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Ensemble forecast post-processing over Belgium: Comparison of deterministic-like and ensemble regression methods

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A comparison of the benefits of post-processing ECMWF ensemble forecasts based on a deterministic-like and a regression technique is performed for Belgium. The former is a Linear Model Output Statistics technique (EVMOS) recently developed to allow for providing an appropriate ensemble variability at all lead times (Vannitsem 2009) and the latter is the Non-homogeneous Gaussian Regression, NGR, (Gneiting et al, 2005). The training of the post-processing techniques is based on the reforecast dataset of ECMWF which covers a period from 1991 to 2007. The EVMOS approach is mainly providing a correction of the systematic error and does not enhance substantially the spread of the ensemble. The application of the NGR method provides an ensemble which encompasses the observations, unlike the EVMOS scheme. However, by taking into account the observational error, the analysis suggests that the ensemble based on the EVMOS post-processing scheme is also found to be consistent. This apparent contradiction is clarified and it turns out that both schemes are valuable depending on the specific purpose, the evaluation of the uncertainty of large scale flows or the downscaling of the temperature uncertainty at the level of the local observations.