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Probabilistic fog forecasting with COSMO model

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The forecast of visibility is a complicated task, due not only to the different methods implemented in NWP models but also to the lack of data that makes very difficult an objective comparison between forecast and observations. In the framework of SRNWP-EPS II Programme, three new implementation methods, namely Boudala method, Zhou method and liquid water content (LWC) method, are used with COSMO model to assess the visibility field in the Po Valley region for a number of cases corresponding to different meteorological situations that led to the formation of either radiation or advection fog.
The results obtained for this geographical area are quite different, depending on the method used for the calculation of visibility field. In particular, a qualitative comparison of the forecasts with some observation data deduced by Metar reports and satellite imagery shows that Boudala method (and, to a less extent, LWC method) seems to provide more realistic fields for the different case studies. On the other hand, the Zhou method tends to produce only some small but very foggy areas, with visibility values below 50 meters, which are not observed. Some tuning of this latter method is also tested to improve the forecast skill.
Ensemble applications at different horizontal resolutions are also presented to investigate the possibility to generate probabilistic forecast of visibility on a quasi-operational basis with COSMO-based ensemble systems.