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## Remember the past: A comparison of time-adaptive training schemes for non-homogeneous regression

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Non-homogeneous regression is a frequently-used post-processing method for increasing the predictive skill of probabilistic ensemble weather forecasts. To adjust for seasonally varying error characteristics between ensemble forecasts and corresponding observations, different time-adaptive training schemes, including the classical sliding training window, have been developed for non-homogeneous regression. This study compares three such training approaches with the sliding-window approach for the application of post-processing near-surface air temperature forecasts across Central Europe. The predictive performance is evaluated conditional on three different groups of stations located in plains, in mountain foreland, and within mountainous terrain, as well as on a specific change in the ensemble forecast system of the European Centre for Medium-Range Weather Forecasts (ECMWF) used as input for the post-processing.

The results show that time-adaptive training schemes using data over multiple years stabilize the temporal evolution of the coefficient estimates, yielding an increased predictive performance for all station types tested compared to the classical sliding-window approach based on the most recent days only. While this may not be surprising under fully stable model conditions, it is shown that "remembering the past" from multiple years of training data is typically also superior to the classical sliding-window when the ensemble prediction system is affected by certain model changes. Thus, reducing the variance of the non-homogeneous regression estimates due to increased training data appears to be more important than reducing its bias by adapting rapidly to the most current training data only.