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Extreme wind projections over Europe from the EURO-CORDEX regional climate models

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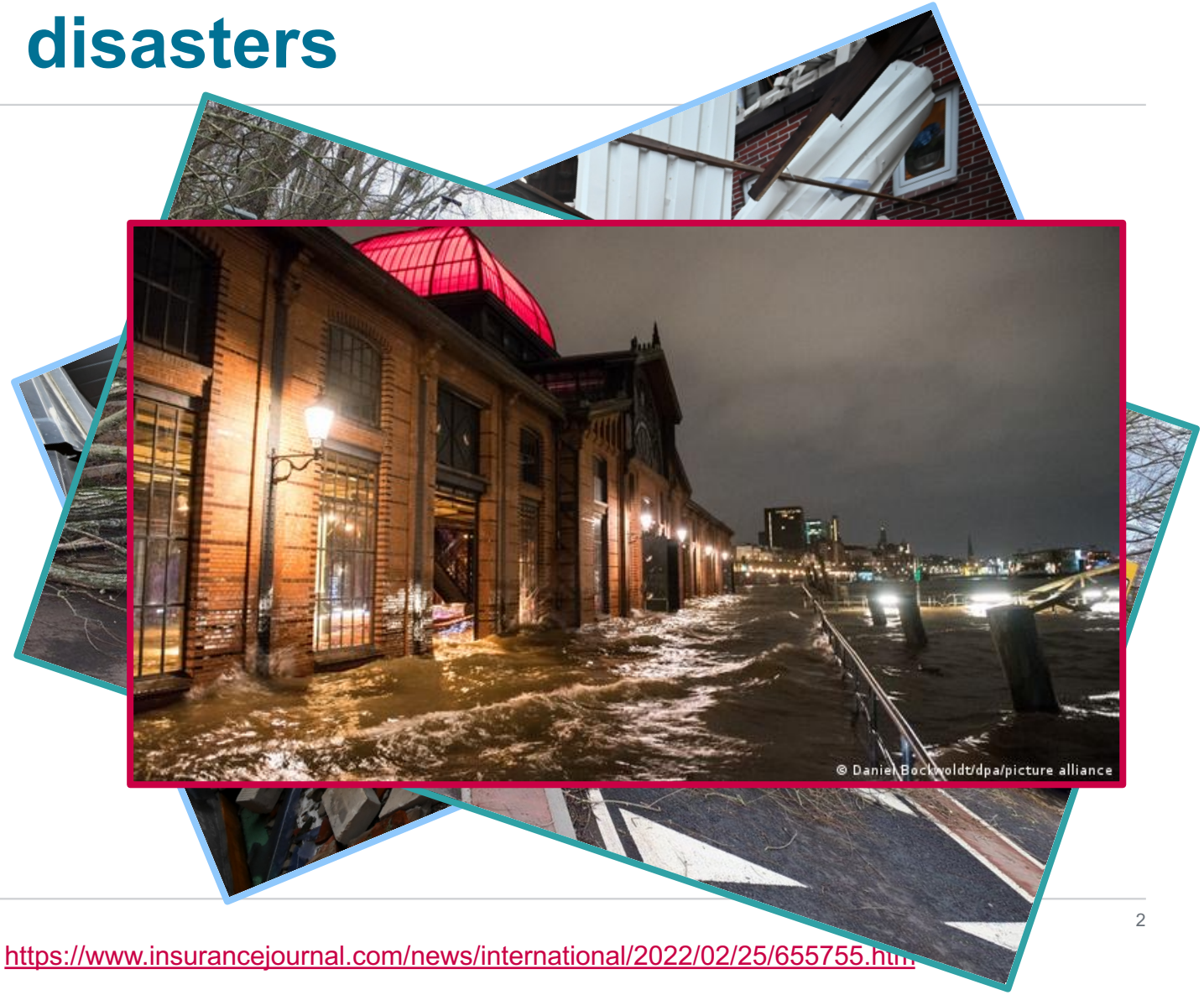
Wind storms are among our most costly natural disasters

- Damages from Winter Storms Dudley/Ylenia and Eunice/Zeynep will range between €3 billion and €5 billion (US$2.2 billion-$5.6 billion).*



* https://www.insurancejournal.com/news/international/2022/02/25/655755.htm

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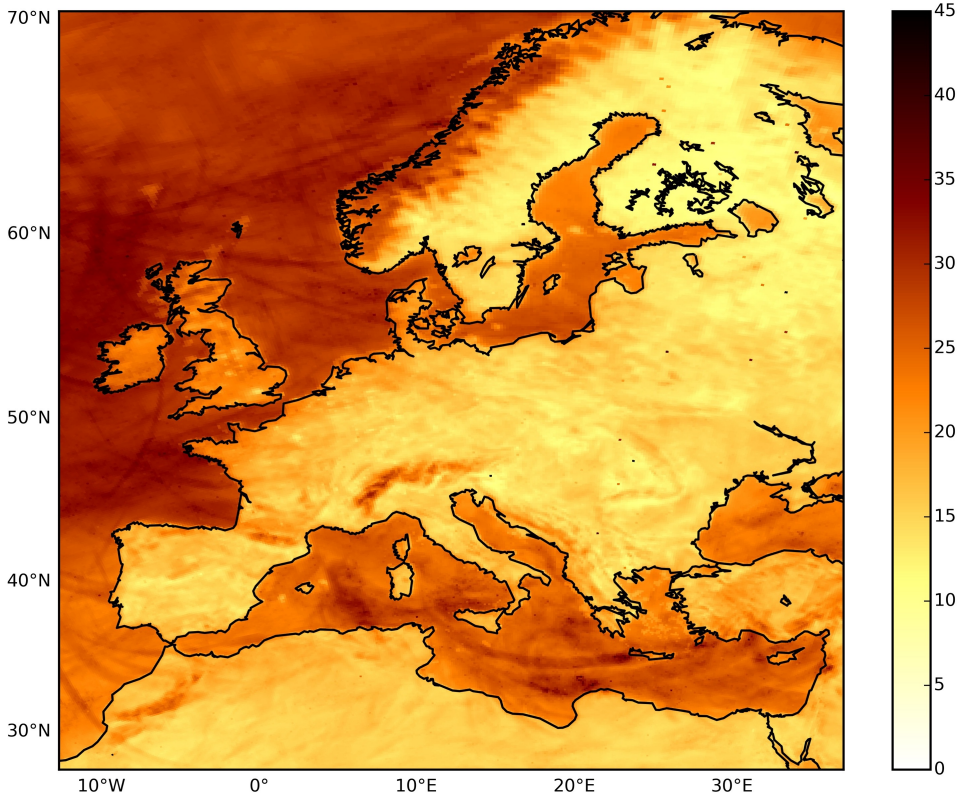
Determining how they may change in the future is a challenging task. Here, we show that…

- State of art RCMs such as those used in the Euro-CORDEX 0.11 simulations realistically reproduce extreme winds.
- Further, these simulations exhibit upscaled added-value confirming that fine scale information is retained.
- Broadly, extreme winds are projected to increase over European land areas as climate warms



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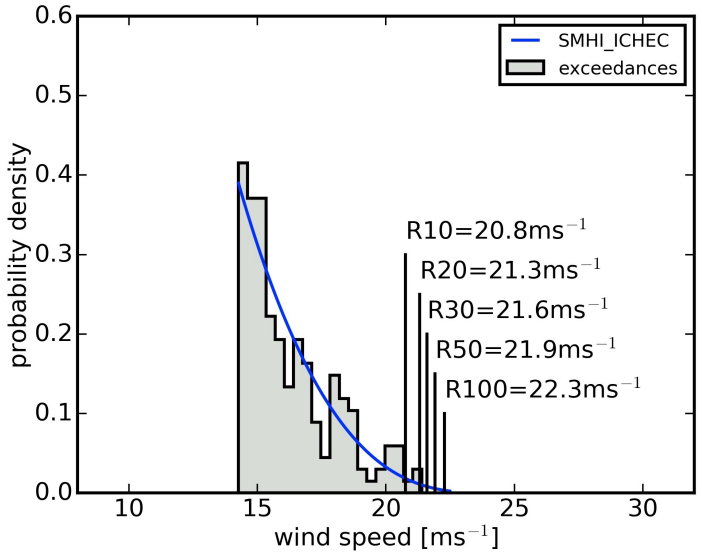
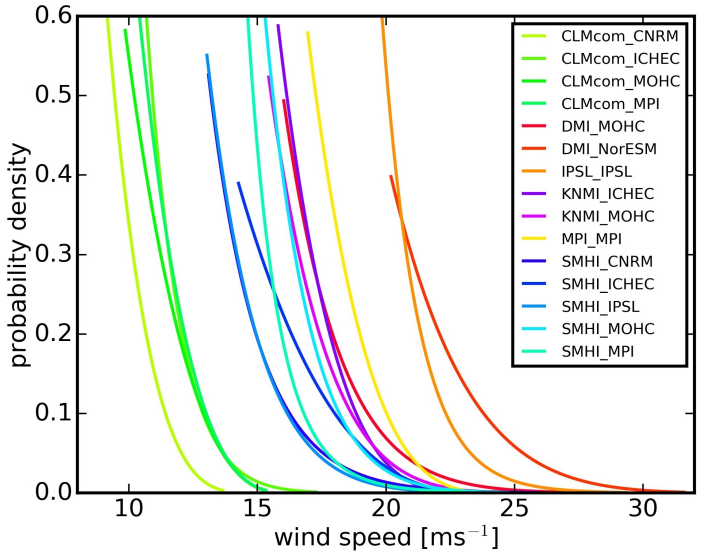
What do we mean by extreme? We focus on relatively modest (R30) extremes to keep results robust

- Euro-CORDEX downscalings of CMIP5 models
- Horizontal resolution of 0.11º
- 15 combinations – 6 GCMs downscaled with 6 RCMs
- Historical and Future RCP8.5
- Employed peaks-over-threshold approach from EVT





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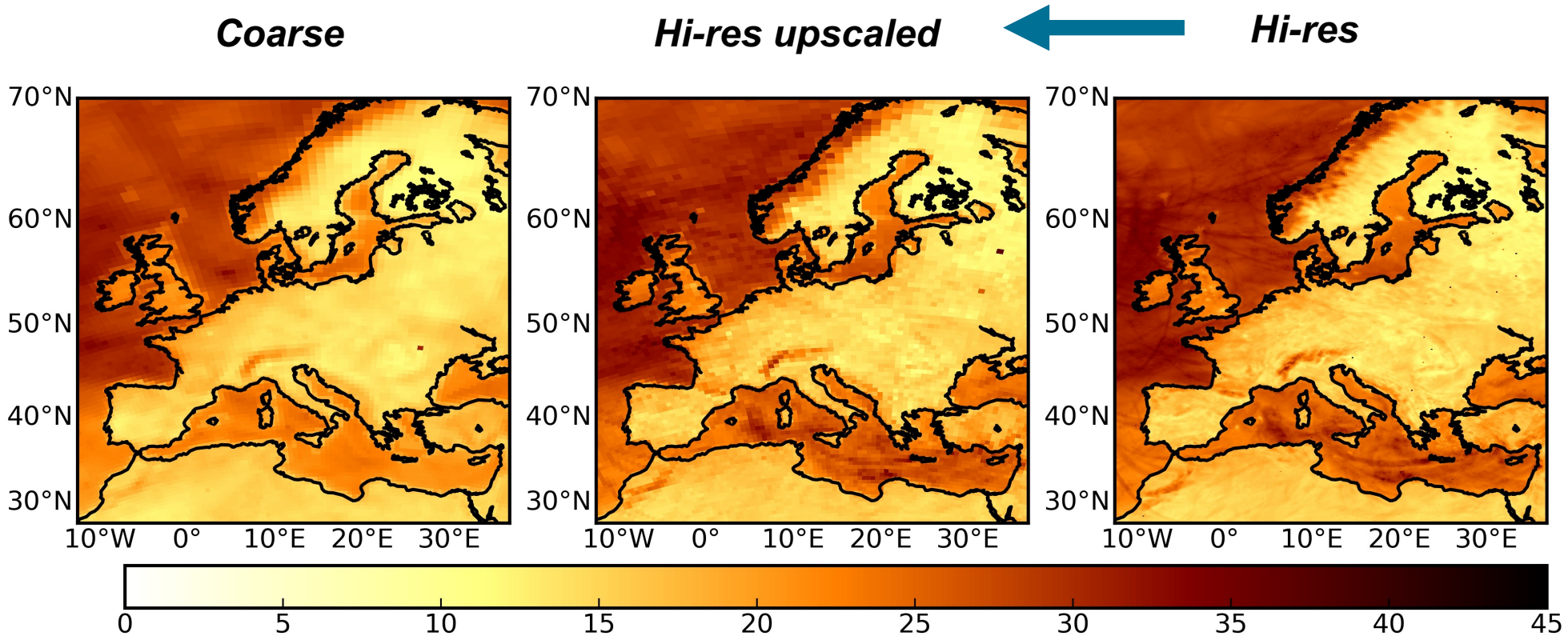
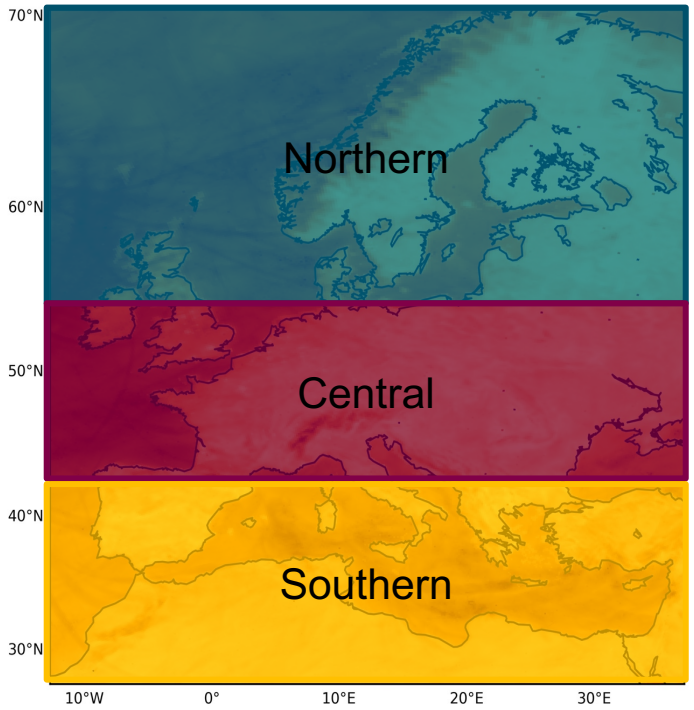
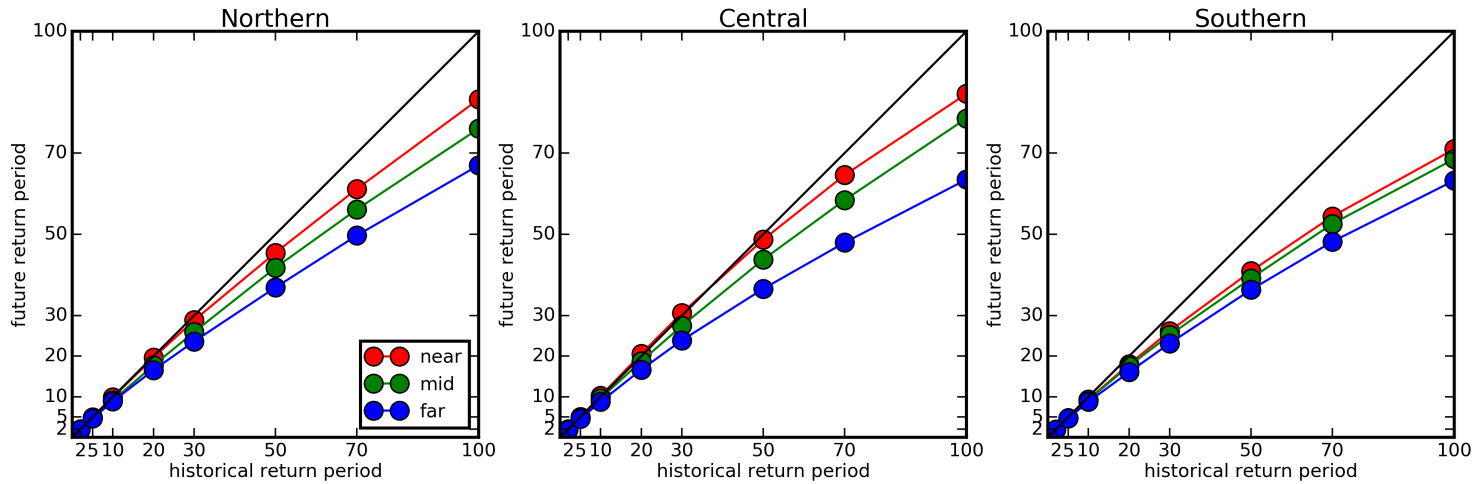
Simulation of extreme winds exhibits upscaled added-value



Under future conditions extreme winds over land areas increase as climate warms





Key Findings

- Large heterogeneity over land, underscores need for extreme winds to be assessed on case-by-case basis at local scale
- High resolution Euro-CORDEX simulations show added value in identifying fine structures, especially near orography and over Mediterranean
- Broadly, extreme winds are projected to increase over land in Europe as the climate warms

- Caveats:
  - Uncertainties only assessed for single locations (computationally prohibitive), but inter-model spread greater than uncertainties associated with estimation of extreme wind
  - Examined limited number of simulations, Euro-CORDEX contains many more simulations now
  - There is no good observational dataset to compare against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Extreme wind projections over Europe from the Euro-CORDEX regional climate models

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