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Deterministic and fuzzy verification of the cloudiness of High Resolution operational models

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The brightness temperature (BT) observed by the Infrared channel of SEVIRI, present in Meteosat 9 is used to verify the forecast qualities of 2 high resolution models Aladin (horizontal mesh 10 km) and Arome (2.5 km) operational in Meteo-France. The observed temperatures are directly related to the atmosphere cloudiness and their forecasted counterparts are obtained through the radiative transfer model RTTOV. The temporal period used for the comparison is summer and autumn 2008.

2x2 tables of contingences are built for different thresholds (defining the events) covering the range data and used to compute deterministic scores. A fuzzy approach is performed by transforming the deterministic forecast in frequencies of events in a neighbourhood around the observation point. Brier skill scores against the persistence forecast are obtained by comparing theses frequencies either to the local yes or no observation or to the observed frequency in the neighbourhood (Amodei and Stein 2009).

The stratification of the results in function of BT allows to document the relative merits of the forecasts all along the troposphere. Thus, it is shown that both models under-estimate the real BT by lack of cloudiness and especially the Arome model for large scale perturbations. Moreover, the high-tropospheric clouds are quasi-absent in the Aladin forecasts and Arome bias is better for this category in convective situations but its clouds are often displaced leading to poor deterministic scores. This drawback is corrected by the fuzzy approach and its probabilistic scores beats the Aladin counterparts. This conclusion is in complete accordance with the verification of the precipitation performed over the same period.