



The contribution of sting-jet windstorms to extreme wind risk in the North Atlantic

Neil C. Hart (2), Suzanne L. Gray (1), and Peter A. Clark (1)

(1) University of Reading, Department of Meteorology, Reading, Berks., United Kingdom (s.l.gray@rdg.ac.uk), (2) School of Geography and the Environment, University of Oxford, United Kingdom

Windstorms are a major winter weather risk for many countries in Europe. These storms are predominantly associated with explosively-developing extratropical cyclones that track across the region. A substantial body of literature exists on the synoptic-scale dynamics, predictability and climatology of such storms. More recently, interest in the mesoscale variability of the most damaging winds has led to a focus on the role of sting jets in enhancing windstorm severity.

We present a present-era climatology of North Atlantic cyclones that had potential to produce sting jets. Considering only explosively-developing cyclones, those with sting-jet potential are more likely to have higher relative vorticity and associated low-level wind maxima. Furthermore, the strongest winds for sting-jet cyclones are more often in the cool sector, behind the cold front, when compared with other explosively-developing cyclones which commonly have strong warm-sector winds too. The tracks of sting-jet cyclones, and explosively-developing cyclones in general, show little offset from the climatological storm track. While rare over Europe, sting-jet cyclones are relatively frequent within the main storm track with up to one third of extratropical cyclones exhibiting sting-jet potential. Thus, the rarity and, until recently, lack of description of sting-jet windstorms is more due to the climatological storm track location away from highly-populated land masses, than due to an actual rarity of such storms in nature.