



ECRA General Assembly 2017

“Climate Change and Vulnerable Regions”

07-08 March 2017

Square Brussels Meeting Centre

 **@ECRA_Climate**
www.ecra-climate.eu

High Impact Events

- **Welcome on behalf of the Collaborative Programme on High Impact Events (HIE) and Climate Change**

- Peter Braesicke, KIT
- Martin Drews, DTU

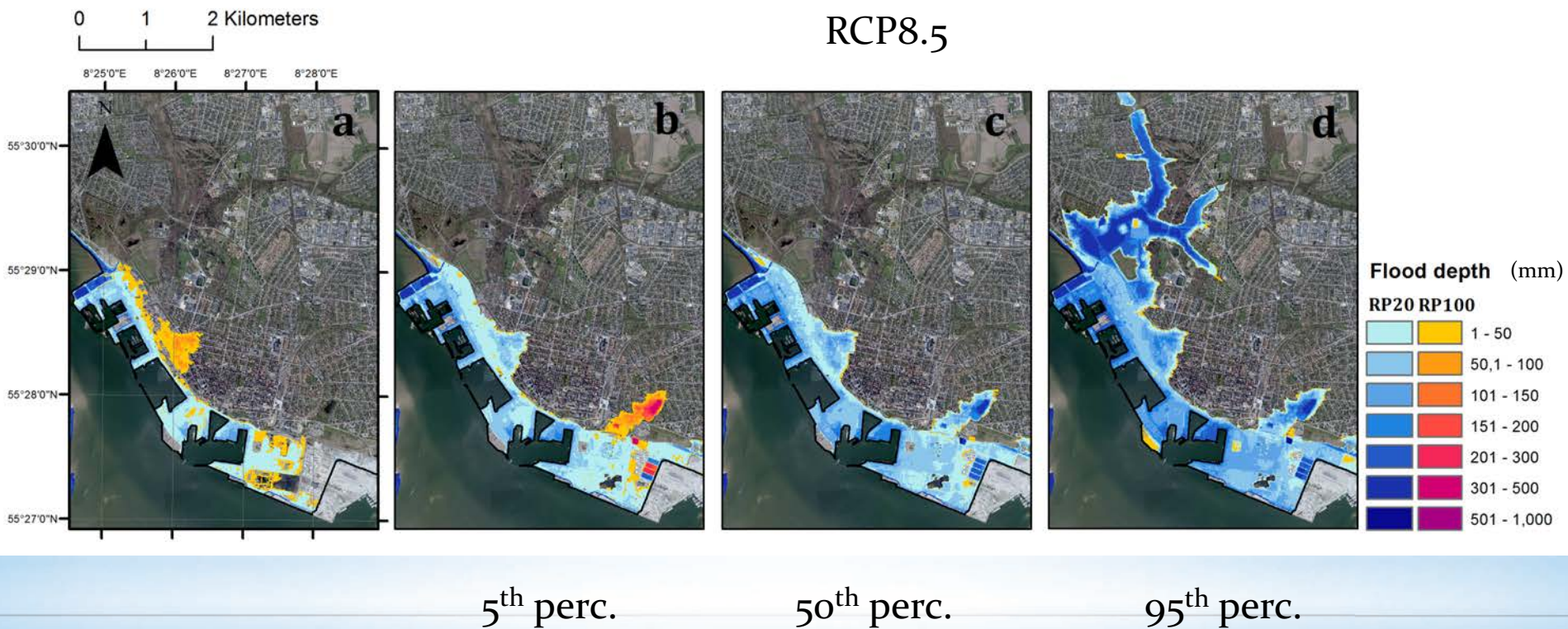


<http://ecra-climate.eu/workshops-conferences/collaborative-programmes2/hievents>



What is a 'High Impact Event'?

- Extremes like storm surges or high intensity rainfall can have disastrous consequences.
- But not all extremes lead to **high impacts**.
- Rather high impact events are conditioned on the exposure and vulnerability of particular regions or locations.
- Different types of extremes might be associated with different regions.



Thorarinsdottir et al. (2017)



CP HIE Key topics

- **Understanding mechanisms:** Assessment of past and future high impact events
- **Projecting changes:** High resolution climate and impact modelling
- **Producing climate information at relevant scales:** Downscaling with different methodologies
- **Co-creating climate services with users:** Climate risk analysis, vulnerability and adaptation

Recommendations

- **Better learning from the past**
 - Better estimates of historical occurrence frequencies - the near past (observations, reanalysis) and faraway past (proxy data).
- **Improved regional and local modelling of extreme events**
 - High resolution modelling, bias reduction
- **Using statistical methods to improve the value of modelling climate extremes**
- **Robust understanding of high impact events**
 - Improved process understanding, driven by observations and models, combined with narrative approaches; understanding the drivers of high impacts
- **Better characterization of vulnerabilities**
 - Better information produced by improved predictions requires better blending with information regarding exposure and vulnerabilities
- **Modelling for climate services**

- **Pilot workshop** in Cambridge 2012
- **Workshop** in Bergen 2013 (first steps towards developing a HIE white paper)
- **Workshop** in Copenhagen 2014
- **Joint Workshop** of CP HIE and CP Hydrological Cycle in Stockholm 2016
- **ECRA/HIE/Hydrological Cycle side event** at CORDEX 2016: “Extreme events in a changing climate - Challenges and perspectives in hydro-meteorological modelling”

Upcoming CP HIE Activities

- **Joint Workshop** of CP HIE and CP Hydrological Cycle in Brussels, March 9 2017
- **Update** on ongoing participant activities within CP HIE
- **Revisiting** the CP HIE White Paper (working document, 2014)
- To be added to the **CP HIE mailinglist**, please contact the CP chairs or ECRA Secretary Tina Swierczynski.

High Impact Events

- **Invited talks (tomorrow, 13.30-15.00)**
 - Moderator: Peter Braesicke, KIT (DE)
- **Extremes and their impacts on vulnerable sectors**
 - Hillpa Gregow, FMI (FI)
- **Has the hail potential over Europe changed and what are the potential drivers?**
 - Susanna Mohr, KIT (DE)
- **Cities and their vulnerability to climate change**
 - Marco Hoogvliet, Deltares (NL)
- **Climate change and extratropical storms**
 - Len Shaffrey, University of Reading (UK)

ENERGY AND FORESTRY



RISK: Windstorms, snow, heat, cold, floods

AGRICULTURE AND FOOD



RISK: Freezing, frost, floods, drought, heat

IMPACTS REGARDING CLIMATE EXTREMES ARE CHANGING

The faster we mitigate climate change,
the better we still know how to minimize the risks and vulnerability



WATER AND FISHERIES



RISK: Warming, sediment erosion, floods and flash floods

TRANSPORT AND TOURISM



RISK:
Wind and snowstorms,
slipperiness, freezing rain,
low waters, ice, heat

HEALTH AND BIODIVERSITY



RISK: Cold, heat, drought, flash
floods, floods

Extremes and
their impacts on vulnerable sectors
Dr. Hilppa Gregow, Head of Unit, FMI



Stiftung Umwelt
und Schadenvorsorge

Has the hail potential over Europe changed and what are potential drivers?

Susanna Mohr, David Piper & Michael Kunz



© HABRDA / shutterstock

Scientific questions

1. Has the thunderstorm/hail potential over Europe **changed during the past**?
2. How will the thunderstorm/hail potential **change in the future**?
3. What are **potential drivers** of severe thunderstorms or hail occurrence in Europe?



Cities and their vulnerability to climate change

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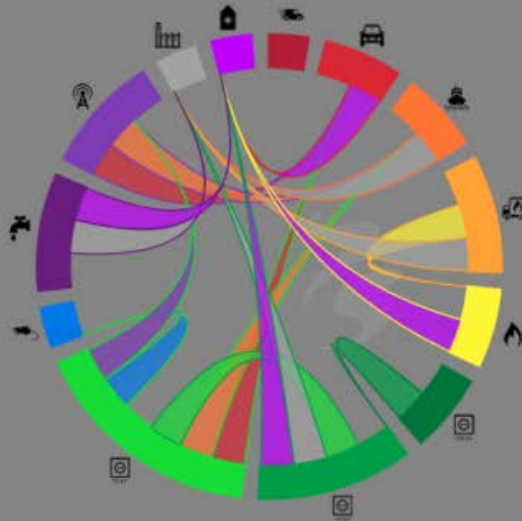
www.deltares.com

Identifying cascading system failures of vital infrastructure



Circle - Critical Infrastructure: Relations and Consequences for Life and Environment

- Highways
- Main roads
- Waterways
- Gas transport
- Gas urban network
- Electricity high voltage
- Electricity mid voltage
- Electricity low voltage
- Wastewater pumps
- Freshwater extraction
- Radio mast
- Industry
- Hospital



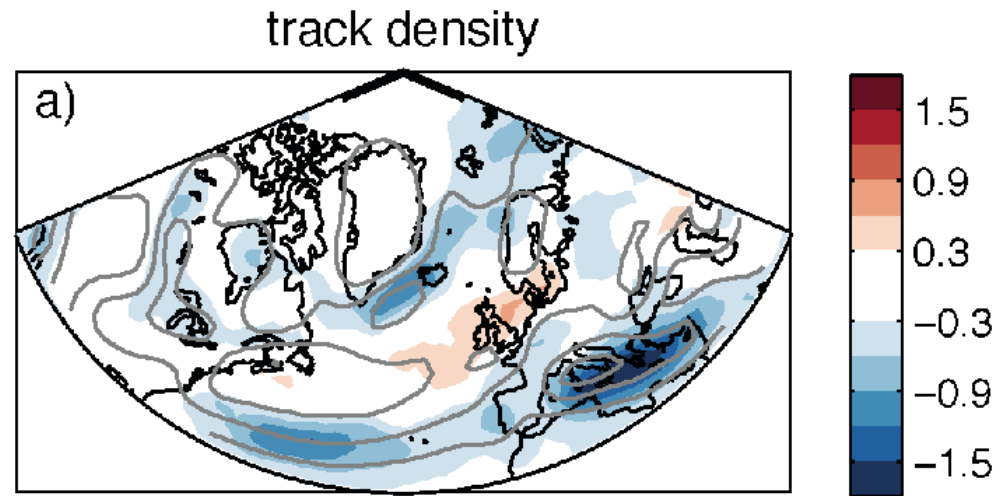
Deltares
Enabling Delta life





Damage from Windstorm Egon in Hanau, Germany, 13 Jan 2017. Windstorm Egon inflicted approx €212 Million of insured losses across Europe (PERILS AG)

How will climate change affect extratropical storms?



CMIP5 cyclone track density: RCP4.5
Scenario (2070-2100) minus Historical
(1980-2005), Zappa *et al.* 2013b, *J. Climate*

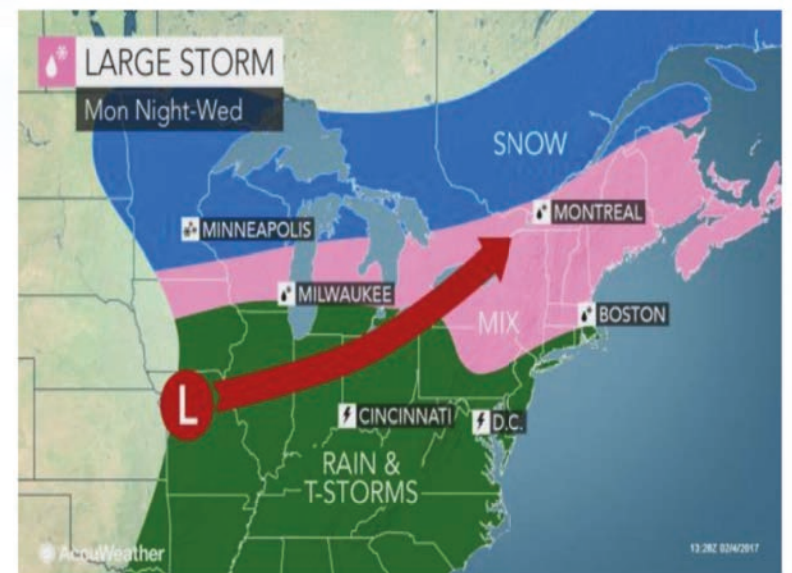
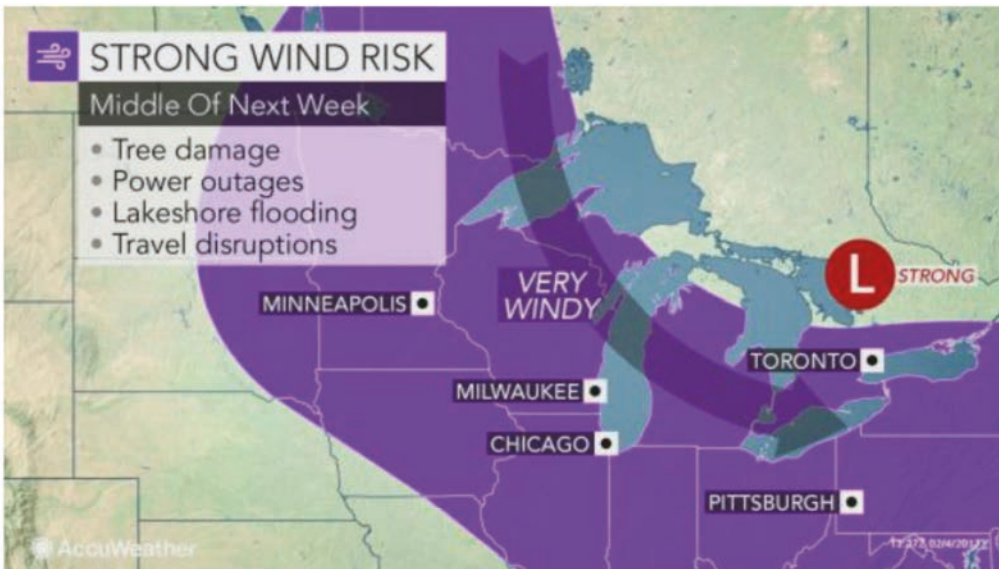
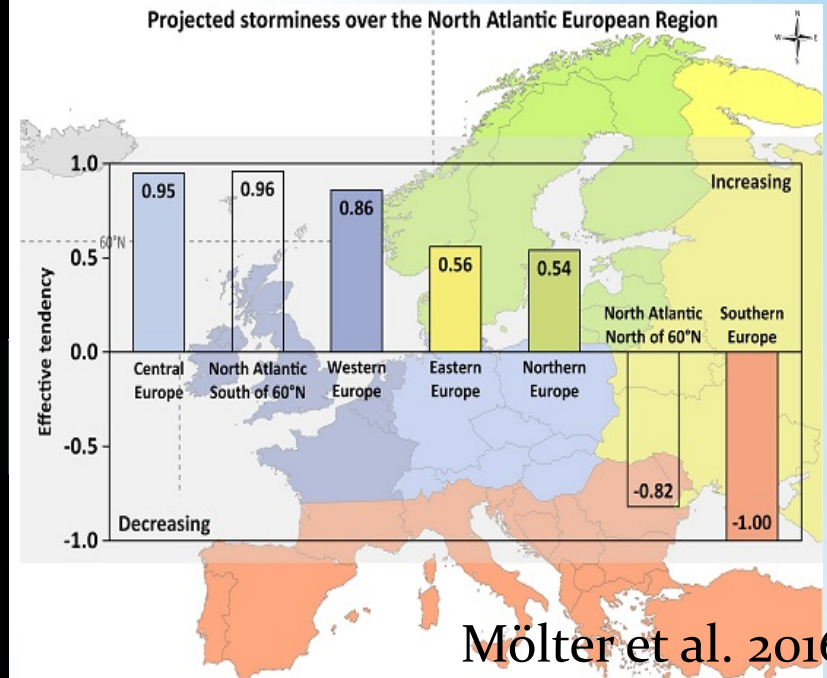
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Extremes and their impacts on vulnerable sectors

Dr. Hilppa Gregow, Head of Unit, FMI

8.3.2017 ECRA GA



ENERGY AND FORESTRY



RISK: Windstorms, snow, heat, cold, floods

Vulnerability of forests and energy infrastructure regarding extremes could be minimized on annual to decadal scale using higher resolution climate predictions and impact models (e.g., Gregow 2013)

AGRICULTURE AND FOOD



RISK: Freezing, frost, floods, drought, heat

Vulnerability in crop growth and food production could be minimized better IF THERE WERE LRF SERVICES TO SUPPORT IN CHOICE OF CROPS (e.g. Gregow et al. 2016 ELASTINEN-hanke <http://en.ilmatieteenlaitos.fi/elastinen>)

RISKS REGARDING CLIMATE EXTREMES ARE CHANGING

The faster we mitigate climate change
the better we still know how to minimize the changing risks

WATER AND FISHERIES TRANSPORT AND TOURISM HEALTH AND BIODIVERSITY



RISK: Warming, sediment

Vulnerability of the waters can be minimized by intensive mitigation, sustainable management and technology



RISK: Wind and snowstorms, slipperiness, freezing rain,



Vulnerability, on the short term, can be minimized by "awareness services", LRF on the long term, by intensive mitigation