




**INSURANCE OF NATURAL CATASTROPHES:  
DATA REQUIREMENTS, RISK ANALYSIS, INDEMNIFICATION**

Conference Prevention and Insurance of Natural Catastrophes - 18 October 2011, Brussels

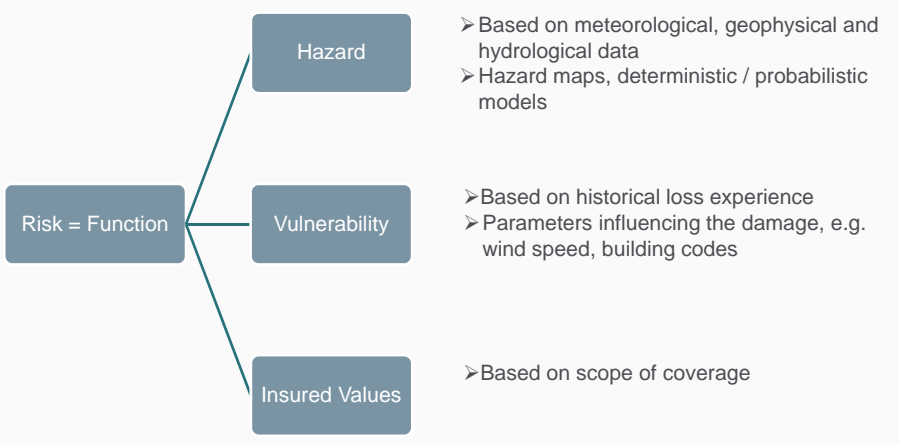
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**Risk principles for the Insurance Industry** 

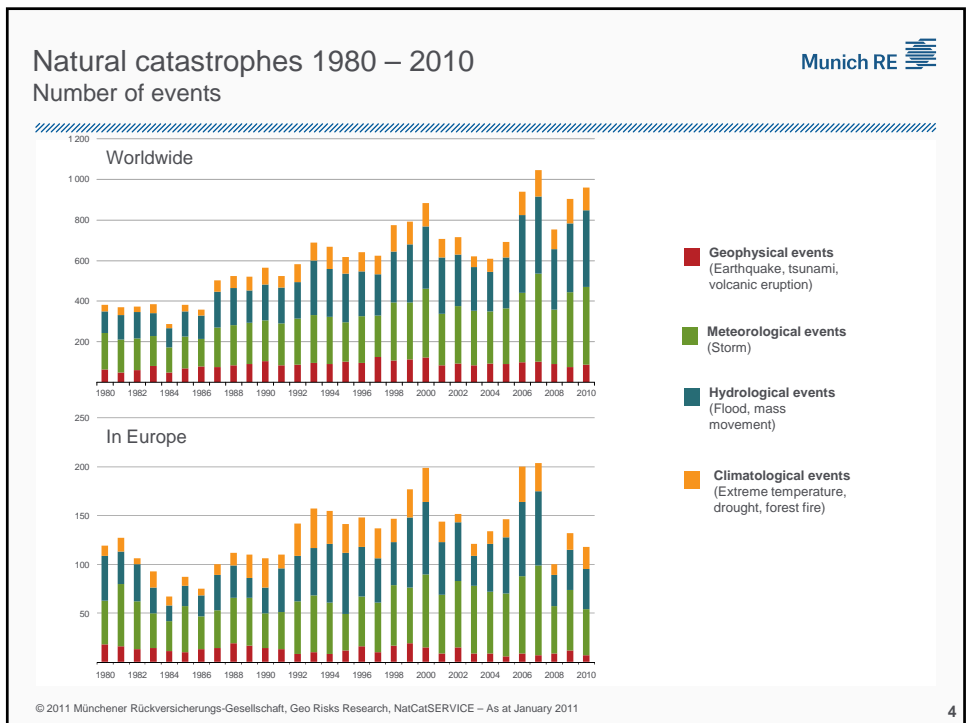
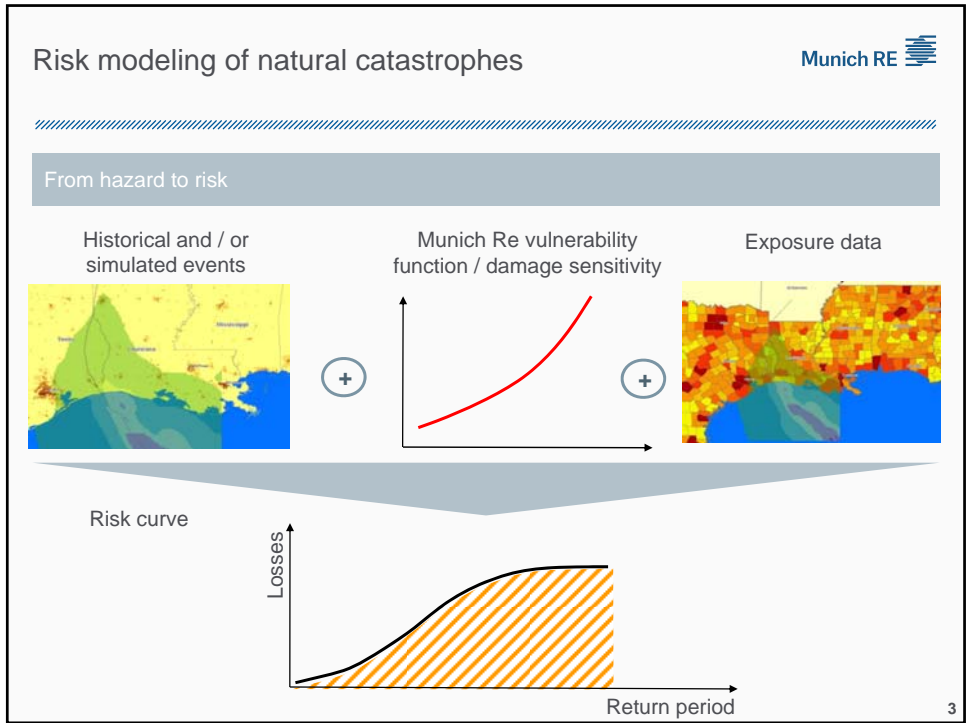
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Risk function and data requirements for the insurance industry to assess the risk




- Hazard**
  - Based on meteorological, geophysical and hydrological data
  - Hazard maps, deterministic / probabilistic models
- Vulnerability**
  - Based on historical loss experience
  - Parameters influencing the damage, e.g. wind speed, building codes
- Insured Values**
  - Based on scope of coverage

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### Significant natural catastrophes 1980 – 2010

5 costliest natural catastrophes ordered by insured losses

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Worldwide.

| Period        | Event                          | Affected Area   | Overall losses          | Insured losses | Fatalities |
|---------------|--------------------------------|---|-------------------------|----------------|------------|
|               |                                |   | US\$ m, original values |                |            |
| 25.-30.8.2005 | Hurricane Katrina, storm surge | USA: LA, New Orleans, Slidell; MS, Biloxi, Pascagoula, Wabeland, Gulfport | 125,000                 | 62,200         | 1,322      |
| 6.-14.9.2008  | Hurricane Ike                  | USA, Cuba, Haiti, Dominican Republic, Turks and Caicos Islands, Bahamas   | 38,300                  | 18,500         | 170        |
| 23.-27.8.1992 | Hurricane Andrew               | USA, Cuba, Haiti, Dominican Republic, Turks and Caicos Islands, Bahamas   | 26,500                  | 17,000         | 62         |
| 17.01.1994    | Earthquake                     | USA: CA, Northridge, Los Angeles, San Fernando Valley, Ventura, Orange    | 44,000                  | 15,300         | 61         |
| 7.-21.9.2004  | Hurricane Ivan                 | USA, Trinidad and Tobago, Venezuela, Colombia, Mexico                     | 23,000                  | 13,800         | 125        |

Europe

| Period         | Event                 | Affected Area   | Overall losses         | Insured losses | Fatalities |
|----------------|-----------------------|---|------------------------|----------------|------------|
|                |                       |   | EUR m, original values |                |            |
| 26.12.1999     | Winter Storm Lothar   | France, Germany, Switzerland, Belgium, Austria                                  | 11,500                 | 5,900          | 110        |
| 18.-20.1.2007  | Winter Storm Kyrill   | United Kingdom, Germany, France, Netherlands, Austria, Switzerland, Poland      | 7,800                  | 4,500          | 49         |
| 25.-26.1.1990  | Winter Storm Daria    | Belgium, Denmark, France, Germany, Ireland, Netherlands, Sweden, United Kingdom | 5,900                  | 4,400          | 94         |
| 12.-20.08.2002 | Floods, severe storms | Germany, Austria, Czech Republic, Hungary, Moldova, Switzerland, Slovakia       | 16,800                 | 3,500          | 39         |
| 15.-16.10.1987 | Winder Storm          | France, Norway, Spain, United Kingdom   | 3,500                  | 2,800          | 18         |

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### Munich Re NatCatSERVICE


The world's most comprehensive database of natural catastrophes

> From 1980 until today all loss events  
 > For USA and selected countries in Europe all loss events since 1970  
 > Retrospectively all Great Natural Catastrophes since 1950  
 > In addition all major historical events starting from 79 AD (eruption of Mt. Vesuvio)  
 > Currently more than 28,000 events documented

NatCatSERVICE database uses a uniform worldwide standard for recording events due to natural hazards.

Subdivision into event groups (e.g. storms) and event types (e.g. tropical storms).

| Geophysical events   | Meteorological events  | Hydrological events   | Climatological events  |
|--|--|---|--|
| Earthquake<br>Volcanic eruption<br>Mass movement (dry)<br>- Rock fall<br>- Landslide<br>- Subsidence | Storms<br>- Tropical storm<br>- Extratropical storm<br>- Local windstorm | Flooding<br>- River flood<br>- Flash flood<br>- Storm surge<br>Mass movement (wet)<br>- Rock fall<br>- Landslide<br>- Avalanche<br>- Subsidence | Extreme temperatures<br>- Heatwave<br>- Freeze<br>- Extreme winter conditions<br>Drought<br>Wildfire |


Indemnification schemes Munich RE 

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Types of loss compensation

- **Loss based indemnification:**  
Compensatory damages up to the sum insured of the insurance policy  
*Advantage:* individual loss-based pay-out, core competence of insurance  
*Disadvantage:* high administration costs; large loss events: demand surge, claims inflation and repair-cost-delay inflation
- **Parametric trigger based indemnification:**  
Event definition trigger-based pay-out (e.g. weather trigger)  
*Advantage:* low administration cost; quick pay-out based on objective scientific data  
*Disadvantage:* high basis risk, potential mismatch between event definition and loss
- **Model based indemnification:**  
Pay-out based on model-simulated loss  
*Advantage:* quick pay-out, low administration cost  
*Disadvantage:* high basis risk

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Conclusions Munich RE 

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Key takeaways

- The insurance industry offers risk transfer solutions for basically all types of natural catastrophes.
- Depending on the availability of scientific data and claims data / loss experience different risk transfer mechanisms can be used.
- Market / client decide on most appropriate risk transfer solution based on their specific needs.

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THANK YOU FOR YOUR INTEREST

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