



## **Eta vs Sigma: Forecasts of extreme precipitation in parts of the Balkans in May 2014 using the Eta regional model**

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This research discusses the influence of selecting the vertical coordinate of the Eta model in order to forecast extreme rainfall. The question that needs to be answered is whether the forecasting / simulation of extreme precipitation by the Eta model is a better running model switched to sigma coordinate or switched to eta coordinate with the sloping steps.

The real-life situation which has been chosen for the comparison of forecasts is from May in 2014, when on the territory of Serbia and Bosnia and Herzegovina and Croatia had been observed the record levels of rainfall, which led to heavy flooding causing human victims and great material damage. The start time of the Eta model is determined so that the highest observed rainfall occurs in the fourth and fifth day of the forecast (that is between the 78th and the 126th hour of the forecast).

The forecasted amount of precipitation for the days of extreme rainfall is verified by observations of daily precipitation amount on the territory of Serbia, Bosnia and Herzegovina and Croatia. The calculated scores are the Mean Error, the Root Mean Square Error, the Equitable threat score and the Bias score. The last two scores are calculated both for the three selected categories of precipitation (higher than 25, 50 and 70 mm/24 h) and for daily precipitation threshold increased from 1 to 60 mm.

The results of the experiment show that in the considered case of extreme precipitation the forecast of the daily precipitation has been more successfully predicted by running the Eta model switched to eta and to sigma coordinate, especially for the day when the most intense precipitation had been observed. In general, the skill of the Eta forecasts increases with the increasing lead time.