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# Towards operational post-processing of probabilistic temperature forecasts at MeteoSwiss

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Accurate temperature forecasts are relevant for multiple end-user applications, ranging from laypeople planning leisure activities, to public authorities and private companies such as in the energy sector. Even though operating at increasingly high spatial resolution, state-of-the-art numerical weather prediction (NWP) models exhibit systematic biases. These biases are often due to unresolved processes and can be large in particular in regions of complex topography such as the Swiss Alps. To quantify inherent forecast uncertainty, ensembles of forecasts are generated. However, NWP ensembles tend to be under-dispersed, especially in the near-term. Statistical post-processing (PP) methods are commonly applied to address the above weaknesses in direct NWP model output, and allow to generate end-user compatible products.

Within the framework of a recently initiated project, MeteoSwiss is developing a post-processing suite that will facilitate a multi-variable (i.e. temperature, precipitation, wind and cloud cover), spatial and probabilistic PP of high-resolution (COSMO-1/COSMO-E) and global NWP (ECMWF IFS) for the territory of Switzerland.

We illustrate that approach with a probabilistic temperature forecasts, and discuss recent advances and experiences at applying and operationalizing state-of-the-art PP methods (non-homogenous Gaussian regression; EMOS) at the station-scale. It is shown that PP leads to a substantial improvement of NWP forecasts by up to 60%, most prominently in mountainous terrain. Remaining biases and comparison to available methods such as MOSMIX of DWD indicate that including additional suitable predictors may further enhance forecast quality. We proceed by discussing first attempts to produce spatial fields by applying a PP to to gridded INCA-analysis fields at 1km resolution as a target and the utilization of multiple model sources (such as COSMO-1/E and ECMWF-IFS) with different but overlapping integration time to produce a seamless multi-model product.