

## **New version of the seasonal forecast model at Hydrometcentre of Russia**

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The seasonal forecast model at Hydrometcentre of Russia is a version of the SL-AV model [1] with the resolution 1.125x1.40625 degrees lat-lon and 28 levels. It uses parameterizations of subgrid-scale processes developed in Météo-France and LACE consortium for ARPEGE/ALADIN NWP model. The seasonal forecast SL-AV model participated in SMIP2 project; also experiments were carried out using SMIP2/HFP protocol. The model produced reasonable fields in midlatitudes, however, the following drawbacks were noticed:

- Unrealistic high precipitation in tropics, wrong geographical distribution (lack of precipitation in continental tropics),
- T850 is too warm over Antarctica, too cold (by 2 degrees) over tropics,
- H500 is 30-40 m lower over tropics.

All this was attributed mostly to the absence of soil-vegetation-snow parameterization in the model version which participated in these experiments. In 2007, the ISBA parameterization [2] was implemented in the SL-AV model, including also soil freezing/melting according to [3] and the snow albedo parameterization [4]. First experiments have shown significant improvements for all the fields in the tropics, especially for precipitation. The seasonal prediction version of the SL-AV model was then further upgraded with the recent version of the shortwave and longwave radiation [5] developed by LACE consortium. This upgrade further improved tropical scores of H500 and T850.

The experiments according to SMIP2/HFP protocol were repeated with the new version of the model using 25 years of NCEP/NCAR reanalysis-2 data for all seasons. Each 4-month hindcast consists of 10-member ensemble. The model ensemble-mean data for the months 2 to 4 are averaged over 25 years and 4 seasons and compared with the corresponding data from reanalysis. The RMS error and bias for the old and new version of the model are given in Figs. 1 and 2 respectively. One can see that both error measures are improved, especially in tropics. Still there is a room for further improvement. Our work will include the increase of the vertical resolution and better account for ozone.

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### **References**

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**Averaged over 4 seasons and 25 years RMSE  
for seasonal hindcasts: H500, MSLP, T850, PRC  
(S20=90S ... 20S; N20=20N ... 90N; TR=20S...20N)**

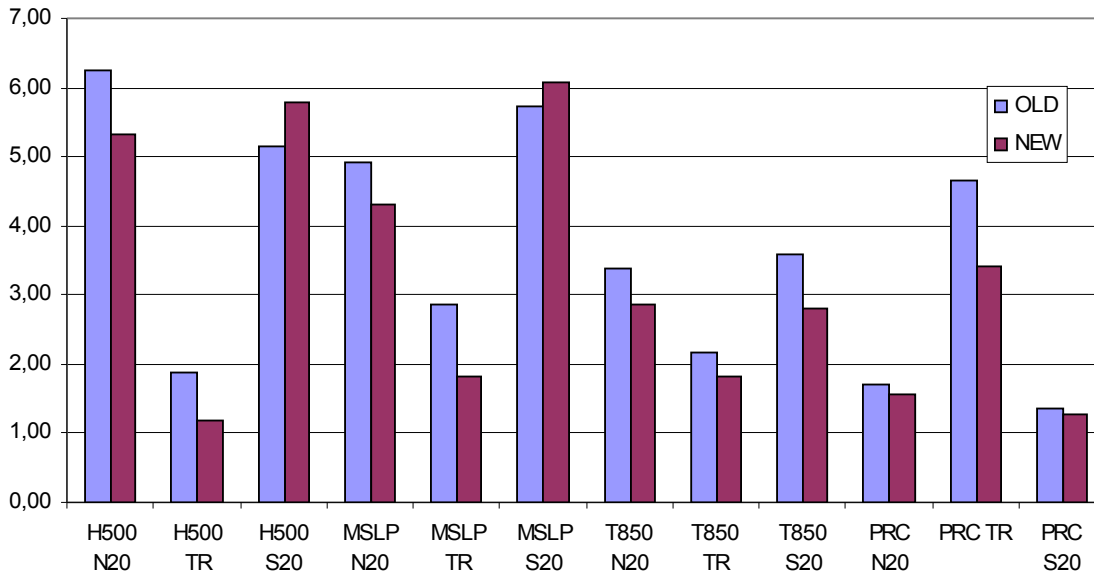


Fig. 1 RMS errors. Units: H500 – dam, MSLP – mb, T850 – K, PRC – mm/day.

**Averaged over 4 seasons and 25 years mean error  
for seasonal hindcasts: H500, MSLP, T850, PRC  
(S20=90S ... 20S; N20=20N ... 90N; TR=20S...20N)**

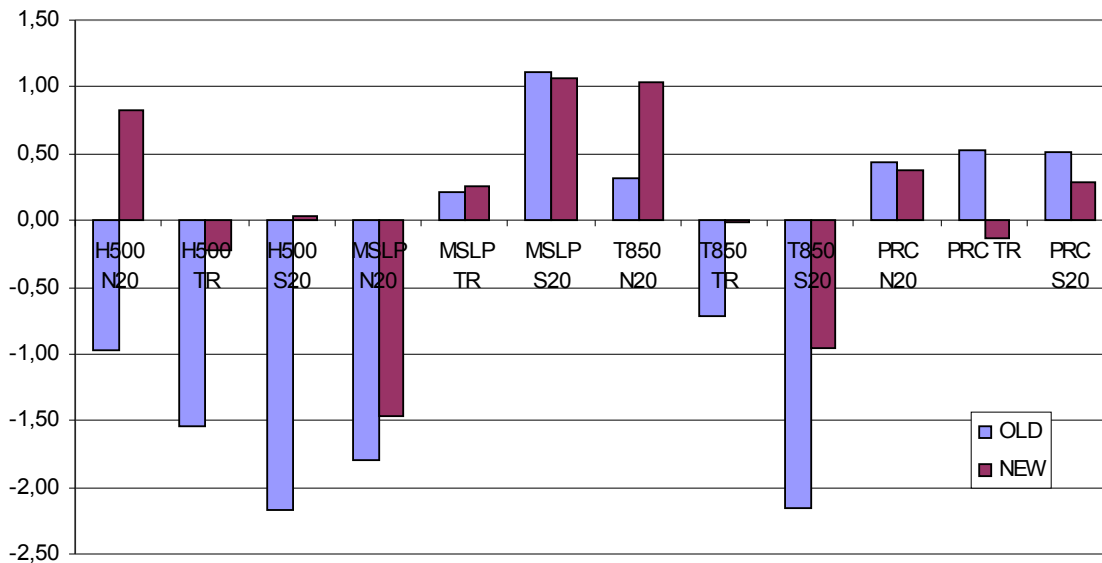


Fig. 2 Mean errors. Units: H500 – dam, MSLP – mb, T850 – K, PRC – mm/day.