



Serial clustering of intense European storms

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It is investigated how clustering of wintertime extra-tropical cyclones depends on the vorticity intensity of the windstorms, and the sampling time period over which storm transits are counted. Clustering is characterised by the dispersion (ratio of the variance and the mean) of the counts of eastward transits of storm tracks obtained by objective tracking of 850hPa vorticity features in NCEP-NCAR reanalyses. The counts are aggregated over non-overlapping time periods lasting from 4 days up to 6 month long October-March winters over the period 1950-2003. Clustering is found to be largest in the exit region of the North Atlantic storm track (i.e. over NE Atlantic and NW Europe). The dispersion increases considerably for more intense storms and quasi-linearly with the logarithm of the length of the aggregation period. The increases and the sampling uncertainties in dispersion can be reproduced using a Poisson regression model with a time-varying rate that depends on large-scale teleconnection indices such as the North Atlantic Oscillation, the East Atlantic Pattern, the Scandinavian pattern, and the East Atlantic/West Russia pattern. Increased clustering with storm intensity and aggregation period has important implications for the accurate modelling of aggregate insurance losses.