Economic Risk and Potential of Climate Change

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Economic Risk and Potential of Climate Change

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As extreme weather events affect the core business of insurance this industry has quite early analysed potential effects of global warming on natural catastrophe hazards. Munich Re already in 1973 has addressed this topic in a publication. Today climate change is regarded as one of the largest risks for insurance industry. Munich Re's experts have been researching loss events caused by natural hazards around the globe for over 35 years. These losses are documented in the NatCatSERVICE database currently documenting more than 27,000 single events.

In recent years we have seen many natural catastrophes with records in intensities and losses caused by them such as:

- The hundred-year flood in the Elbe region in Germany in the summer of 2002, still the most expensive natural catastrophe in Europe
- The 450-year event of the hot summer of 2003, which caused more than 70,000 heat fatalities in Europe
- The largest ever recorded number of tropical cyclones (28) and hurricanes (15) in a single North Atlantic season in 2005, with the strongest (Wilma – core pressure: 882 hPa), fourth strongest (Rita), and sixth strongest (Katrina) hurricanes on record.
- Hurricane Katrina, the costliest single event of all times, with economic losses of over US$ 125bn and insured losses of approximately US$ 60bn;
- In October 2005, Hurricane Vince formed close to Madeira, subsequently reaching the northernmost and easternmost point of any tropical cyclone.
- In 2006 record heat in July in the Netherlands: about 1000 heat fatalities.
- Winter storm Kyrill (January 2007) has caused the second largest losses in Europe caused by a winter storm
- Largest losses ever caused by flooding in the UK in June/July, 2007.
- Hurricane season 2008: Gustav had the highest ever measured gust wind velocity of a hurricane near the ground (340 km/h measured at a site in Cuba), Ike had the highest ever calculated destructive potential calculated by the Integrated Kinetic Energy Index.
- In 2009 tropical storm Grace set a new record as never before a tropical storm has been documented developing so far north-east in the Atlantic Ocean!

The analyses of the NatCatSERVICE data clearly show a dramatic increase in the number of natural catastrophes around the globe, with ever growing losses. The trend curve indicating the number of devastating natural catastrophes (losses > US$ 500m at current values or

fatalities > 500) worldwide reveals an increase from about 17 per year at the beginning of the 1980s to about 33 at the present time and thus roughly a doubling (figure 1).

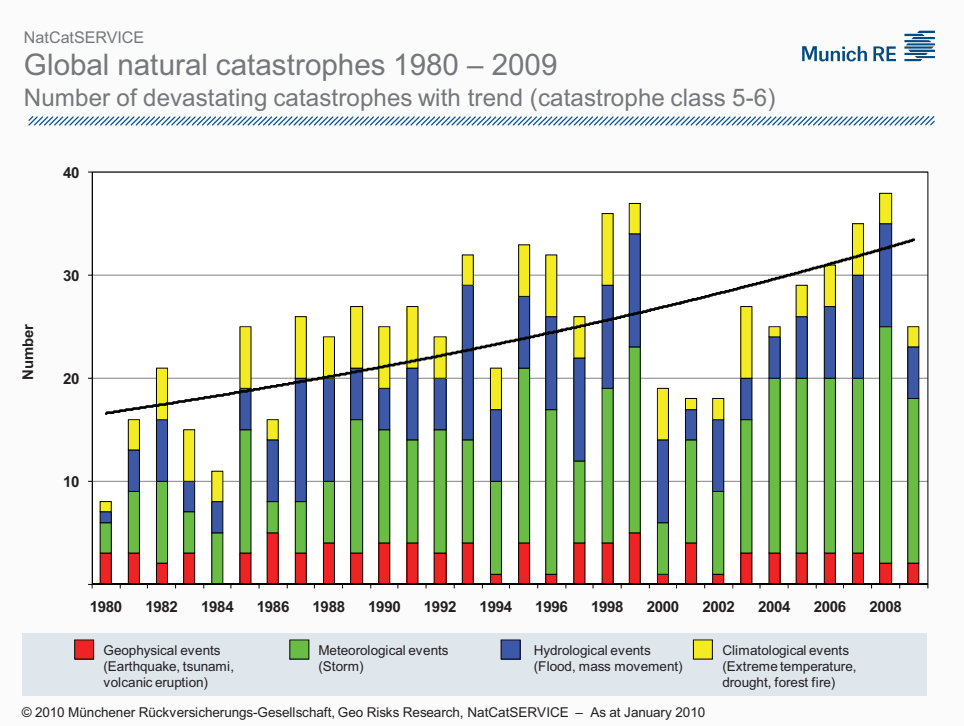

Figure 1: Annual number and trend line of devastating catastrophes (catastrophe classes 5-6) (Source: NatCatSERVICE, Munich Re).

Since 1980 on average 18% of the devastating weather events have occurred in Europe, the continent affected most has been Asia with 39%, second North America with 33%. In Europe 33% of the events have been caused by floods, 32% by wind storms, 25% by other weather related events and 10% by earthquakes.

Economic and insured losses resulting from weather disasters have risen even more sharply. In 2005, a record year, global economic losses were as high as nearly US$ 180bn and insured losses around US$ 90bn.

The main reasons for the sharp increase in losses from weather-related catastrophes are population growth, the settlement and industrialisation of regions with high exposure levels and the fact that modern technologies are more vulnerable to losses. The state of Florida in the USA, which has always had a high hurricane exposure, is a good illustration of the way that socioeconomic factors can act as natural catastrophe loss drivers. The population there has grown from three million in 1950 to the current 19 million.

As the rise in the number of natural catastrophes is largely attributable to weather-related events like windstorms and floods (figure 2), with no similarly strong increase in geophysical events such as earthquakes, tsunamis, and volcanic eruptions, there is some justification in assuming that anthropogenic changes in the atmosphere, and climate change in particular, play a decisive role. There has been more and more evidence to support this hypothesis in recent years. The fourth status report of the Intergovernmental Panel on Climate Change (IPCC 2007) regards the link between global warming and the greater frequency and intensity of extreme weather events as probable. The report finds, with more than 66% probability, e.g. that climate change already produces more heat waves, heavy precipitation, drought and intense tropical storms and that such effects will be growing in the future.

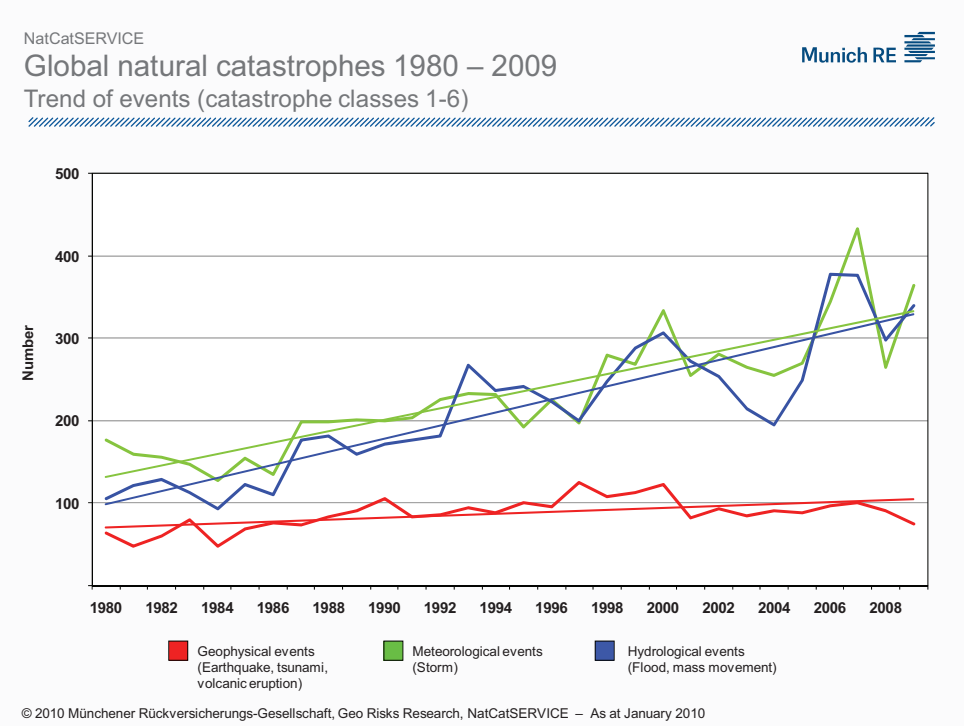

Figure 2: Annual numbers and trend lines of loss relevant natural events broken down to the different perils (Source: NatCatSERVICE, Munich Re).

The rise in global average temperatures significantly increases the probability of record temperatures. Higher temperatures also enable air to hold more water vapour, thus increasing the precipitation potential. Combined with more pronounced convection processes, in which warm air rises to form clouds, this results in more frequent and more extreme intense precipitation events. Already today such events are responsible for a large proportion of flood losses.

Now that a number of changes have already happened and some of the predictions for the coming decades have already been seen, the key issue is no longer if and when there will be conclusive proof of anthropogenic climate change. The crux of the matter is whether the existing climate data and climate models can provide sufficient pointers for us to estimate future changes with reasonable accuracy and formulate adaptation and prevention strategies in good time.

The insurance industry's natural catastrophe risk models have already been adjusted in the light of the latest findings. For instance, they now incorporate the increased hurricane hazard due to higher sea surface temperatures that will remain above the long-term average due to the ongoing cyclical warm phase in the North Atlantic and the continuous warming caused by anthropogenic climate change.

Global warming is one of the largest risks for humankind in this century. Mitigation of global warming is urgent in order to keep the changes manageable, ambitious reductions of CO_2, the most important greenhouse gas, are indispensable. In order to achieve a long term and sustainable solution the energy supply has to be transformed to carbon free renewable energies. In this context hydrogen will play an important role as an environmentally friendly energy carrier.

The insurance industry after having been one of the first alerters of potential climate change effects now consequently is providing solutions both for mitigation of and adaptation to the problem. Such solutions provide great business opportunities for the first movers in these new technologies. So e.g. Munich Re together with the Desertec Foundation has initiated the foundation of the Desertec Industrial Initiative GmbH, which is developing a business case for the carbon free generation of large amounts of electricity in the deserts of North Africa. By custom made insurance covers for innovative technologies like renewable energies and hydrogen technologies, incentives can be given for investments into such assets.

With our long experience we have not only created unique expertise on natural catastrophe risks in this changing world but also on insurance solutions for innovative climate protection technologies, hydrogen energy being one of them.