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Very high precipitation amounts in western Slovakia at the beginning of September 2018

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In my contribution, I made a research of cold front during September 1st and 2nd in 2018, when extremely high precipitation amounts occurred in western Slovakia. The mentioned cold front was associated with the low centered above northern Italy. During the analysis I focused on comparing outputs from two forecasting models: ALADIN and ECMWF. I analyzed the situation in terms of precipitation amount and area, where the highest amounts were predicted. More accurate forecast of precipitation amount for this cold front was calculated by ALADIN model, which predicted twice as much precipitation amount as ECMWF model did. However, prediction of area with the highest precipitation amount was not calculated well by either model. Over most of western Slovakia 35 to 60 mm of precipitation in 24 hours (until 2nd September 6 UTC) was observed during the first of September. The highest amounts were about 80 mm. High amounts were observed here also next day, when 35 to 62 mm of precipitation, however not more than 71 mm, fell on half of western Slovakia. During these two days, the highest total amount of precipitation was in Siladice (126.2 mm) and in Jaslovské Bohunice (123.9 mm). It is worth mentioning that the mean monthly amount of precipitation for September over western Slovakia is 40 to 50 mm. The errors that occurred in the ECMWF model forecast compared to the ALADIN model are mainly because of the fact that the ALADIN model as a local Slovak model has a better resolution (4.5 km) than the global ECMWF model (10 km). Very important in this context is also orography, which is relatively rugged not only in Slovakia, but within Central Europe – therefore just ALADIN model calculated better prediction, especially for precipitation amount. The prediction of the position of the cold front, which in such an environment is surging (in some parts of front temporary opposite movement), is very difficult and even a small difference in the calculation of its position can produce very different results over a smaller area.