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Estimating worst-case European windstroms, and worst-case seasons, using seasonal forecasts.

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Windstorms pose continual risk to Europe. Among their associated hazards, strong near-surface winds can be particularly damaging, threatening infrastructure, life and billions of pounds in insured losses. Insurers (and reinsurers) therefore need to prepare for the potential cost of extreme windstorms. Storm severity indices (SSIs) have been developed to quantify the potential losses associated with windstorm winds. Here, the most extreme windstorms that could potentially occur in the current climate are estimated using seasonal forecast data together with a cyclone-tracking algorithm, and their potential losses quantified using an SSI. As maximum wind gusts, the typical input variable for SSIs, are not available in the seasonal forecast dataset, a method is developed to calculate SSIs using wind speed data and a bias correction used to convert to SSI values representative of those obtained when calculated using wind gusts. Nearly 700 extended winter seasons of forecast data are analysed, representing a much larger sample of potential windstorms compared to that available from reanalysis or observational products. The storm track is reasonably well represented in the seasonal forecast data: spatial features are similar to those in a reanalysis, but there exists a slight poleward bias and underestimation of number of storms per season (maximal underestimation of around 10%). Additionally, distributions of SSI values for several countries in Europe are similar in the forecast data and reanalysis. Together, these suggest that the seasonal forecast data is suitable for analysing windstorm statistics and informing on potential extreme storms. We give estimates of worst-case storms, and worst-case seasons, that are identified in the forecast data and compare to those seen in a reanalysis, highlighting the potential insurance loss implications.