Redrawing the climate change map: What should we be preparing for?

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A (re-)insurers approach to climate change

Conventional risk transfer solutions are supplemented by innovative Insurance covers and investment activities in the energy sector

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Identification, measuring ("price tag") and transferring of risks

- Smoothing of balance sheets
- Improvement of bankability of projects
- Capital relief of technology manufacturers

- "conventional risks" (e.g. construction, operation of power plants, natural catastrophes)
- New: long-term performance warranties for renewable energy technologies, serial loss covers, lack of wind/sun

Climate Change = "risk of change" (e.g. changing loss probabilities from natural catastrophes, emerging/new risks) for the insurance industry.

NatCatSERVICE

Natural catastrophes worldwide 1980 – 2012

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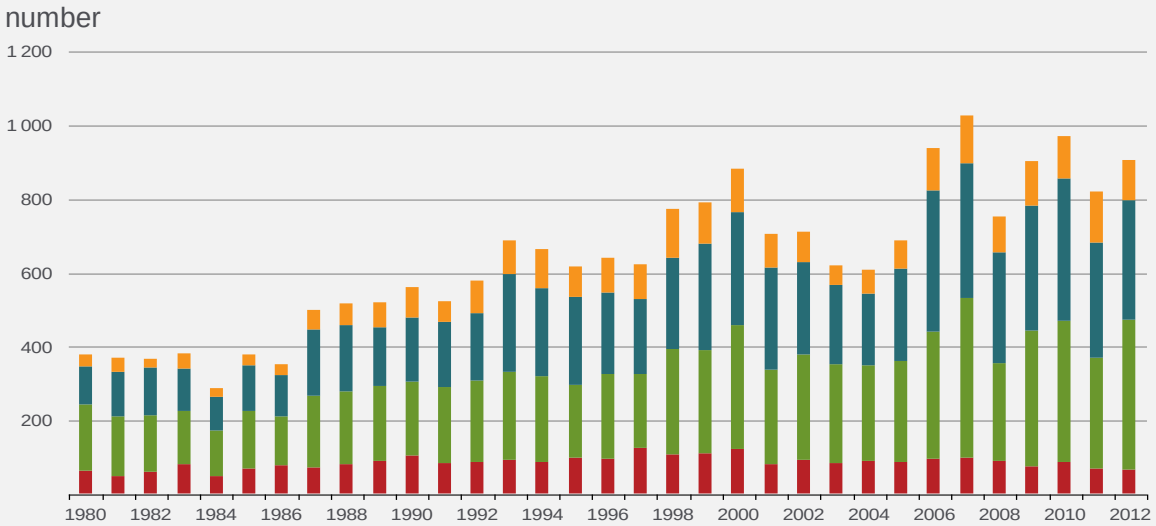
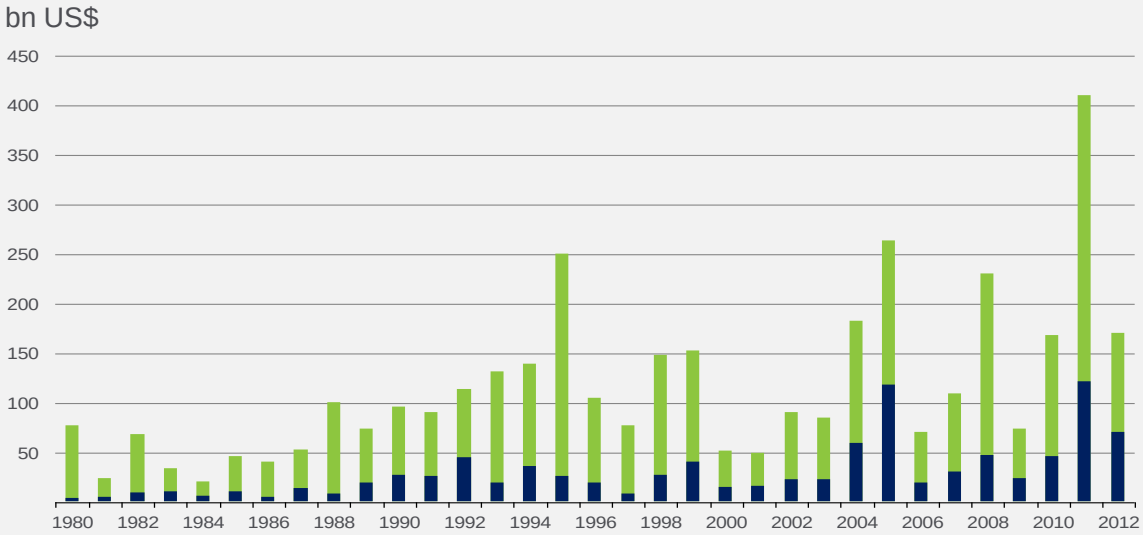


Number of events

- **Geophysical events** (Earthquake, tsunami, volcanic eruption)
- **Meteorological events** (Storm)
- **Hydrological events** (Flood, mass movement)
- **Climatological events** (Extreme temperature, drought, forest fire)



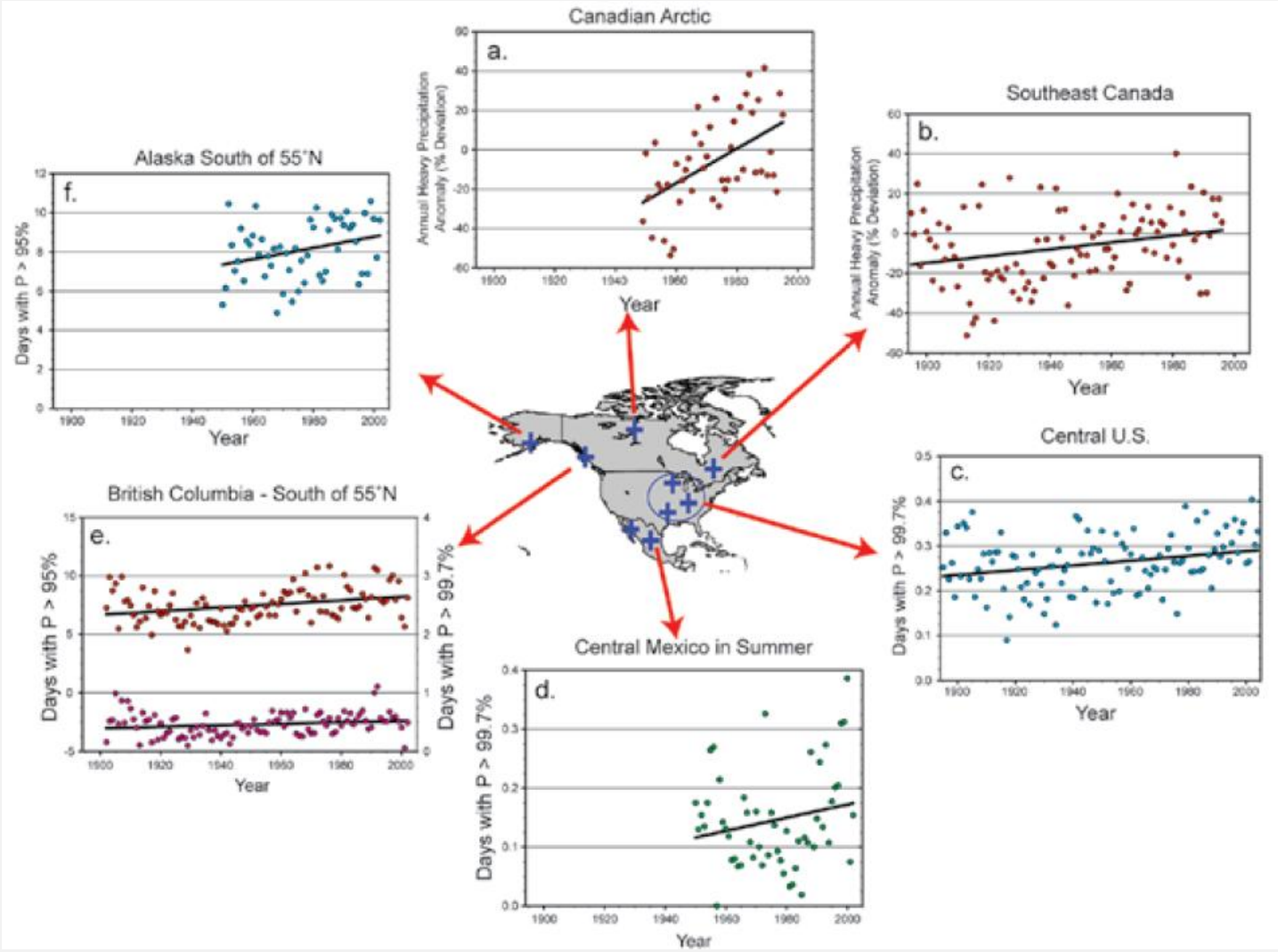
Overall and insured losses

- **Overall losses** (in 2012 values)
- **Insured losses** (in 2012 values)

Climate change: observations

Trends with weather patterns in some regions already observed

Example: heavy precipitation events in North America and Canada



Definitions:

(a)
annual anomalies (% departures) of heavy precipitation for northern Canada (updated from Stone et al., 2000);

(b)
as (a), but for southeastern Canada;

(c)
the top 0.3% of daily rain events over the central United States and the trend (22%/113 years) (updated from Groisman et al., 2005);

(d)
as for (c), but for southern Mexico;

(e)
upper 5%, top points, and upper 0.3%, bottom points, of daily precipitation events and linear trends

Source: US Climate Change Science Program (2008)

Exposure of the energy sector to weather extremes

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Single and accumulation risks

- Higher frequency and intensity of severe weather: high wind/waves, inland flooding/storm surge, ice storms

→ Changing loss probabilities for single risks (damage of constructions or energy-infrastructure)

→ Changing/new accumulation risks of geographically extended portfolios

Performance related impacts

- Increased range of weather anomalies: fluctuation of wind, sun, precipitation, extreme temperature, extreme precipitation (flooding/droughts)

→ Performance risks of renewable energy technologies (hydropower, windpower)

→ Impacts on performance of power plants (availability of cooling water)

Loss examples in the energy sector

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Hurricane Andrew 1992

The Hurricane significantly affected a commercial nuclear power plant, Turkey Point and caused extensive onsite and offsite damage.

Ice storm Canada 1998

The storm caused heavy damage of transmission and distribution infrastructure of the power sector.

Heat wave Europe 2003

The scarcity and high temperature of water led to production bottlenecks, shut down of electrical power plants, rising prices of electricity

Winter storm Klaus 2009

The storm caused i.a. severe damage to PV modules. It was one of the 10 costliest winter storms between 1980-2012.

Hurricane Sandy 2012

Sandy caused damage by collapsing power lines and led to widespread power outages. An explosion at a Con Edison power station caused a blackout for up to four days.

Example: accumulation risk scenario „Storm Europe“ is increasing with the expansion of offshore wind

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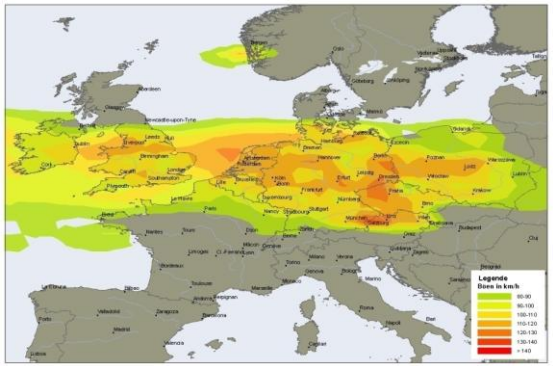
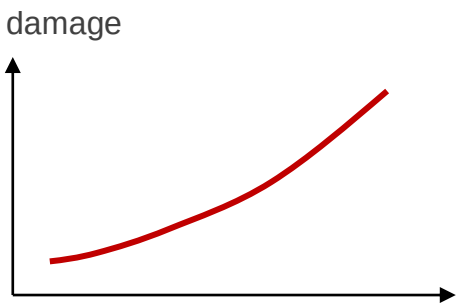
1. The risk is a function out of:

Hazard

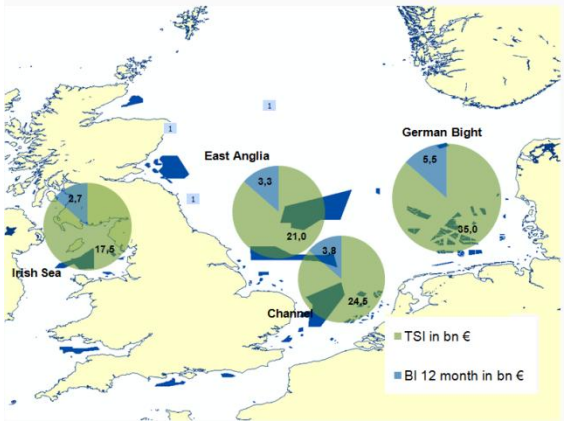


Storm area „Kyrill“ (18.1.2007)

Vulnerability



Exposure



2.Status and development

- Offshore-investments up to 100 bn $ expected until 2020
- No long-term track record available
- Unfavorable loss history

Summary and Conclusions

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- The insurance sector closely monitors/analyses the impact of climate change on frequency/intensity of severe weather events. Transfer of risks from natural catastrophes is a core business segment of the (re-) insurance industry.
- Climate change leads to a risk of change for investors in power generation and grid systems and to risk takers (e.g. insurance industry).
- Also: New accumulation risks of geographically dispersed power generation and/or grid portfolios (conventional technologies and renewable energy technologies).

Thank you!

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