

Climate Change

The Risk of (Climate) Change: Hot Times Ahead

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The concentration of climate gases is increasing, and with it the challenges facing the insurance industry. In short, stable reinsurance capacity will not be possible in the future without risk-adequate insurance prices. The solution to this problem may well be risk partnerships between primary insurers and reinsurers and the capital markets.

The subject of climate change is by no means new to scientific research. In fact, it is over 20 years since leading academic institutions started research into the processes that are triggered by an increase in the concentration of climate damaging trace gases in the atmosphere. Many of these studies were, or rather should have been, of major significance for the insurance industry. However, the results were mostly of a qualitative nature only and involved projections far into the future – too far for some risk carriers to take seriously.

The 2005 watershed

This situation altered dramatically in 2005. Even before the record losses from Hurricane Katrina, studies had been published which analysed the changed hurricane exposure in the North Atlantic and investigated natural as well as man-made influences on the sea surface temperature. The conclusions arrived at in these studies were so specific and definitive that the insurance industry was left in no doubt about the need for quantitative adjustments to its hurricane risk models. Munich Re included elements of these scientific works, such as the changed hurricane frequency, in its risk evaluations for the renewals at 1 January 2006.

A look at the loss years 2004 and 2005 raises the following question: Were climate researchers in fact not forthright enough in the predictions they made? To find out, let us go back 16 years to an article on climate

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change in a Munich Re publication on windstorms, which offered a detailed summary of the state of knowledge on this subject at this time.

Munich Re's special publication "Windstorm" from 1990

"A warmer atmosphere and warmer seas result in greater exchange of energy and add momentum to the vertical exchange processes so crucial to the development of tropical cyclones, tornadoes, thunderstorms and hailstorms. Accordingly, such natural hazards will increase not only in frequency and intensity, but also in duration and the size of the areas at risk. This applies above all to tropical cyclones, which will penetrate moderate latitudes and thus also affect areas so far not exposed to this risk. Hence, risk conditions are not only growing worse in the population centres and industrial regions along the north-east coasts of the USA, Australia and New Zealand or in the whole of Japan already exposed to such hazards in the past, but possibly also along the coasts of Western Europe, which [...] might even be reached by a full-fledged hurricane. [...] Last but certainly not least, water temperatures in some parts of the South Atlantic will reach the critical threshold of 27°C already mentioned, opening up the door for the development of tropical cyclones so far not encountered in that part of the world. It goes without saying that such cyclones would then present a tremendous hazard along the coast of Brazil."

Chronicle of climate change

The mean global temperature has risen by 0.7°C over the last 100 years and by 0.3°C in the last 20 years alone. That is equivalent to a one-hundred-year increase of 1.5°C.

2001 to 2005 were among the five warmest years since temperature readings began.

According to preliminary estimates by the World Meteorological Organisation, 2005 was in global terms the second warmest year ever recorded. If one considers only the northern hemisphere, 2005 was the warmest year ever recorded.

The mean surface temperature of the tropical oceans has risen by 0.5°C since 1970.

The CO₂ content of the atmosphere increased by more than a third during the main phase of industrialization following 1800.

Since the end of the 19th century, the surface area of inland glaciers has decreased worldwide by about 50%.

In the last 25 years the Arctic sea ice cover (measured every year at the end of September) has diminished by some 8%.

Indeed, we have witnessed events in recent years which make the predictions back then appear almost optimistic. These exceptional meteorological phenomena include:

2002: the hundred-year floods on the Elbe in Germany and neighbouring countries

2003: the summer heatwave in Europe with over 35,000 fatalities

2004: the then highest losses from hurricanes in the North Atlantic in a single season

2004: the highest recorded number of tropical cyclones with landfall in Japan in a single year

2004: the first tropical cyclone in the South Atlantic with landfall in Brazil

2005: the highest number of tropical cyclones (27) and hurricanes (15) in a single season in the North Atlantic

2005: the strongest hurricane ever recorded in the North Atlantic (Wilma, 882 hPa central pressure), the fourth strongest (Rita) and the sixth strongest (Katrina) in a single season.

2005: the most northerly and easterly hurricane ever (Vince), which formed in October near Madeira

2005: the first tropical storm ever (Delta) to reach the Canary Islands

This catalogue of disasters clearly shows that some of the long-term changes in weather patterns that experts had predicted back in the early 1990s have taken just a few years to become reality.

Challenges for the insurance industry

Now risk carriers agree that there is a need for change. New frequencies and intensities of extreme weather events must be incorporated in risk measurement and in the calculations to determine price and accumulation. The next stages of this process are crucial:

- Classify the changed circumstances according to hazard – windstorm, flood, hail – and region
- Quantify the changes more precisely, both for smaller and more frequent events and for less frequent and more intense or catastrophe (accumulation) events

Science provides the impulses required to re-evaluate risks. However, the responsibility for decisions based on the findings of climate research rests with the risk carriers. When science can only provide an imprecise guide to the expected changes or probabilities, it is up to the insurance industry to develop its own answers to the problem. The key to risk evaluation, i.e. weighing up arguments for an optimistic or conservative assessment, will be to avoid making decisions which are detrimental to the principle of caution.

Innovation complements tradition

Rising mega-loss potentials are testimony to the need for alternative forms of risk transfer. The two most widespread products currently used in the market are both non-traditional:

- Risk-swap: the exchange of risks between insurance companies. For example, windstorm Europe against earthquake Japan with one or more insurers
- Cat bonds: the transfer of risks to the capital market. The trading volume of both products has risen steadily in recent years, and they constitute a useful addition to traditional reinsurance and retrocession solutions. However,

the insurance industry's capacity for innovation has by no means been fully exploited just yet. In order to become more efficient, alternative risk transfer products need to be standardised further and reach additional investor groups.

Risk partnership for sustainable solutions

The range of catastrophe covers can only develop further in the long term if the insurance and reinsurance markets pursue this objective together with the capital markets.

One thing is certain: the risk partnership will need to be redefined and will have to focus on the following fields of activity:

Reducing the loss susceptibility of insured risks

This includes amending and monitoring building regulations and land-use restrictions in areas at risk, such as those exposed to storm surge and flooding. Such changes will concern owners and/or operators of insured property as well as public institutions responsible for approving building land. The insurance industry

can play a key advisory role here thanks to its wealth of experience in dealing with losses. As a result, loss-minimisation measures will be taken into account in the risk-measurement process and will directly benefit insureds in the form of cheaper premiums.

Risk-adequate premiums

A steady supply of natural catastrophe covers is only possible if the claims paid out by insurers do not exceed their risk premium revenues in the long term. Prices must be adjusted so that they keep pace with changes in risk. Intervening in the insurance industry's freedom to set prices would be counterproductive. Instead of protecting consumers, this would in fact bring about a reduction in the cover on offer in the medium term.

Insurers must accept the challenges posed by the risk of climate change and make sure they accord it sufficient consideration in the risk-management process. Given a partnership involving all risk carriers and a fair distribution of the burden, ample insurance and reinsurance cover will continue to be available at affordable prices. ■