EMS Annual Meeting Abstracts
Vol. 15, EMS2018-551, 2018

Preliminary analysis of binary distance metrics used for verification of precipitation forecasts

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A common problem encountered in many precipitation forecasts is an offset in the predicted position of a precipitation relative to where it actually occurred. In the recent decade and a half, a range of new spatial verification metrics have been developed. A special case of the spatial verification metrics are binary distance metrics which provide a direct measure of spatial displacement of precipitation in the forecast. The use of spatial displacement as a verification measure is very appealing for forecast interpretation since it is easy to understand and mimics how we tend to judge fields by eye. However, their behavior has, so far, not been studied or inter-compared in a comprehensive enough manner. In this study the behavior of some of these metrics is analyzed using a set of idealized geometric test cases that are being prepared as part of the MesoVICT project (Mesoscale spatial forecast Verification Inter-comparison over Complex Terrain) as well as some other idealized setups. The main goal is to gain some basic understanding of how the metrics behave in certain situations and highlight the differences in the results they provide. Three metrics were analyzed, Mean Error Distance (MED), Baddeley's delta (BDEL) and Fractions Skill Score displacement (dFSS). Results show that oftentimes the three metrics will provide similar results that tend to be in line with a subjective evaluation of the precipitation fields. However, some situations exist when the metrics provide quite different results for the same input fields. This shows that special care needs to be taken when interpreting the results provided by these metrics.