

Variability of the Impacts of European Winter Windstorms

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Is this a CASE studentship? YES

If so, please state intended CASE partner: Risk Prediction Initiative

Introduction:

European winter windstorms caused by extratropical cyclones can cause billions of euros of damage. When a favorable large-scale flow pattern sets up, repeated strikes by landfalling cyclones can be catastrophic to insurance and re-insurance companies. Such was the case in the winter of 1989–1990 when 8 consecutive storms hit Europe and later in 1999 when two large cyclones Lothar and Martin occurred within 36 hours of each other, killing 140 people and producing damages of 10 billion euro.

The Risk Prediction Initiative and the Oasis Loss Modelling Framework is seeking a collaborative project to develop a loss simulation model based on the Oxford Probabilistic European Winter Windstorm Event Set (OxPEWWES), developed by Neil Massey and Myles Allen of Oxford University. OxPEWWES was developed under partial RPI funding to provide a dataset for the exploration of variability of European winter windstorm variability in a probabilistic framework. It is a natural fit for an open-source loss simulation framework such as Oasis. To fully exploit the event set for societal benefit, the next step will be to find appropriate vulnerability curves and exposure datasets that may enable to simulation of impacts (specifically economic damage or insured losses).

Project Summary:

The successful candidate will:

- Source or develop a set of vulnerability/damage curves based on European winter wind storm events, and calibrate the damage curves with OxPEWWES data,
- Integrate the event set and damage curves into a damage model, and implement the simulation of losses in the Oasis Loss Modelling Framework,
- Examine the output to test sensitivities, assess uncertainty, and determine the effect of climate variability (e.g. North Atlantic Oscillation) on simulated losses.

This work would entail collaboration with the reinsurance industry representatives connected via Oasis LMF and the Risk Prediction Initiative at the Bermuda Institute of Ocean Sciences.

Later stages of this project may entail the scope to work on other/related event sets and damage curves for different regions and/or hazards (e.g. flood).

This project is ideal for students who want to be challenged and to develop a range of skills including theory, observations and modeling. Ideally, students should be comfortable and confident in computer programming. Your background can be in meteorology, atmospheric science, physics, mathematics, statistics, economics, political science, computer science, or a related field. The successful candidate will be expected to spend several weeks each year at the offices of RPI, Oasis LMF and/or their Member companies in the risk transfer industry.

This project provides an excellent opportunity to work at the cutting-edge of interdisciplinary research, understanding our limits of predictability of windstorms and their societal and economic impacts. Upon graduation with your PhD, the successful candidate will have gained useful work experience, developing skills that can be used in a wide range of careers afterward, particularly within the financial sector.

References

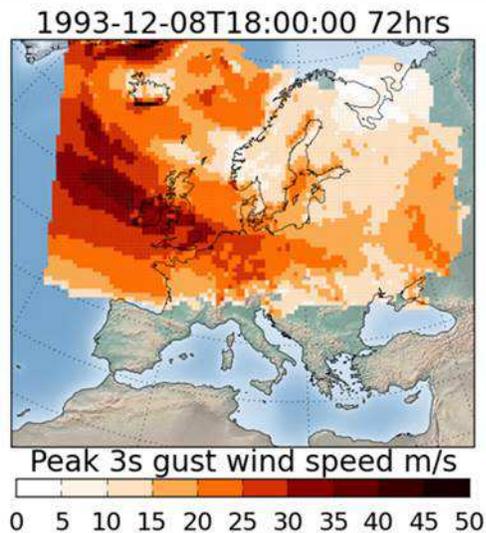


Figure: example of the output from the Oxford probabilistic European winter windstorm dataset of a windstorm on 8 December 1993 across Ireland and the UK.