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Atmospheric Extreme Events in the North Atlantic Region

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An important part of European weather and climate are storms. European winter storms cause economic damage and insurance losses on the order of billions of Euro per year. European winter storms rank as the second highest cause of global natural catastrophe insurance loss. Many of these hazard events are not independent; for instance, severe storms can occur in trains of storms. Recent examples of such subsequently occurring storms include January 2008 (Paula and Resi) and March 2008 (Emma, Johanna and Kirsten). Each of these trains of storms caused damages on the order of $\sim$€bn.

Extreme value statistics are based on the premise that extreme events are iid but this is rarely the case in natural systems where extreme events tend to cluster. Thus, no account is taken of memory and correlation that characterise many natural time series; this fundamentally limits our ability to forecast and to estimate return periods of extreme events.

In my presentation I will discuss two possible causes of this clustering: (i) The propensity of extreme events to depend on large-scale circulation regimes and (ii) the long-range correlation properties of surface windspeeds enhances the likelihood of extreme events to cluster. These two characteristics affect the return periods of atmospheric extreme events and thus insurance pricing.