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High-resolution gridded forecasts brought on a new set of challenges for evaluating their performance in part because of the over accumulation of small-scale errors and the double-penalty problem, but also the challenge of summarizing the wealth of detail that became available, which highlighted the need for more diagnostic information about how a forecast went wrong. Many new verification methods, generally called spatial verification, were developed rapidly and they range from incredibly complex to fairly simple. Operationally, it can be prohibitive to employ some of the more complicated methods. One type of method focuses primarily on how well the patterns of the forecast match those of the analysis, while informing about intensity only indirectly via a thresholding procedure whereby values of the field below the threshold are set to zero (and those above set to unity thereby creating a binary field). Such methods have been called by different names, such as distance-based and distance-map because of their focus on distances between these binary sets. Here, I use the term spatial dissimilarity methods. They can be employed as overall summaries of forecast performance in and of themselves, or within a more complicated framework. They are, for example, used within the Method for Object-based Diagnostic Evaluation (MODE) approach. These methods are particularly useful for cloud forecasts. They are also practical from an operational standpoint as they are computationally efficient and provide very brief summaries of the overall spatial similarity between the forecast and the analysis grids. Of course, such terse summaries also mean the loss of information, so that no one summary is practically useful. Here, I give an overview of the more common spatial dissimilarity measures, as well as some new ones that are specifically designed to address certain issues with the older ones. I also compare these methods on contrived geometric cases designed to test the methods for specific challenges and inform users about how each method handles (or doesn't handle) various situations.
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