Robustness of serial clustering of extra-tropical cyclones to the choice of tracking method

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Cyclone families are a frequent synoptic weather feature in the Euro-Atlantic area in winter. Given appropriate large-scale conditions, the occurrence of such series (clusters) of storms may lead to large socio-economic impacts and cumulative losses. Recent studies analyzing Reanalysis data using single cyclone tracking methods have shown that serial clustering of cyclones occurs on both flanks and downstream regions of the North Atlantic storm track. This study explores the sensitivity of serial clustering to the choice of tracking method. With this aim, the IMILAST cyclone track database based on ERA-interim data is analysed. Clustering is estimated by the dispersion (ratio of variance to mean) of winter (DJF) cyclones passages near each grid point over the Euro-Atlantic area. Results indicate that while the general pattern of clustering is identified for all methods, there are considerable differences in detail. This can primarily be attributed to the differences in the variance of cyclone counts between the methods, which range up to one order of magnitude. Nevertheless, clustering over the Eastern North Atlantic and Western Europe can be identified for all methods and can thus be generally considered as a robust feature. The statistical links between large-scale patterns like the NAO and clustering are obtained for all methods, though with different magnitudes. We conclude that the occurrence of cyclone clustering over the Eastern North Atlantic and Western Europe is largely independent from the choice of tracking method and hence from the definition of a cyclone.