



## Relevance of changing weather patterns

Baden-Baden, 20 October 2014  
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## 40 years of expertise

**1973**

Munich Re's first global warming alert

**1974**

**Foundation of Geo Risks Research department**

**1989**

First (physical) Globe of Natural Hazards

**1993**

Start of NatCatSERVICE

**2000**

First CD-ROM World of Natural Hazards

**2005**

Foundation of MCII

**2007**

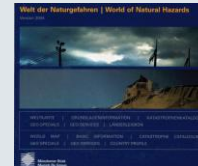
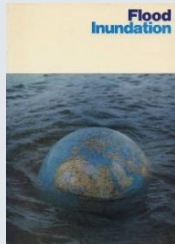
Climate change is defined as a strategic topic for Munich Re; founding of the Corporate Climate Centre (CCC)

**2011**

Nathan Risk Suite

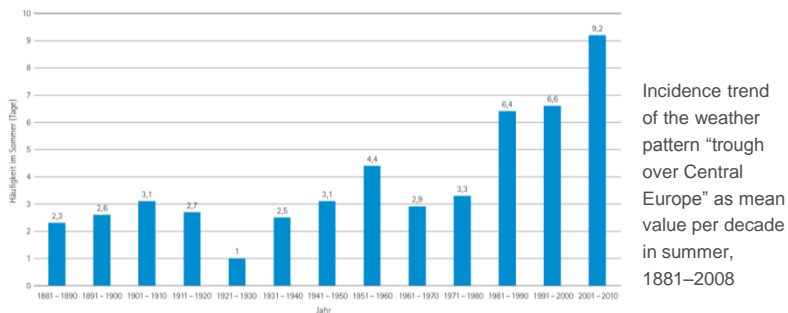
1880

1974 - 2014



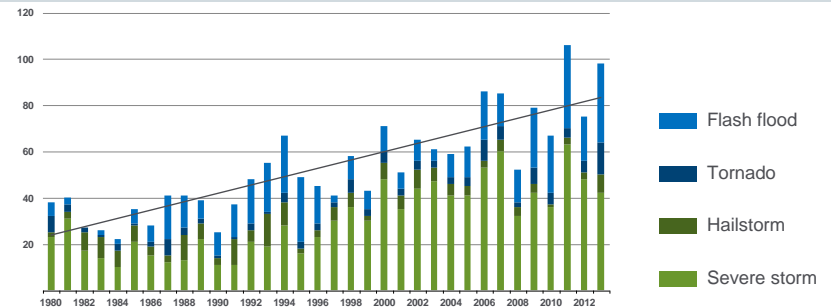
- Highest increases in frequencies for flood events
- Data show new trend of weather patterns: More frequent persistent weather conditions in Central Europe
- Long-lasting weather conditions with precipitation can lead to river floods in one region while dry and hot weather causes heatwaves and droughts at the same time in another region.
- More and more intense convective events increase exposure to flash floods and hailstorms, which can occur everywhere  
→ influence on probability and intensity of events and thus possible losses due to hail and floods
- Risk of winter storms nearly unchanged

## Number of days (as mean value per decade in summer) with troughs over Central Europe



Source: Sächsisches Landesamt für Umwelt, Landwirtschaft und Geologie, 2010

## Convective storms in Europe 1980–2013 Number of events



Source: Munich Re

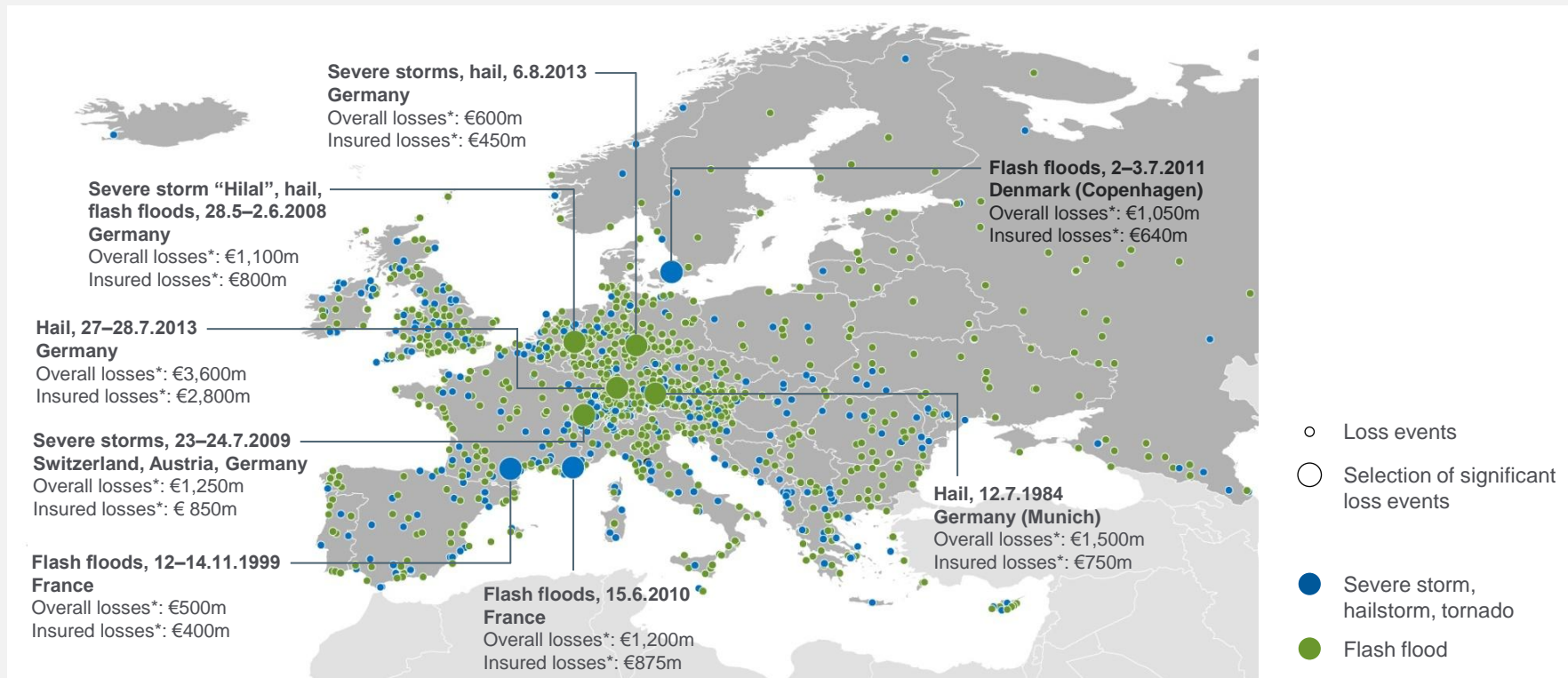


## Examples of floods and convective storms in Europe

- Floods May/June 2013 (Germany, Austria, Czech republic): overall losses €9.7bn, insured losses €2.4bn (in Germany: €8bn/€1.8bn)
- Hailstorm in southwestern Germany, July 2013: overall losses €3.6bn, insured losses €2.8bn
- Floods in UK, December 2013 - January 2014: overall losses €1.1bn, insured losses €0.8bn
- Storm Ela in Belgium, Luxembourg and western Germany, June 2014: overall losses €2.3bn, insured losses €1.8bn (in Germany: €880m/€650m)

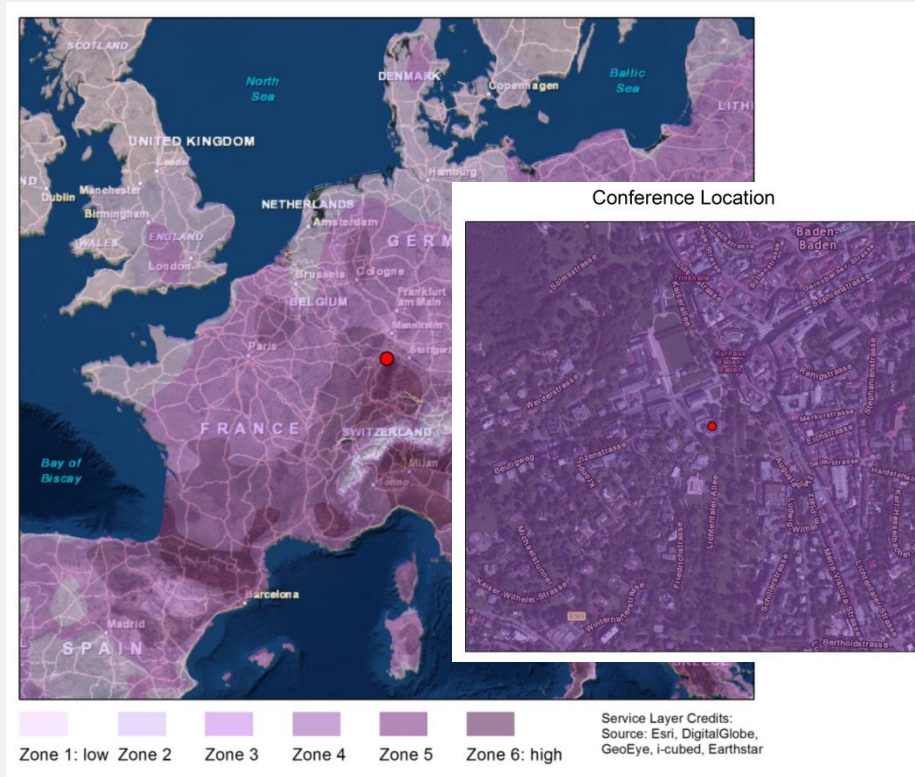
**Resilience is key; state should support market solution wherever possible**

# Convective storms in Europe 1980–2013



\*Losses in original values  
Source: Munich Re

# Detecting risks with Munich Re's NATHAN e.g. in motor insurance



- More/stronger thunderstorms and hail also affect fleet owners and carmakers with large parking lots, e.g. hail in summer 2013 led to the total loss of 80% of the cars in a French stockyard.
- Greater risk of accumulated losses increases need for reinsurance and services to better understand risks of individual portfolios and improve prevention.
- Example: connecting motor own insurance portfolio with NATHAN hail intensity map to generate individual loss forecasts for each address

# Recent hail and flood events show significant changes in loss pattern



- Severe building losses from recent hail events (e.g. Reutlingen 2013). New materials with higher resilience could support loss prevention.
- Flooding and unprotected oil tanks: severe contamination losses possible and probability of a total loss is significant.
- Photovoltaics and external thermal insulation, which have experienced a boom in recent years, especially in Germany, are exposed to weather-related loss scenarios.
- Weather-related losses in the industrial sector are a growing concern – not only high property losses, but also increased exposure to BI and CBI losses (contingency plans and loss mitigation strategy are essential).

# Higher frequency of smaller nat cat losses impacts insurance companies' net results

## Meteorological trends

- Increased frequency of weather-related summer events:
  - Convective storms (e.g. hailstorms)
  - Flash floods
  - Droughts
- Local frequencies and intensities still difficult to predict
- No changes observable in respect of winter storms.

Increased frequency of summer events impacts net earnings and volatility of net result

## Trends in RI structures

- Structure and pricing of reinsurance programmes tailored to winter storms and river floods
- Increasing demand for non-proportional and cat covers
- Higher amounts retained by insurers

▶ Changed weather risks call for **adequate risk awareness** and tailor-made reinsurance protection

▶ Primary insurance rates need to be adapted to changed weather patterns across all LoBs (e.g. residential building and motor own damage insurance)

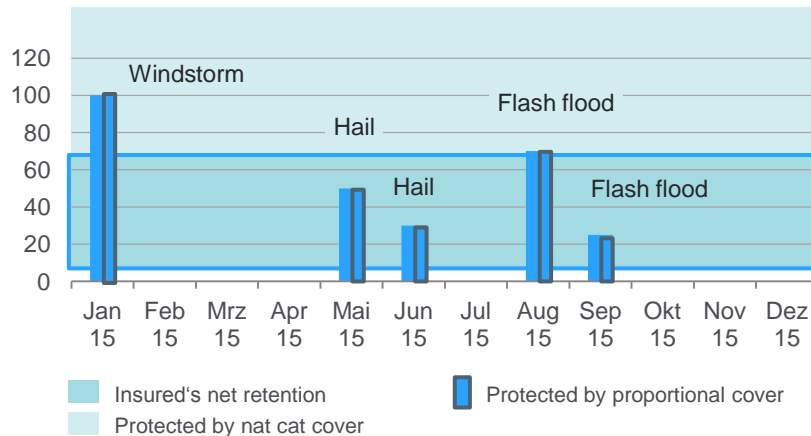


# Every situation is different – our solutions are tailor-made to protect insurance companies' results

## Awareness of changing weather trends is still heterogeneous

Locally limited events do not affect insureds and insurers to the same extent and at the same time.

## Highly affected primary insurer (illustrative)



## Munich Re offers clients protection against nat cat accumulation losses



Munich Re tailors solutions to the individual client's needs, e.g. protection

- against accumulated losses in net retention;
- on a standalone basis or integrated into the existing programme;
- on a proportional or non-proportional basis;
- for one or more classes of business.

# Munich Re weather and commodity business: Solutions for all weather conditions



## Highly affected primary insurer (illustrative)

**\$5.7 trillion**

Portion of US GDP that is “weather-sensitive”

**\$485 billion**

Typical annual variance in US GDP due to weather (3.4%)

**>\$12 billion\***

Weather variability explicitly hedged with weather instruments (worldwide)

## Munich Re offers holistic solutions for future weather risk management

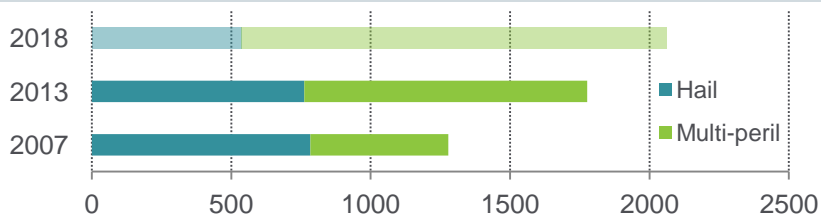
- Fluctuating and difficult-to-predict weather conditions are significant economic risks for many business sectors
- The acquisition of a leading provider in the market segment completes MR’s business model for weather risks.
- The aim is to offer “one-stop” client-centered risk management with the capability of combining weather with commodities.
- This is achieved by designing volumetric hedging instruments that help to reduce the risks of adverse weather conditions, also in combination with market-price risks where required (high-frequency, low-impact occurrences).

# Agricultural insurance through PPP protects farmers against climatic risks – in Europe, we are on the way



Specialised crop insurers in Europe have to stick to actuarially sound underwriting as well as lobbying for PPP

## Agriculture insurance premiums in Europe (€m)



## Munich Re reinsures major PPP systems worldwide and also supports PPP development in Europe

In Europe, multi-peril insurance is on the rise:

- Increased severity and frequency of loss events is expected due to climate change.
- Farmers need comprehensive covers to stabilise investment in production.
- New 2015 EU common agriculture policy supports implementation of PPPs: insurance coverage beyond hail-only, including drought/floods/excess rain.

Multi-peril cover is only sustainable in a PPP:

- A sustainable PPP approach enables risk sharing through premium co-financing with co-financing of cat losses

- Trend of weather patterns with more frequent persistent weather conditions and higher convective potential in Central Europe changes the probability and intensity of weather events. Thus also possible change in losses, with higher volatility of claims costs
- Increased frequency of summer events impacts net earnings and volatility of net results
- Changed patterns in weather risk call for adequate risk perception. Better understanding of risks and detection of accumulations are necessary, as well as detailed analysis of sites
- Tailor-made reinsurance protection needed, e.g. for accumulated losses in net retention
- Innovative insurance solutions, e.g. for
  - significant economic risks triggered by fluctuating and difficult-to-predict weather conditions
  - agricultural insurance through PPP to protect farmers against weather risks

*“We all grumble about the weather, but--but--but nothing is done about it.”*

Mark Twain

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Thank you very much  
for your attention

Dr. Ludger Arnoldussen, Prof. Dr. Peter Höppe