ECRA General Assembly 2019

Collaborative Programme on High Impact Events and Climate Change (CP-HIE)

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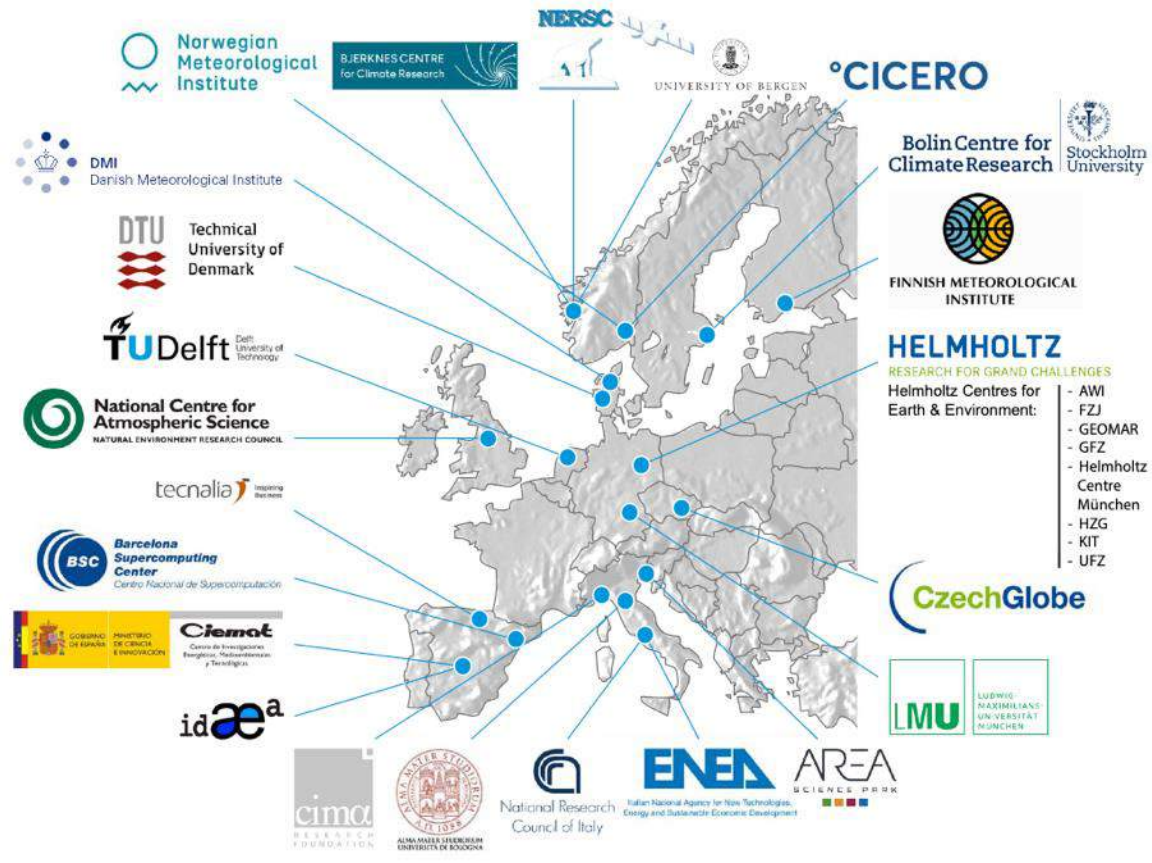
ECRA CP-HIE
European Climate Research Alliance
Collaborative Programme High Impact Events & Climate Change

Members



About CP-HIE

- Understanding mechanisms: Assessment of past and future high impact events, detection & attribution
- Projecting changes: High resolution climate and impact modelling
- Producing climate information at relevant scales: Downscaling with different methodologies
- Co-creating climate services with users: User-relevance and scientific fit-for-purpose, climate risk analysis and adaptation support

Past CP-HIE events

- Scientific Workshops in Cambridge 2012, Bergen 2013, Copenhagen 2014
- Joint Workshop of CP-HIE and CP-CHC in Stockholm 2016
- ECRA/CP-HIE/CP-CHC side event at CORDEX 2016: “Extreme events in a changing climate - Challenges and perspectives in hydro-meteorological modelling”
- Joint Workshop of CP-HIE and CP-CHC in Brussels 2017
- ECRA/CP-CHC (CP-HIE) side event at Climate Change and WATER 2018 (Tours) : “Societal challenges related to climate change impacts on the hydrological cycle - risk analysis, vulnerability and adaptation”

CP-HIE @ EGU

9 April 2019, 14-15.45 (oral, Room L7) & 10 April 2019. 14-15.45 (posters, Hall X3)

Session on High Impact Events and Climate Change

The occurrence of extremes such as droughts, flash floods, hailstorms, storm surges and tropical storms can have significant and sometimes catastrophic consequences to society. However, not all low probability weather/climate events will lead to "high impacts" on human or natural systems or infrastructure. Rather, the severity of such events depend also intrinsically on the exposure, vulnerability and/or resilience to such hazards of affected systems, including emergency management procedures. Similarly, high impact events may be compounded by the interaction of several, e.g., in their own right less severe hydro-meteorological incidents, sometimes separated in time and space. Or they may similarly result from the joint failures of multiple human or natural systems. Consequently, it is a deep transdisciplinary challenge to learn from past high impact events, understand the mechanisms behind them and ultimately to project how they may potentially change in a future climate.

CP-HIE Special issue

All relevant contributions are most welcome

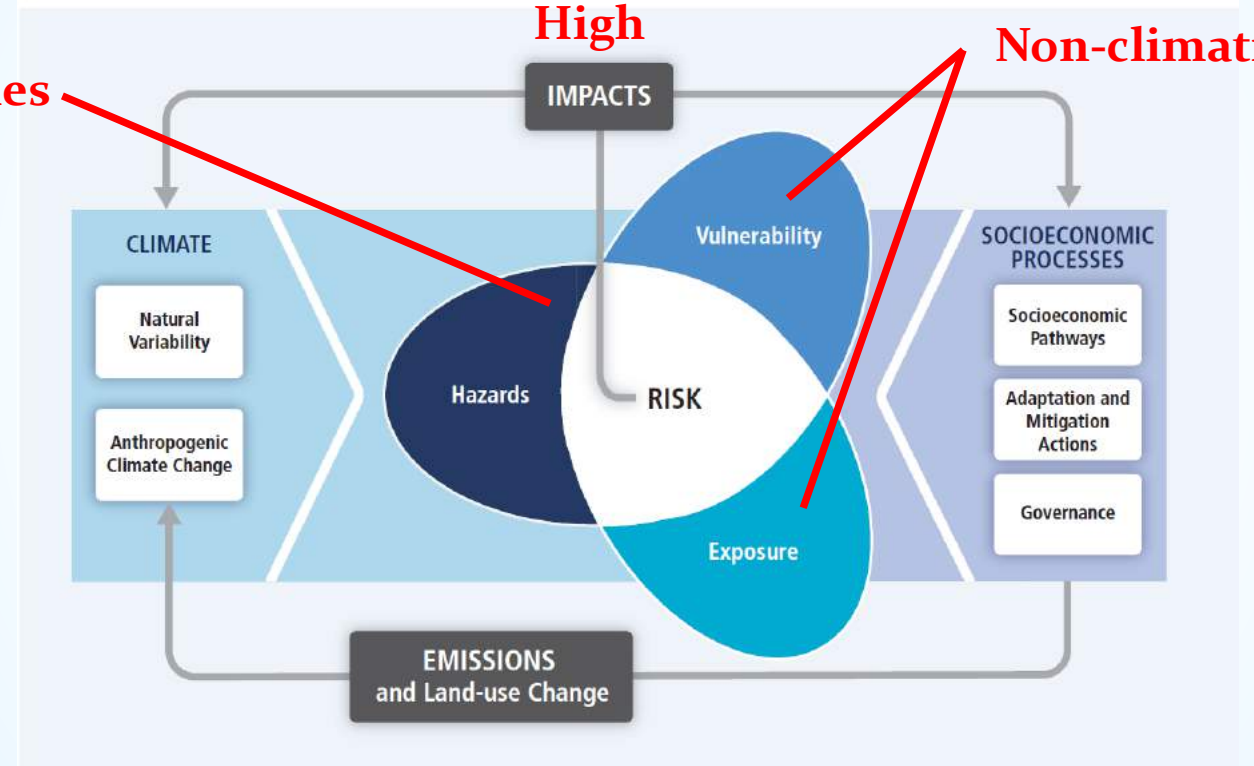
What is a high impact event?

- Extremes like storms, storm surges or high intensity rainfall can have disastrous consequences.
- But not all extremes lead to high impacts.
- High impact events are generally conditioned on the **exposure** and **vulnerability** of particular regions or locations ..
- .. or they may result from several **compounded events**, sometimes separated in time and space.

High

Extremes

Non-climatic factors



From IPCC AR5 WG2

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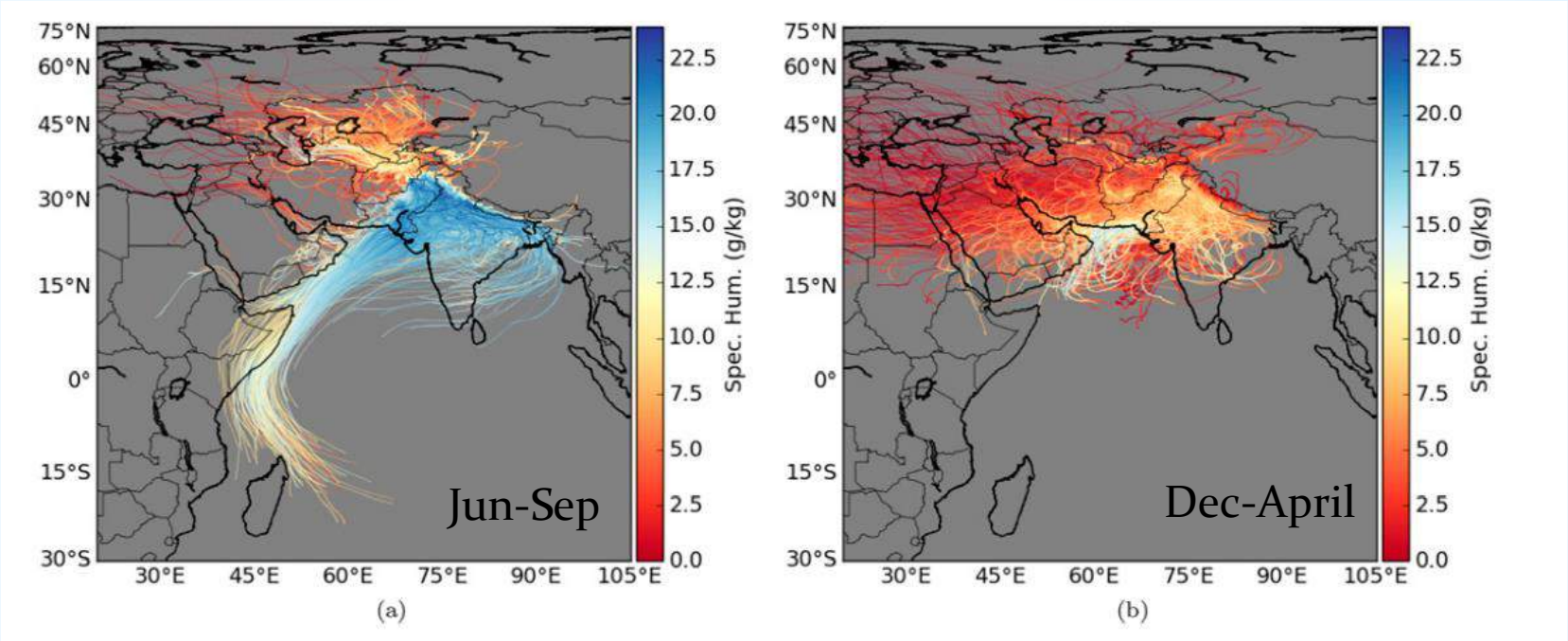
Adapted from Zscheischler et al. 2018

Hazard	Climatic drivers
Drought	Precipitation, evapotranspiration, historic evolution of soil moisture, temperature
Heat stress	Temperature, atmospheric humidity (strongly dependent on diurnal cycle)
Fire	Temperature, precipitation, relative humidity, wind, lightning
Storm	Wind speed, humidity, large scale atmospheric circulation
Coastal flood	River flow, precipitation, coastal water level, surge, wind speed
Flood risk at river confluences	Precipitation, water levels of contributing rivers, large-scale atmospheric circulation
Concurrent drought and heat	Temperature, precipitation, evapotranspiration, atmospheric humidity
Concurrent wind and precipitation extremes	Wind speed, precipitation, orography, large-scale atmospheric circulation

Understanding extreme precip. events



Ex. from Hunt, Turner & Shaffrey, 2018

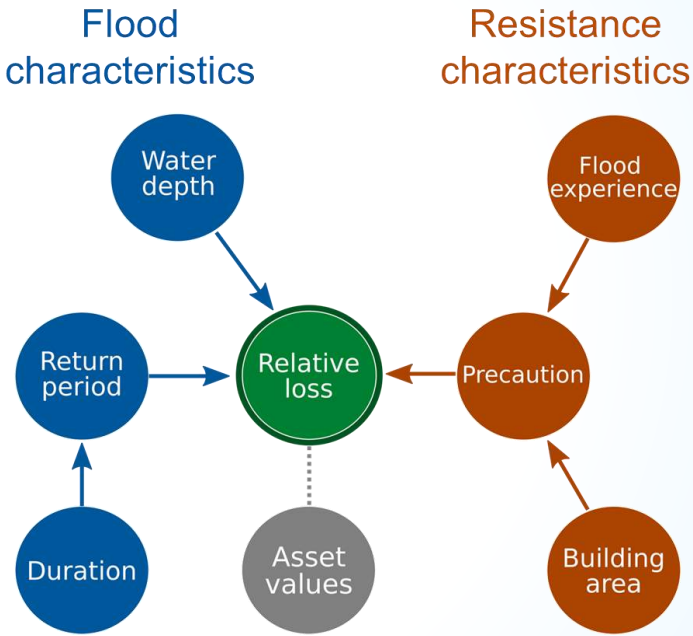
Impact dependencies

Model features & structure

BN-FLEMOps

The **B**ayesian **N**etwork – **F**lood **L**oss **E**stimation **Mo**del for the **p**rivate **s**ector

- Multi-variable
- Probabilistic
- For the private sector (buildings)
- Transferable in location and scale
- Predictions also with incomplete data



Courtesy of K. Schröter et al., GFZ-Potsdam

nature climate change

PERSPECTIVE

https://doi.org/10.1038/s41558-018-0156-3

Corrected: Author Correction

Future climate risk from compound events

Jakob Zscheischler[1*], Seth Westra[2], Bart J. J. M. van den Hurk[3,4], Sonia I. Seneviratne[1], Philip J. Ward[4], Andy Pitman[5], Amir AghaKouchak[6], David N. Bresch[7,8], Michael Leonard[2], Thomas Wahl[9] and Xuebin Zhang[10]

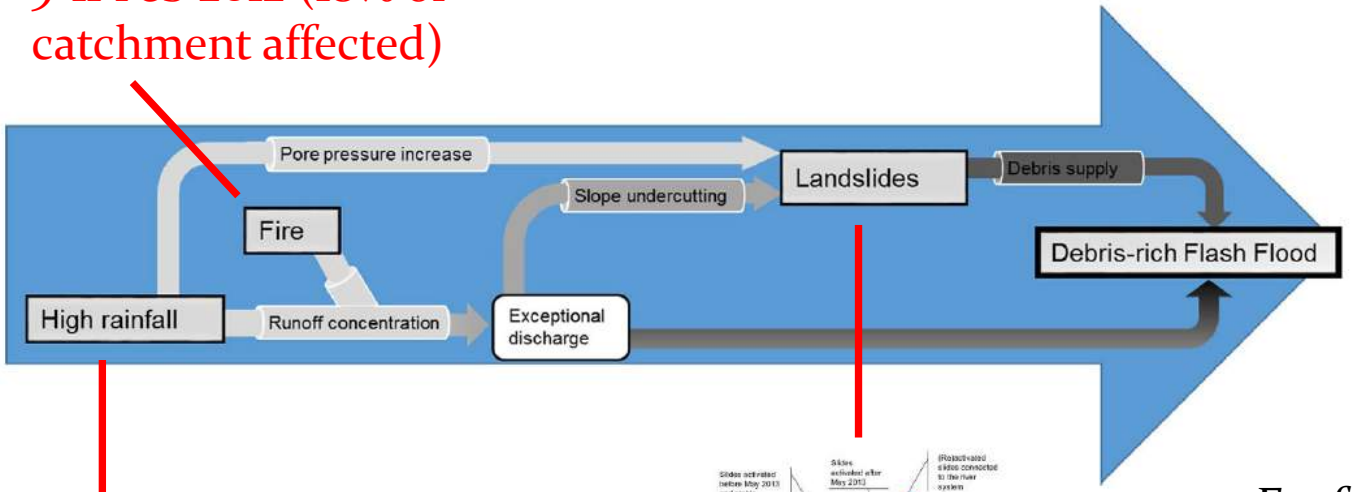
Floods, wildfires, heatwaves and droughts often result from a combination of interacting physical processes across multiple spatial and temporal scales. The combination of processes (climate drivers and hazards) leading to a significant impact is referred to as a 'compound event'. Traditional risk assessment methods typically only consider one driver and/or hazard at a time, potentially leading to underestimation of risk, as the processes that cause extreme events often interact and are spatially and/or temporally dependent. Here we show how a better understanding of compound events may improve projections of potential high-impact events, and can provide a bridge between climate scientists, engineers, social scientists, impact modellers and decision-makers, who need to work closely together to understand these complex events.

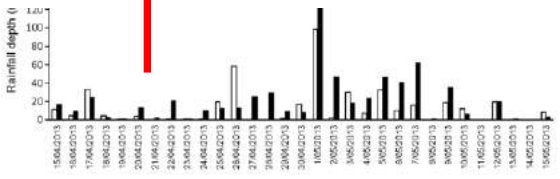
→ http://damocles.compoundevents.org/

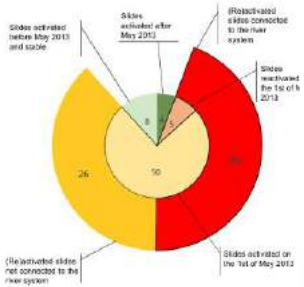
cost
EUROPEAN COOPERATION IN SCIENCE & TECHNOLOGY

Ex. East Africa (1 May 2013)

9-11 Feb 2012 (18% of catchment affected)







Several fatalities
70 buildings, bridges, school, hospital, etc. destroyed

Ex. from Jakobs et al., Nat Hazards 2016 (Nicole van Lipzig)

Joint ECRA – DAMOCLES session

EMS Annual Meeting 2019: 9-13 September 2019 (DTU, Denmark)

- **ES1.4 From hazards to impacts: understanding the mechanisms behind single and compound climate events.**
- Conveners: Martin Drews, Hilppa Gregow, Bart van den Hurk, Jakob Zscheischler
- Deadline for abstracts: **12 April 2019**

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Co-creating climate services

European Commission | Copernicus Europe's eyes on Earth | Climate Change Service | ON BEHALF OF ECMWF FOR THE EUROPEAN COMMISSION

HOME USER GUIDE DECM LAB ABOUT

! Beta version of DECM application for visualising and exploring climate model data.!

To assess the large volume of climate model simulations, we propose a straightforward comparison of climate models' ability in reproducing the seasonal cycle of summary statistics based on large multi-model ensembles and a set of predefined regions and domains (e.g AR5 IPCC domains, European regions). The DECM app contains figures and tables showing examples of summary statistics derived from simulated and observed-based climate datasets.

The climate simulations evaluated here are based on the Coupled Model Intercomparison Project-Phase 5 - CMIP5, the European branch of the Coordinated Regional Climate Downscaling Experiment over Europe - EURO-CORDEX, the global atmospheric reanalysis ERAINT , and the gridded dataset E-OBS in order to assess how reliable are estimations from global and regional climate models before they can be used in impact studies.

The functions are categorised in two main groups such as 'Product Users' and 'Data Users'. The 'Product users' group focuses on fancy and interactive graphics of output statistics, while the 'Data Users' group is more devoted to output statistics in terms of data and tables.

DATA EVALUATION FOR CLIMATE MODELS

Product Users
- Explore the Simulations
- Seasonal Cycle
- Models' Biases
- Changes in Climate
- Models' Spread (Cf. External App.)

Data Users
- Global Climate Models
- Regional Climate Models
- Models' Ranks (Cf. External App.)

Try it yourself!

You can click here or on the dashboard (figure above) to launch the DECM-App and navigate between menu items.

EU·macs

POTENTIAL FOR CLIMATE SERVICES MARKET ENHANCEMENT AND RELATED INNOVATION FOR URBAN PLANNING

DELIVERABLE 4.3 – POLICY BRIEF

Raffaele Giordano[1], Ines Vaittinen[2], Karoliina Pilli-Sihvola[3], Ivan Portoghese[1], Raffaele Matarrese[1]

[1] Water Research Institute – National Research Council, Bari, Italy
[2] European Network of Living Lab, Brussels, Belgium
[3] Finnish Meteorological Institute, Helsinki, Finland

October 2018

WHAT HAMPERS THE USE OF CLIMATE SERVICES IN URBAN PLANNING?

There is a mounting international interest about **how to adapt urban areas to climate change**. This is mainly due to two reasons:

1) cities are everywhere

2) cities have high population density, capital assets, and key public and private services which makes them potential "hot spots" for climatic risk.

All this underscores the importance of climate change adaptation planning in cities. This process can be boosted by **improved use of climate services.**

Identifying and removing barriers and enhancing enablers for climate services market uptake for urban planning requires acknowledgment of the

By means of interviews and workshops with urban planners and different stakeholders from two urban case studies, Helsinki and Bologna, we detected **the main barriers hampering climate service uptake, identified users' needs** and involved climate service users in a **co-development process** aiming at filling the gaps between the users and suppliers of climate services in urban planning.

KEY FINDINGS

USE OF CLIMATE SERVICES IN URBAN PLANNING VARIES

Although there is an increasing awareness of the role of informed decision making in urban planning for climate change adaptation, the use of climate services in the daily activities is still far from being the standard in most of the EU cities. Only few cities – Helsinki and Copenhagen to cite

Economics of Disasters and Climate Change
pp 1–30 | Cite as

Overadaptation to Climate Change? The Case of the 2013 Finnish Electricity Market Act

Authors | Authors and affiliations

Väinö Nurmi, Karoliina Pilli-Sihvola, Hilppa Gregow, Adriaan Perrels

Open Access | Original Paper
First Online: 20 February 2019

Abstract

In this paper, we put forward a definition of over-adaptation in disaster risk reduction (DRR) and climate change adaptation (CCA) projects. We detail an illustrative case in which the response to extreme weather risk while aligned with the goals of CCA, is implemented beyond the economically efficient scale. We undertake a cost-benefit analysis of the 2013 Finnish Electricity Market Act, enacted partially as a reaction to long, storm-induced electricity blackouts experienced after 2000. The Act imposes strict requirements on electricity distribution companies as regards the duration of blackouts. Meeting these requirements entails investments amounting to billions of euros. As a benefit, we quantify the avoided cost from the blackouts for households and producers. Our results, derived from Monte-Carlo

Upcoming events

- **EGU, 9 April 2019, 14-15.45 (oral) & 10 April 2019. 14-15.45 (posters)**: Session on High Impact Events and Climate Change. Convened by CP-HIE. [Vienna]
- **High Impact Events and Climate Change Special Issue, 31 May 2019***
- **EMS, 9-13/9 2019**. ES1.4 From hazards to impacts: understanding the mechanisms behind single and compound climate events. Convened by CP-HIE & DAMOCLES Cost Action. [Copenhagen]
- **Open CP-HIE workshop (planned)** – in connection with EMS [Copenhagen]

*tentative

Please contact Martin Drews (mard@dtu.dk) or Hilppa Gregow (Hilppa.Gregow@fmi.fi) if you want to know more, join CP-HIE and/or our mailing list.

Invited keynotes (tomorrow)

- **Rasmus Benestad, Norwegian Meteorological Institute**:

A new factor explaining more extreme rain - the reduction in global area with rainfall

- **Nicole van Lipzig, KU Leuven:**

High Impact weather events in a changing climate in different regions of the world (see also slide 12)

Please contact Martin Drews (mard@dtu.dk) or Hilppa Gregow (Hilppa.Gregow@fmi.fi) if you want to know more, join CP-HIE and/or our mailing list.