



Persistency as a reference in determining rare event forecasting skill

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In this work skill score with persistency forecasting as a referent model (SSp) is defined using several verification measures such as accuracy, critical success index, polychoric correlation coefficient and other widely used skill scores (Heidke skill score, SEEPS, etc.). Persistency forecasting used in determining skill, unlike random chance, gains from information of current weather. Question that needs to be answered is: will SSp appropriately describe skill of rare event forecast?

Score SSp is tested at climatologically different locations on daily cumulative precipitation forecasts of two numerical models:

- ALADIN (Aire Limitée Adaptation Dynamique développement InterNational) regional model with 8 km horizontal resolution
- ECMWF (European Centre for Medium-Range Weather Forecasts) global model with 0.25° grid spacing.

Precipitation is considered as a categorical predictand with three categories: dry, light and heavy precipitation. Dry category dominates the contingency table, while heavy precipitation is considered as rare event.

Skill score defined in this way inherits characteristics of original measure (M) that is used to create it, but it has lower value than M. Difference between SSp and M enlarges if average M value reduces or if value of original measure for persistency forecasting (P) enlarges. The latter is important because P is high for climatologically frequent categories such as dry weather, but low for rare event categories. This way correct forecasting of rare event is rewarded more than correct forecasting of common event. Including information about current weather in determining skill efficiently reduces sensitivity to climatological probability of defined categories. Consequently, SSp appropriately describes the skill of rare event forecasting and should be used for evaluation, validation or intercomparison of different numerical and physical schemes.