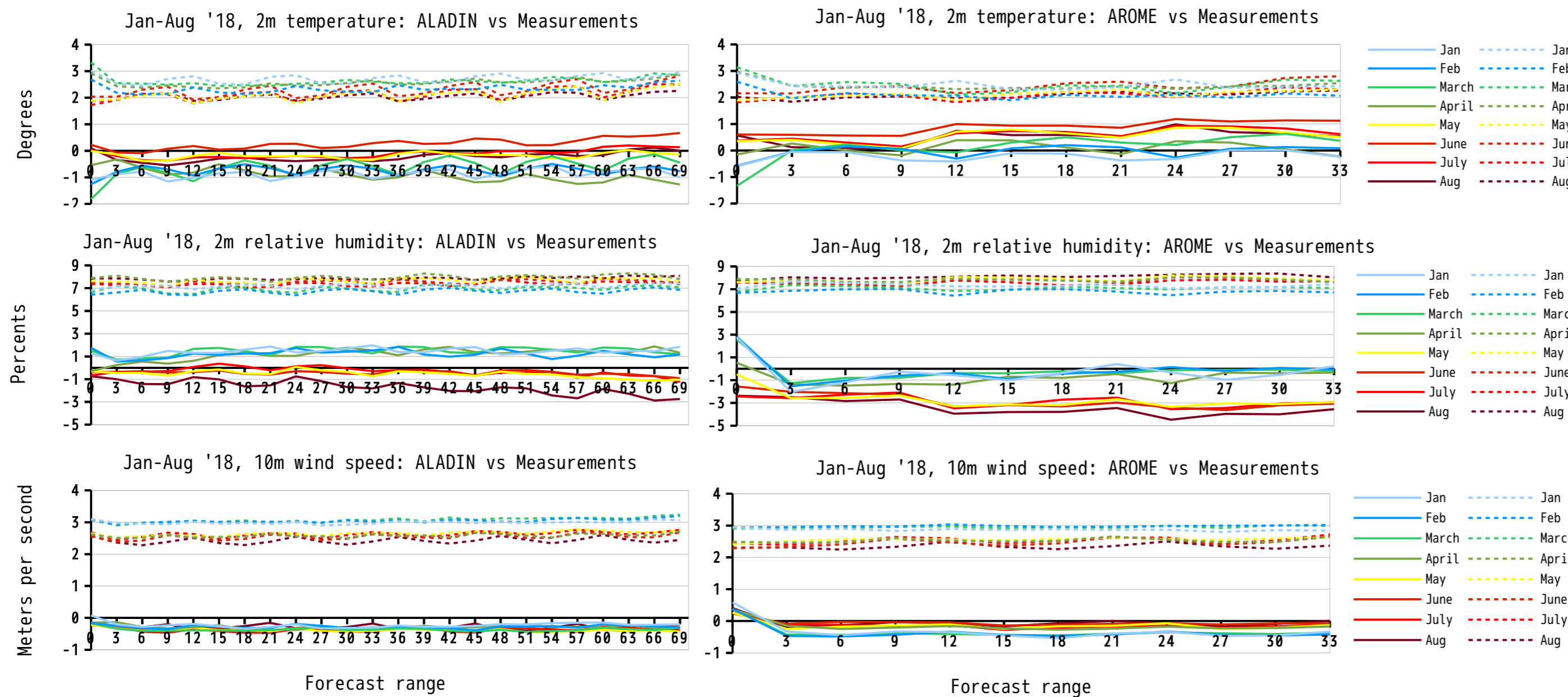


AROME-BG (2.5/60):

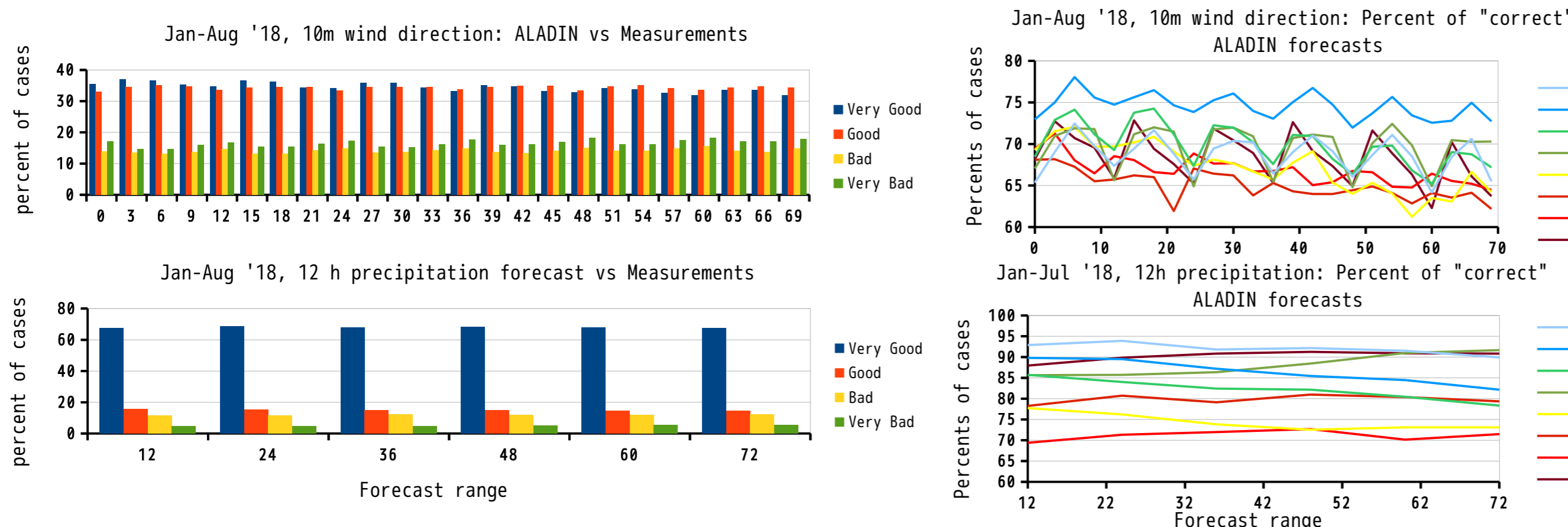
- horizontal resolution - 2.5 km (320x240 points)
- vertical levels - 60 (27 below 3 km)
- time step - 60 s
- forecast range - 36 h
- initial and boundary conditions from ALADIN-BG



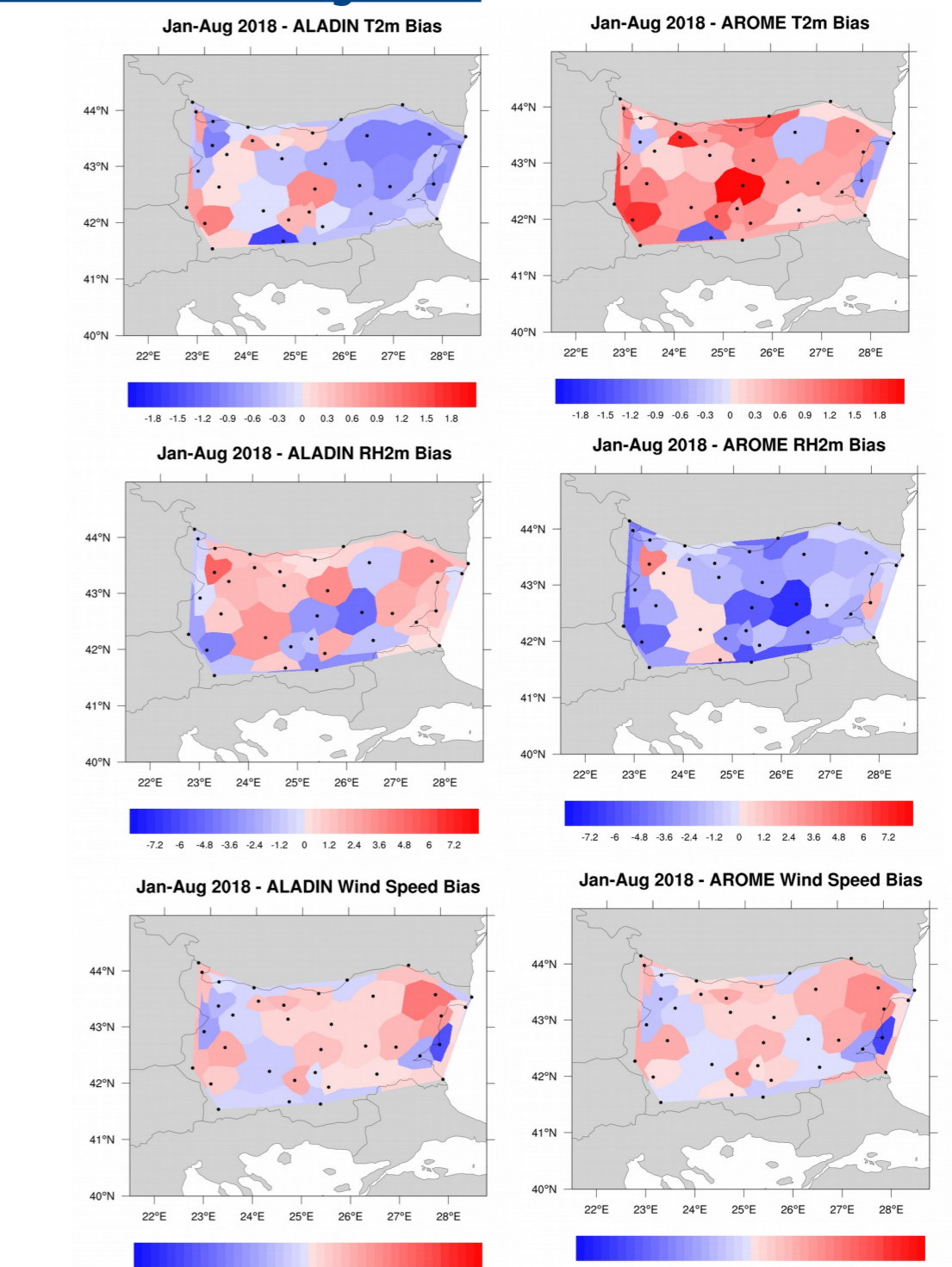
Forecast verification against surface measurements in SYNOP stations in Bulgaria



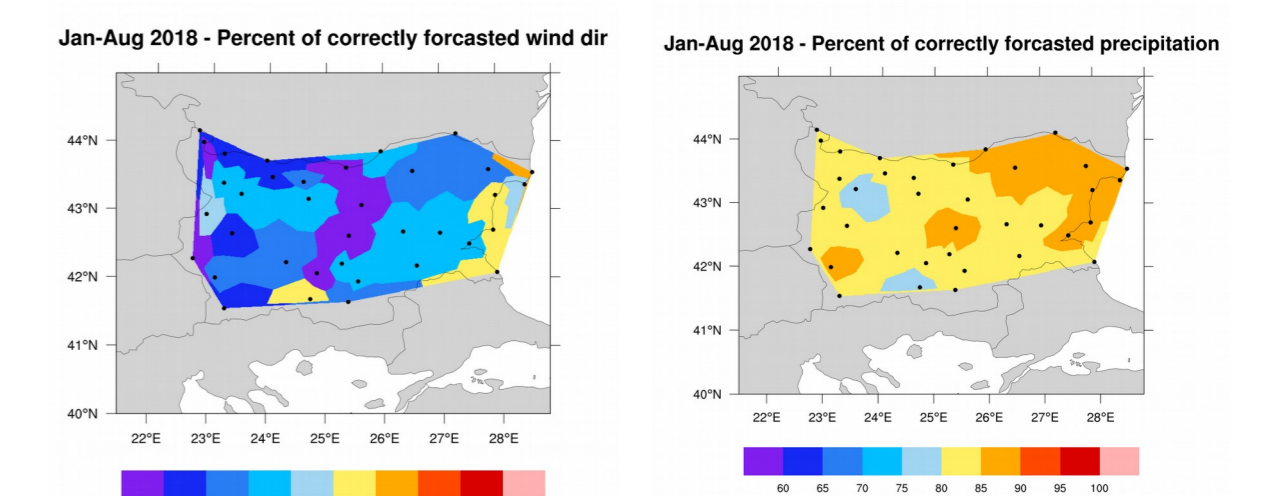
Mean monthly BIAS and RMSE for forecasted T2m, RH2m, and Wind10m by ALADIN-BG and AROME-BG for 06 and 18 UTC models runs



ALADIN-BG forecast for 10m wind direction and 12h total precipitation against measurements for 06 and 18 UTC model runs

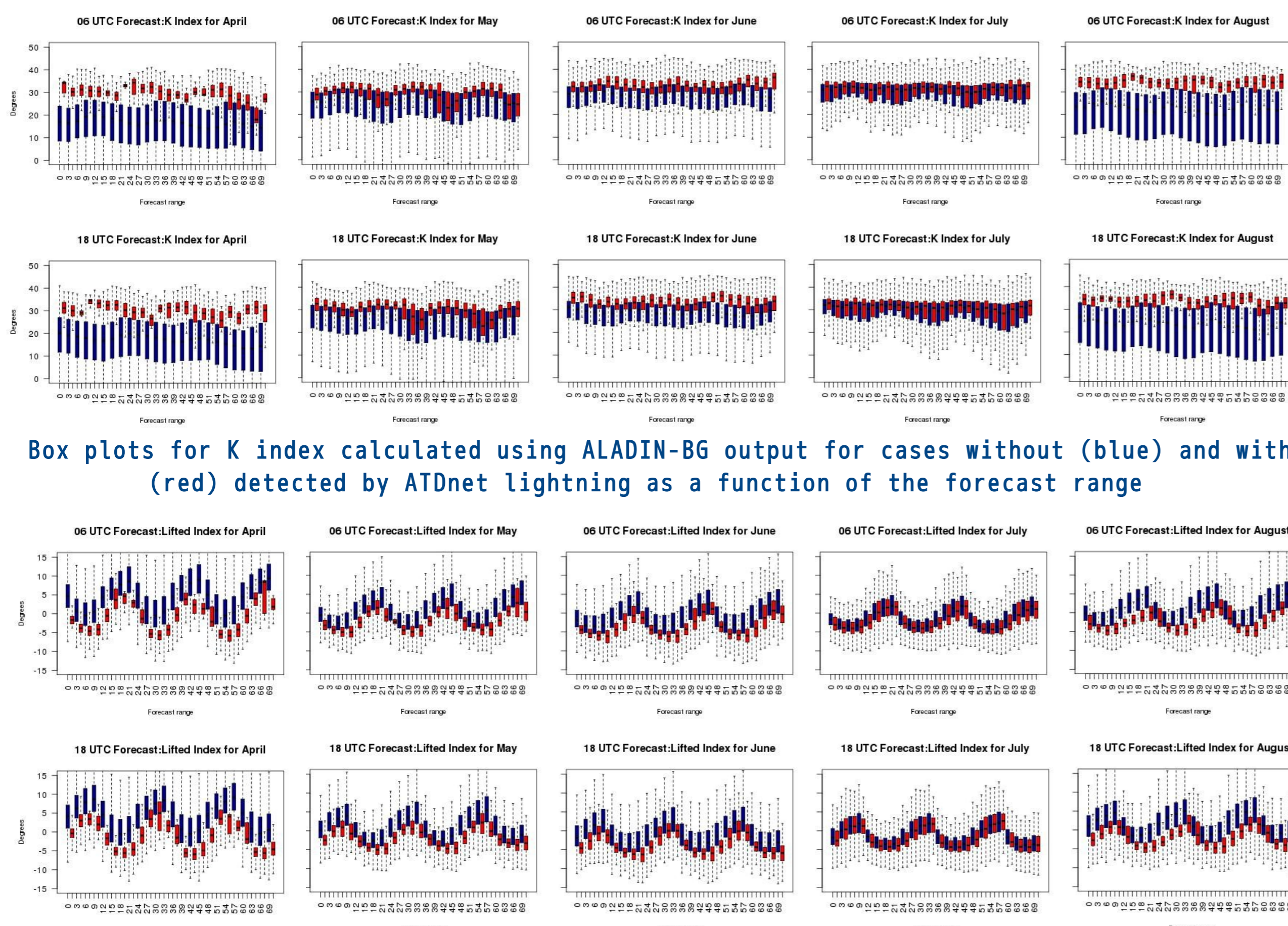


Spatial distribution of Mean BIAS for forecasted T2m, RH2m, and Wind10m by ALADIN-BG (left) and AROME-BG (right) for the period January-August, 2018



Spatial distribution of the percent of correctly forecasted by ALADIN-BG 10m wind direction (left) and 12h total precipitation (right) for the period January-August, 2018

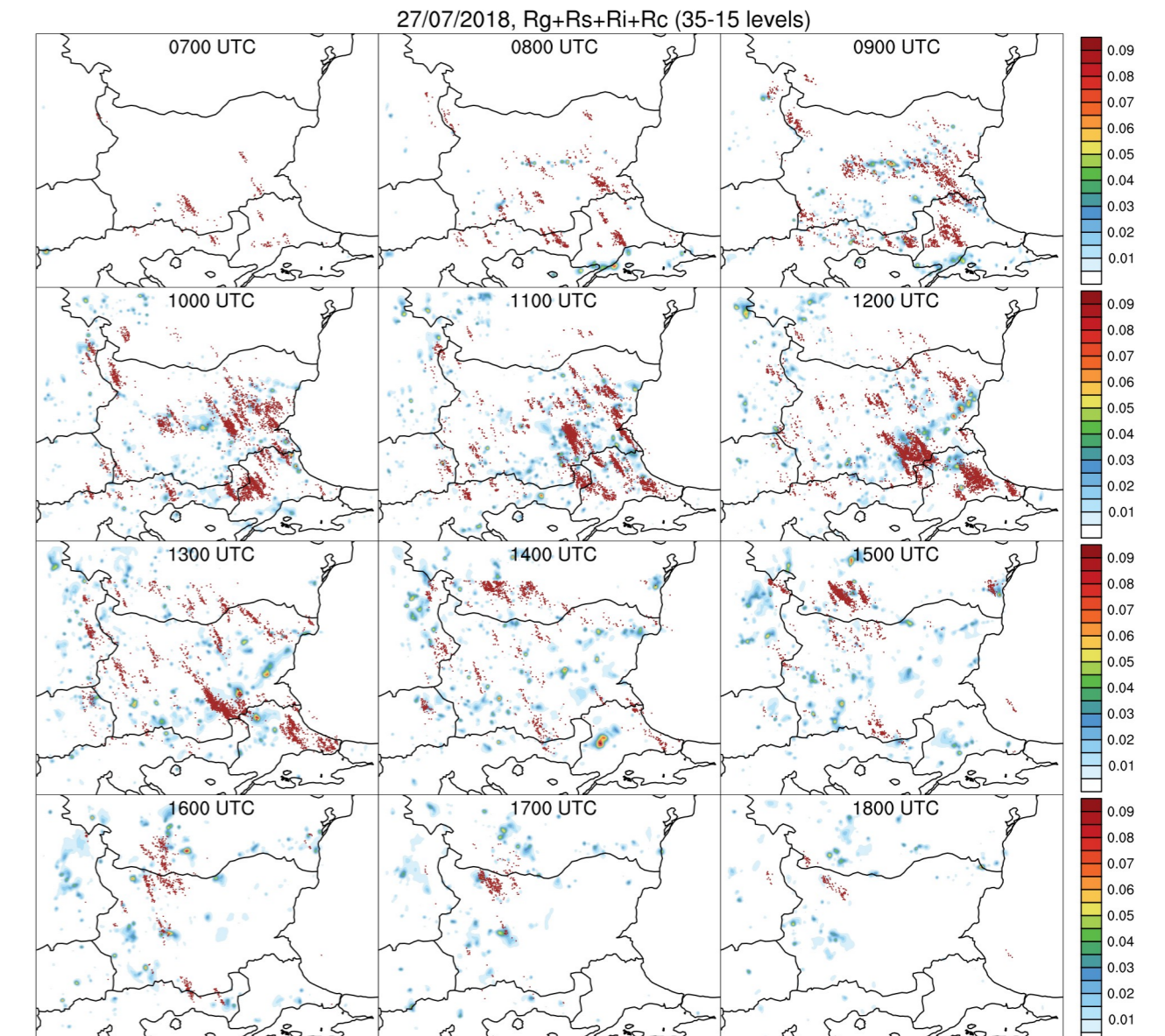
Atmospheric instability and some microphysical fields forecast against ATDnet lightning detection system data



Box plots for K index calculated using ALADIN-BG output for cases without (blue) and with (red) detected by ATDnet lightning as a function of the forecast range

Box plots for Lifted index calculated using ALADIN-BG output for cases without (blue) and with (red) detected by ATDnet lightning as a function of the forecast range

Having in mind that cloud electrification is mainly due to interactions between the different hydrometeors in the cloud, the forecasted by AROME-BG mixing ratios of Graupel, Snow, Ice crystals and Cloud water were considered to find a relationship with the detected flashes.



Forecast for the integrated between AROME-BG model levels 35 (~2756 m) and 15 (~10305 m) mixing ratios [kg/kg] of Graupel (Rg), Snow (Rs), Ice crystals (Ri) and Cloud water (Rc) for 27/07/2018 and the corresponding detected by ATDnet flashes