# Simultaneous Ensemble Post-Processing for Multiple Seasons and Lead Times with GAMLSS

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Ensemble forecasts show strong seasonal variability in their error characteristics, especially in complex terrain such as the Alps. Often statistical ensemble post-processing models are adjusted to this seasonal variations by regular refitting, which is computationally expensive and might not use all available data most efficiently. Therefore this study proposes to fit one overall post-processing model for all seasons. The generalized additive model for location, scale and shape (GAMLSS) framework is employed which is similar to the well known non-homogeneous Gaussian regression but allows nonlinear variations of the model parameters. Additionally, with GAMLSS it is also possible to combine different lead times in one model, which can further reduce the computational costs. Results for temperature forecasts in the Eastern Alps show that the proposed method has a similar or even better forecast skill than conventional NGR with refitting.