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Predictability of precipitation type based on ECMWF ensemble forecasts

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Successful forecasts of precipitation is quite challenging task of the numerical weather prediction. Forecast of precipitation type is especially difficult as it is very changeable in space and time. Last few decades statistical post-processing methods were only applied beside the experience of the operational forecasters. As a consequence of intensive developments on numerical weather prediction models precipitation type is directly calculated in physical processes of the model. In ECMWF IFS model rain and snow has been separated since 2010. Due to some other developments six different types of precipitation (rain, snow, freezing rain, wet snow, snowy rain and ice pellet) have been distinguished in operational model since May 2015. During forecast of precipitation type ensemble technic is especially important as we can get useful information about probability of dangerous meteorological phenomena.

At the end of 2015 in Hungarian Meteorological Service we developed a new meteogram product, showing the temporal evolution of the instantaneous precipitation type probabilities for a specific location. In our current work we aimed to do comprehensive investigation of ensemble precipitation forecasts. We studied the potential benefit of using ensemble forecasts compared to deterministic one. We had an attention on relationship of precipitation type and other meteorological variables too. As precipitation type forecast has been available since May 2015 in ECMWF MARS archive three winters (2015/16, 2016/17 and 2017/18) were studied. Deterministic and ensemble verification was applied for all available locations of the Hungarian high density observation network. Usefulness of this type of forecasts is illustrated for a very intensive freezing rain situation occurred at 17 March 2018.