EMS Annual Meeting Abstracts
Vol. 16, EMS2019-214-1, 2019

Towards operational postprocessing of probabilistic cloud cover forecasts at MeteoSwiss

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Accurate forecasts of cloud cover are increasingly important for a wide range of end-users. For instance, solar energy production, tourism, and aviation are highly affected by cloudiness. Furthermore, cloud cover strongly interacts with other weather variables with the moderating effect on the diurnal cycle of near surface temperature as a prominent example. Even high resolution state-of-the-art numerical weather prediction models (NWPs) typically lead to raw ensemble forecasts that tend to be biased and underdispersed. Switzerlands' geographical location additionally impairs cloudiness NWP direct model output (DMO) provided by COSMO-E and the IFS-ENS of ECMWF. On the one hand low stratus over the Swiss Plateau during situations of winter inversion are represented poorly by DMO. And on the other hand even the high resolution COSMO-E ensemble is not able to resolve small-scaled cloud patterns over complex alpine terrain. Hence, statistical post-processing is needed in order to estimate predictive uncertainty, improve reliability, and as a result also increase forecast skill.
Within the framework of a postprocessing project at MeteoSwiss , we are developing a method to obtain postprocessed predictions of cloud cover for arbitrary locations in Switzerland. Methodologically, we start from ensemble model output statistics like models that are suitable for postprocessing of the bounded variable of cloud cover. As ground based cloud cover observations are rather scarce, the training of the statistical model is based on EUMETSAT CM SAF satellite data. Since the satellite observations are available only at a rather coarse resolution, they may not be suitable for estimation and verification of statistical postprocessing models over complex terrain. Therefore, the verification data set will potentially be augmented by ground based observations. Further a correct representation of the spatial dependence structure of cloud cover is key for obtaining realistic forecast scenarios. In a first step spatial consistency is ensured by applying empirical copula based approaches like ensemble copula coupling and the Schaake shuffle.