GREENHOUSE 2011, CAIRNS
MANAGING THE UNAVOIDABLE:
NATURAL CATASTROPHES

Data, trends, analysis

Sandra Schuster
Who is Munich RE?

- Insurer of Insurances
- Founded 1880
- The world’s largest re-insurer
- Premium income ca. € 22 bn
- Leading role in insurance of natural catastrophes

Geo Risks Research of Munich Re – Analyses of natural disasters since 1974
Core business of insurance industry is quantification of risks!
Weather disasters

The last years have brought records in weather disasters in respect to:

- Intensities
- Frequencies
- Damages and losses
NatCatSERVICE
One of the world’s most comprehensive database on natural catastrophes

• from 1980 until today all loss events
• retrospectively, all “great” natural catastrophes since 1950
• all major events starting from 79 AD – eruption of Mt. Vesuvio (3,000 historical data sets)
• currently more than 27,000 events documented
• The Munich Re NatCatSERVICE records up to 1,000 loss events per year.
### 2010: The year of fire, water, air and ...

#### Wildfires in Russia: July to Sept

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>Fatalities</strong></td>
<td>56,000</td>
</tr>
<tr>
<td><strong>Overall losses</strong></td>
<td>3,600</td>
</tr>
<tr>
<td><strong>Insured losses</strong></td>
<td>20</td>
</tr>
<tr>
<td><strong>Number of homes destroyed</strong></td>
<td>2,500</td>
</tr>
<tr>
<td><strong>Burned area</strong></td>
<td>&gt;12,500 km²</td>
</tr>
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</table>

* Black Saturday: 4,300 km²

#### Flooding Pakistan: July to Sept

<p>| | |</p>
<table>
<thead>
<tr>
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<tbody>
<tr>
<td><strong>Fatalities</strong></td>
<td>1,760</td>
</tr>
<tr>
<td><strong>Homeless</strong></td>
<td>6 million</td>
</tr>
<tr>
<td><strong>Overall losses</strong></td>
<td>9.5</td>
</tr>
<tr>
<td><strong>Insured losses</strong></td>
<td>100</td>
</tr>
<tr>
<td><strong>Number of homes destroyed/damaged</strong></td>
<td>approx. 1.5 million</td>
</tr>
<tr>
<td><strong>Flooded fields, one-fifth of the country was flooded</strong></td>
<td>&gt;69,000 km²</td>
</tr>
</tbody>
</table>

#### Winter storm Xynthia - Spain, France, Germany: February

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<table>
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<td><strong>Overall losses</strong></td>
<td>6,100</td>
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<tr>
<td><strong>Insured losses</strong></td>
<td>3,100</td>
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</tbody>
</table>

2010 hurricane season was most active, however, the losses inflicted were only moderate as very few made landfall.
2010 (2011?): a year of earthquakes
2010 fatalities: 295,000  second highest death toll since 1980

- Haiti, 12 January (magnitude 7.0)
- Chile, 27 February (magnitude 8.8)
- China, 13 April (magnitude 7.0)
- New Zealand, 40km west of Christchurch, 4 September (magnitude 7.1, 10km depth)
- New Zealand, 10km SE of Christchurch, 22 February (magnitude 6.3, 5km depth)

<table>
<thead>
<tr>
<th>Location</th>
<th>Date</th>
<th>Magnitude</th>
<th>Fatalities</th>
<th>Injured</th>
<th>Overall losses (US$ bn)</th>
<th>Insured losses (US$ bn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Haiti</td>
<td>12 Jan</td>
<td>7.0</td>
<td>-</td>
<td>2</td>
<td>6.5</td>
<td>5</td>
</tr>
<tr>
<td>Chile</td>
<td>27 Feb</td>
<td>8.8</td>
<td>-</td>
<td>165 +</td>
<td>10-15 Est. NZ Treasury</td>
<td>6 –12 MKT Est. Only</td>
</tr>
<tr>
<td>China</td>
<td>13 Apr</td>
<td>7.0</td>
<td>-</td>
<td>2</td>
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<td>5</td>
</tr>
<tr>
<td>New Zealand</td>
<td>4 Sep</td>
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Second deadliest EQ with 222,570 fatalities
Second costliest EQ with US$ 8bn insured losses
Costliest insured natural catastrophe in NZ history.
Natural catastrophes worldwide 1980 – 2010
Number of events with trend

- 2010 is second highest since 1980 with 960 events
- ø10years: 785
- ø30years: 615
Natural catastrophes worldwide 1980 – 2010
Number of events by peril with trend
2008 was one of the most devastating years on record: TC Ike, TC Nargis, EQ Sichuan /China, winter storm

2010
US$ bn 150 overall
(amongst the 5 costliest years since 1980)
US$ bn 38 insured
(in line with ø10 years)
Natural catastrophes 2010
Insured losses US$ 38bn - Percentage distribution per continent

<table>
<thead>
<tr>
<th>Continent</th>
<th>Overall losses [US$ m]</th>
<th>Insured losses [US$ m]</th>
<th>Fatalities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>110</td>
<td>Minor losses</td>
<td>1,300</td>
</tr>
<tr>
<td>America (North and South America)</td>
<td>75,000</td>
<td>23,600</td>
<td>225,000</td>
</tr>
<tr>
<td>Asia</td>
<td>36,000</td>
<td>900</td>
<td>12,400</td>
</tr>
<tr>
<td>Australia/Oceania</td>
<td>16,000</td>
<td>8,200</td>
<td>40</td>
</tr>
<tr>
<td>Europe</td>
<td>22,000</td>
<td>5,600</td>
<td>56,500</td>
</tr>
</tbody>
</table>

11% of premium income was paid by MR for natural catastrophes in 2010
(avg. 6-7% in normal year!)
Natural catastrophes 1980 - 2010
Insured losses US$ 740bn - Percentage distribution per continent

<table>
<thead>
<tr>
<th>Continent</th>
<th>Insured losses* [US$ m]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Africa</td>
<td>2,000</td>
</tr>
<tr>
<td>America (North and South America)</td>
<td>496,000</td>
</tr>
<tr>
<td>Asia</td>
<td>66,000</td>
</tr>
<tr>
<td>Australia/Oceania</td>
<td>23,000</td>
</tr>
<tr>
<td>Europe</td>
<td>148,000</td>
</tr>
</tbody>
</table>

© 2011 Münchener Rückversicherungs-Gesellschaft, Geo Risks Research, NatCatSERVICE – As at January 2011 - * Losses in 2010 values
Natural catastrophes in Australia/Oceania 1980 – 2010
Geographical overview in US$

- Hailstorm (Perth) March 2010
  - Insured losses*: US$ 990m

- Hailstorm (Melbourne) March 2010
  - Insured losses*: US$ 950m

- Cyclone Larry March 2006
  - Insured losses*: US$ 450m

- Flood (Queensland) Dec 2010 - Jan 2011
  - Insured losses*: US$ 890m

- Earthquake (Newcastle) Dec 1989
  - Insured losses*: US$ 670m

- Hailstorm (Sydney) April 1999
  - Insured losses*: US$ 1,100m

- Wildfire (Victoria) Feb 2009
  - Insured losses*: US$ 650m

- Earthquake (Christchurch) Sept 2010
  - Insured losses*: US$ 5,000m (Preliminary estimation)

- Flood (Queensland) Feb 2008
  - Insured losses*: US$ 890m

Geophysical events
- (Earthquake, tsunami, volcanic eruption)

Meteorological events
- (Storm)

Hydrological events
- (Flood, mass movement)

Climatological events
- (Extreme temperature, drought, forest fire)

1 Munich Re catastrophe categories
* Losses in original values

Small-scale¹/Moderate¹/Severe¹ loss events
Major¹/Devastating¹/Great¹ Catastrophes
[Overall losses of US$ >200m (in 2010 values) and/or >100 fatalities]
**Recent Disaster Statistics - estimates**

<table>
<thead>
<tr>
<th>Event</th>
<th>Location</th>
<th>Preliminary insured losses (AUD m)</th>
<th>Number of Claims</th>
</tr>
</thead>
<tbody>
<tr>
<td>QLD floods (Dec 19-28)</td>
<td>Central &amp; Coastal (Rockhampton, Bundaberg, Bowen (incl. some of the mining losses))</td>
<td>414m (includes some mining losses)</td>
<td>14,588</td>
</tr>
<tr>
<td>QLD floods (Jan 11-13)</td>
<td>Toowoomba, Lockyer Valley, Ipswich, Brisbane (CBD)</td>
<td>1,700m</td>
<td>34,021</td>
</tr>
<tr>
<td>QLD Tropical Cyclone Yasi (Feb 3)</td>
<td>North Queensland</td>
<td>868m (TC Larry 540m)</td>
<td>59,990</td>
</tr>
<tr>
<td>VIC floods (Jan 12-15)</td>
<td>Victoria</td>
<td>86m</td>
<td>6,609</td>
</tr>
<tr>
<td>VIC severe Storm Melbourne &amp; suburbs (Feb 3-5)</td>
<td>Victoria, Melbourne (CBD)</td>
<td>299m</td>
<td>38,984</td>
</tr>
<tr>
<td>WA Feb Bushfires Perth and surroundings</td>
<td>Perth, WA</td>
<td>35m</td>
<td>410</td>
</tr>
</tbody>
</table>

**Geographical spread of claims**

- Regional Qld 30%
- Brisbane 53%
- Toowoomba & Lockyer Valley 17%

State government estimate: AUD 5.8bn
(50% is damage to road infrastructure) Feb 2011

Source: Insurance Council of Australia
Australia 2010
Hailstorms

**Melbourne, 6th March 2010**
- Grapefruit size hail
- Wind gusts of more than 100km/h
- 45mm of rain in 30min
- Over 6000 requests for assistance
- AUD 1,044m; 130,000 claims
- Com/Motor/Home 10%/45%/45% (MR estimates)

**Perth, 22nd March 2010**
- Tennis ball size hail
- Wind gusts of more than 120km/h
- 63mm of rain in 2h
- Over 3000 requests for assistance
- AUD 1,053m; 150,000 claims
- Com/Motor/Home 5%/55%/40% (MR estimates)

**What do we know about Hail?**
- Very few studies globally as to how hail risk will change
- Sydney study: increase in frequency & intensity of hailstorms
- Australian wide study: similar increase in hail frequency along eastern seaboard / decrease in the south
- Little work has been done to quantify the relation of hailstorms and ENSO
- Comprehensive and detailed analysis of past and future hailstorms is crucial in order to improve risk management strategies

**With 9 out of the largest 27 losses* in Australia, Hail presents the most underestimated insured peril!**

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* greater than AUD 400m
Natural catastrophes in Australia / Oceania 1980 – 2010
Number of events and trend; 65 in 2010

Number of events

Overall and insured losses

Significant trend for weather related perils

Increasing ratio of insured / overall losses

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NatCatSERVICE
Natural catastrophes in Australia/Oceania 1980 – 2010
Annual number of events according to catastrophe classification

Munich Re's catastrophe classification:
- **Damaging events:** <20 deaths, up to considerable property damage
- **Severe catastrophes:** 20-500 deaths, AUS 55-550m overall losses
- **Major catastrophes:** >500 deaths, >AUS 550m overall losses

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Natural catastrophes, especially weather related events, are increasing dramatically in number and loss magnitude, both globally and in Australia.

- Rise in population
- Better standard of living
- Increasing insurance density
- Settlement in extremely exposed regions
- Increased vulnerability of modern societies and technologies to natural hazards
- More scientific evidence for causal links between global warming and increasing frequencies and intensities of natural catastrophes.
Thank you for your attention!

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Dr. Sandra Schuster