VERIFICATION OF ENSEMBLE PRECIPITATION FORECASTS FOR HYDROLOGICAL MODELLING IN THE CZECH REPUBLIC

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Introduction:
Hydrological forecast system in the Czech Republic is operated by the Czech Hydrometeorological Institute (CHMI). Outflow is predicted by two models, AquaLog and HYDROG. The hydrological forecast is generated for one hundred river profiles in 48h lead time. Precipitation forecast is a key model input and also the most significant source of the forecast uncertainty. Nowadays the ALADIN-CZ high resolution precipitation forecasts are used. Rainfall forecasts are aggregated into 37 areas (see fig. A) over the Czech Republic. This pre-processing simplifies the model outflow computation and reduces uncertainty in the spatial distribution of rainfall [1]. This study aims at assessment of potential added value of ALADIN-LAEF forecast ensemble in comparison with deterministic model ALADIN.

Methodology:
- The most significant rainfall events from summer seasons 2011-2015 were determined by applying Universal Soil Loss Equation methodology [2]
- The observed and forecasted data were aggregated over each of the 37 regions. For hydrological models AquaLog and HYDROG are data pre-processed in the same way
- For the verification following metrics were used: RMSE, ETS, Frequency Bias Score, Correlation Coefficient
- All ensemble members, ensemble mean (MEAN), ensemble median (MEDIAN), ensemble control forecast (CF) and ALADIN-CZ were verified

Results:
- In the case of RMSE, the lowest value was found for ensemble member E7, MEAN, MEDIAN and CF. Between regions the best value was found for region “m”. Models E16 and ALADIN had the largest error, especially for region “a” (fig. 1-4.)
- In the case of ETS the most successful was the member E2 and MEAN, and region “O”. The worst results gave model E16 again in region “n” (fig. 5-9.)
- All models tend to underestimate rainfall amounts
- Ensemble MEAN performed best in the most cases. Especially in comparison with ALADIN, which is currently used for hydrological forecast models
- Some hydrological areas are problematic for rainfall forecasting (see fig. 1., 5.)

Outlook:
- Development and verification of effective post-processing methods for hydroperspective