



sigma

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**Natural catastrophes and man-made disasters
in 2007:**
high losses in Europe

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Swiss Reinsurance Company
Economic Research & Consulting
P.O. Box
8022 Zurich
Switzerland

Telephone +41 43 285 2551
Fax +41 43 285 4749
E-mail: sigma@swissre.com

New York Office:
55 East 52nd Street
40th Floor
New York, NY 10055

Telephone +1 212 317 5135
Fax +1 212 317 5455

Hong Kong Office:
18 Harbour Road, Wanchai
Central Plaza, 61st Floor
Hong Kong, SAR

Telephone +852 2582 5691
Fax +852 2511 6603

Authors:
Rudolf Enz
Telephone +41 43 285 2239

Kurt Karl (Chapter on indices)
Telephone +41 212 317 5564

Jens Mehlhorn (Chapter on floods)
Telephone +41 43 285 4304

Susanna Schwarz
Telephone +41 43 285 5406

sigma co-editor:
Brian Rogers
Telephone +41 43 285 2733

Managing editor:
Thomas Hess, Head of Economic Research
& Consulting, is responsible for the *sigma*
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Catastrophes in 2007: more than 20 000 fatalities, losses of roughly USD 70bn, insurers bear USD 28bn of the losses

Although 2007 was not an exceptional year in terms of either fatalities or losses, statistics confirm a trend towards an increase in the number – and cost – of natural catastrophes and man-made disasters. Natural catastrophe losses are rapidly on the rise, especially those related to storms and flooding.

Catastrophes claimed the most lives in Bangladesh, India, China and Pakistan in 2007. In terms of property and insured losses, Europe was the worst hit last year. However, losses in the US, which are usually at the top of the loss tables, were minor in comparison.

A total of 21 500 people fell victim to catastrophes in 2007.

- 14 600 died as a result of natural catastrophes, though most of them – 12 500 – perished because of storms and flooding. In Bangladesh and India alone, 6 700 people lost their lives, while in China, Pakistan and Europe, the death toll was 1 300, 700 and 80, respectively.
- Man-made disasters claimed 6 900 lives; including over 2 000 lives that were lost due to passenger ship accidents.

Property losses from catastrophes in 2007 were estimated at approximately USD 70bn. Most of the losses were uninsured, leaving private individuals, companies or the state to bear the costs. Nevertheless, insurers covered USD 27.6bn of the losses in 2007, which was USD 10.7bn more than in 2006.

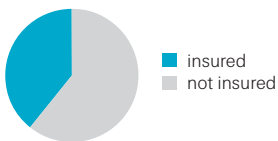
Of the USD 27.6bn in insured losses, USD 23.3bn could be attributed to natural catastrophes, while the remaining USD 4.3bn were due to major man-made disasters.

Storms and floods were the most prevalent natural catastrophes in 2007:

- In January, winter storm Kyrill caused losses of USD 10bn in Germany, the UK, Belgium and the Netherlands (the insured loss was USD 6.1bn).
- The UK was hit several times by heavy rainfall and flooding during the summer. The losses were estimated at USD 7.2bn (the insured loss was USD 4.8bn).
- At the end of October, floods in the Tabasco region of Mexico led to losses of USD 4.5bn (the insured loss was USD 0.5bn).
- At the beginning of June, Cyclone Gonu caused losses of USD 3.9bn in the Gulf of Oman (the insured loss was USD 0.6bn).
- The most expensive event in the US occurred in April: a storm with high winds, hail and floods, which resulted in losses of USD 2bn (the insured loss was USD 1.6bn).
- October's forest fires in California caused losses in excess of USD 2bn (the insured loss was USD 1.1bn).

With regard to man-made catastrophes, several industrial fires and accidents in the energy and space sectors each contributed insured losses of USD 100m.

14 600 lives claimed by natural catastrophes, and 6 900 by man-made disasters



Insured flood losses have increased by 7% annually in real terms since 1970.

Loss figures indicate that the hazard potential of flood losses is not sufficiently accounted for in flood coverage in Europe.

Indices play a key role in the transfer of insurance risks to the capital markets.

Due to premium underpricing, US state insurers have gained significant ground, leaving taxpayers and other policyholders to cover the gaps.

Better pricing of flood losses, increased capital market protection and more state participation in response to the rising trend in losses

Long-term figures indicate a steep upward trend, particularly in flood losses. Since 1970, losses have risen annually by an average of 12% (or 7% when adjusted for inflation). This translates into a doubling of the nominal burden in just over six years. The developments of recent years have prompted insurers and politicians to take action.

Over the past few years, insurers have been working to adapt their models to the new data and findings, especially since their flood loss models are still flawed. Most flood models rely heavily on data from the 1960s to the 1980s, when the incidence of flooding in Europe was below the norm. As a result, the probability of flood events is under-weighted in most flood models.

The insurers' other focus is on the transfer of catastrophe risks to the capital markets. An important aspect of this is the development of transparent indices outside the US. Under the guidance of the CRO Forum (Chief Risk Officer Forum of the Geneva Association), the insurance industry in Europe has launched an initiative aimed at developing loss-based indices for Europe.

Politicians are taking a variety of approaches to dealing with catastrophe losses, though some observers have criticised the tendency of the state to react to catastrophes by stepping up intervention. Experience has shown that this often has a counterproductive effect from an economic perspective.

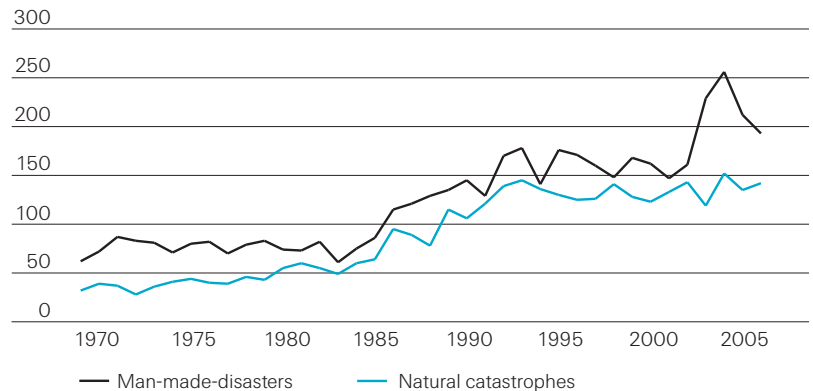
- In continental Europe and the UK, the state restricts itself mainly to shaping conditions in such a way as to ensure that policyholders are covered. One further important element is prevention.
- In the US, however, the state intervenes more directly. For example, with the primary insurer, Citizens Property Insurance Corporation, and a reinsurer, the Florida Hurricane Catastrophe Fund, the state has a direct influence on the Florida insurance market. The sale of catastrophe covers at below-market prices and the financing of them – with either indirect subsidies from other insurance lines or taxpayers' money – create problems for private commercial insurers. Other concerns about the approach adopted in Florida include the non-sustainable nature of the financing and the indiscriminate levels of compensation, which, in some cases, are extended to affluent homeowners, but not necessarily to those most in need of financial assistance. Moreover, the non-risk-adjusted insurance prices often wrongly incentivise people to continue investing in highly exposed regions.
- In Germany, the state provided generous assistance after the floods of 2002, which led to consequences similar to those in Florida.

Overview of catastrophes in 2007

More than three hundred catastrophes in 2007

In 2007, 142 natural catastrophes and 193 man-made disasters were recorded. As in previous years, the reporting threshold was raised in line with US inflation. Even if the number of natural catastrophes is somewhat lower than in previous years, we assume that the long-term trend towards more loss events will continue in the areas of natural catastrophes and man-made disasters.

Figure 1
Number of events 1970–2007



More than 21 500 catastrophe victims across the globe

Natural catastrophes claimed
14 600 lives in 2007

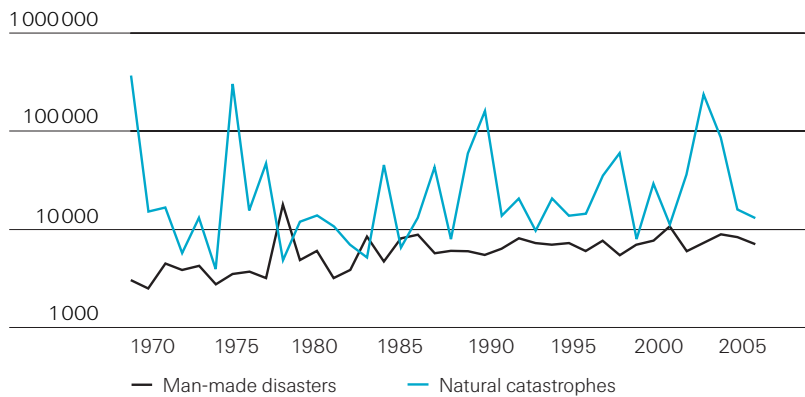
In 2007, natural catastrophes claimed 14 600 lives, including those reported missing. This is lower than the long-term average of 55 000 fatalities dating back to 1970. The worst catastrophes hit developing and threshold countries in 2007.

Asia, the most densely populated continent, registered the most deaths. Storms, floods and landslides in Asia claimed more than 11 000 lives, with Cyclone Sidr alone causing 3 363 fatalities in Bangladesh in November; 871 people are still reported as missing. Latin America also had its share of catastrophes in 2007. A severe earthquake with a magnitude of 8 on the Richter scale hit Peru on 15 August. The quake was followed by several serious aftershocks that mostly affected the Ica-Lima-Pisco region. More than 52 200 houses were destroyed and roughly 140 000 people were left homeless; over 500 people died and 1 000 were injured.

Man-made disasters claimed more than 6 900 lives.

Of the 6 900 deaths from man-made disasters in 2007, shipping disasters claimed 2 200 lives, which was higher than the long-term average. Numerous accidents, involving mostly unseaworthy boats overflowing with illegal immigrants, took place in the Gulf of Aden, claiming more than 800 lives. Bombings, social unrest and riots also claimed more than 1 300 lives across the globe, with more than 500 deaths in Pakistan alone.

Figure 2
Number of victims 1970–2007



* The scale is logarithmic – the number of victims increases tenfold per band.

Total financial losses from natural catastrophes were USD 63.7bn – from man-made disasters, USD 6.9bn

Total financial losses estimated at USD 70bn

Catastrophes led to financial losses¹ of USD 70.6bn in 2007; USD 63.7bn of these losses were caused by natural catastrophes, while man-made disasters accounted for USD 6.9bn. Winter storm Kyrill in Europe contributed significantly to the losses – USD 10bn – followed by the summer flood catastrophes in the UK with USD 7.2bn. The severe flooding at the end of October and the beginning of November in Mexico’s Tabasco region caused a total loss of roughly USD 4.5bn. Meanwhile, Cyclone Gonu in the Gulf of Oman was responsible for a loss of USD 3.9bn.

¹ See page 42 “Terms and selection criteria” for the calculation of total losses.

Insured losses of USD 23.3bn from natural catastrophes

Insured losses of USD 4.3bn from man-made disasters

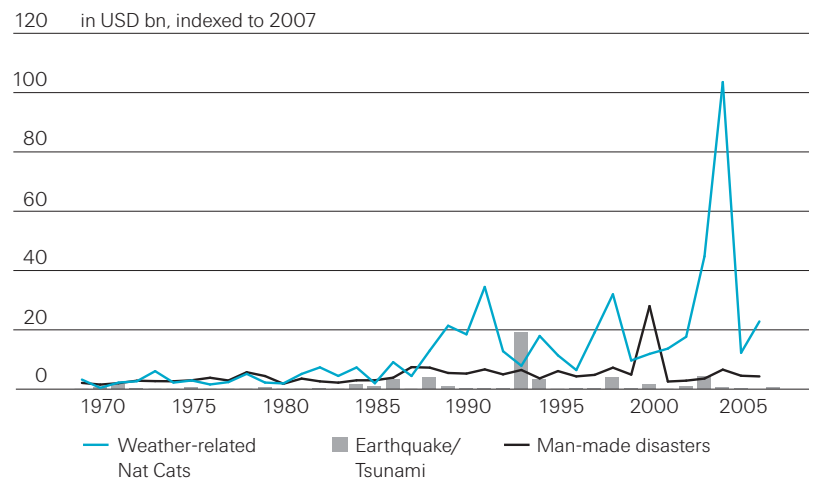
Insured catastrophe losses: in excess of USD 27bn

Individuals, companies or state institutions absorbed most of the USD 70.6bn in catastrophe losses in 2007. Only 40% of the total losses, or USD 27.6bn, were insured. Moreover, USD 23.3bn of the insured losses were the result of natural catastrophes.

Overall, statistics reveal that five natural catastrophe losses each exceeded the billion dollar mark. Taken together, they make up just under half of the catastrophe losses registered in 2007. Europe was particularly affected by natural catastrophes. Substantial losses occurred in Germany, the UK, Belgium and the Netherlands due to winter storm Kyrill in January. At USD 6.1bn, it was the third most expensive storm in Europe after Daria in January 1999 (USD 7.4bn) and Lothar in December 1999 (USD 7.2bn).² The UK was also hit in summer by torrential rainfall and flooding, which caused insured losses of USD 4.8bn. The US was less affected by natural catastrophes. A winter storm in April cost USD 1.6bn. The Witch forest fires that swept through California at the end of October caused extensive property damage of USD 1.1bn.

Man-made disasters gave rise to property losses of USD 4.3bn in 2007, with major industrial fires, explosions and losses in the aviation, space and energy sectors making up the majority, each contributing USD 1.2bn.

Figure 3
Insured losses 1970–2007
(Property and business interruption losses)



² All losses from previous years at 2007 prices.

The last 20 years show a marked increase in the catastrophe loss trend. Most of this increase can be traced back to weather-related natural catastrophes, such as storms and floods. From just under USD 4bn during the 1970–1988 period, the average loss has since climbed to more than USD 23bn. However, losses fluctuate considerably from one year to the next. 2005 continues to be the year of record losses, when more than USD 100bn of losses occurred – mostly due to hurricanes in the US and the Caribbean. Alongside obvious causes, such as the increase in insured values and loss vulnerability, the global increase in temperature is likely to also play a key role (see the chapter “Increasing flood losses”).

High catastrophe losses in Europe

Catastrophes in 2007 led to 64% of fatalities in Asia, and 45% of insured losses in Europe.

Europe reported the highest insured catastrophe losses in 2007, contributing 45% to the world total. This was noteworthy because Europe has, on average, accounted for only 19% of the world’s losses since 1970. These high values reflect the expensive winter storm Kyrill and the devastating floods in the UK that followed on the heels of torrential rainfalls. North America, which usually accounts for two-thirds of the world’s insured catastrophe losses, contributed just under a third of the world total in 2007, largely due to lower hurricane losses. In terms of fatalities, Asia continued to dominate in 2007.

Table 1
Catastrophes in 2007 by region

Region	Number	in %	Victims	in %	Insured loss	
					(in USD m)	in %
North America	47	14.0%	983	4.6%	8 767	31.8%
Europe	35	10.4%	1 088	5.0%	12 431	45.1%
Asia	146	43.6%	13 748	63.8%	3 533	12.8%
South America	19	5.7%	1 216	5.6%	228	0.8%
Oceania/Australia	7	2.1%	303	1.4%	1 283	4.7%
Africa	32	9.6%	2 215	10.3%	46	0.2%
Oceans/Space	49	14.6%	2 000	9.3%	1 276	4.6%
World total	335	100.0%	21 553	100.0%	27 564	100.0%

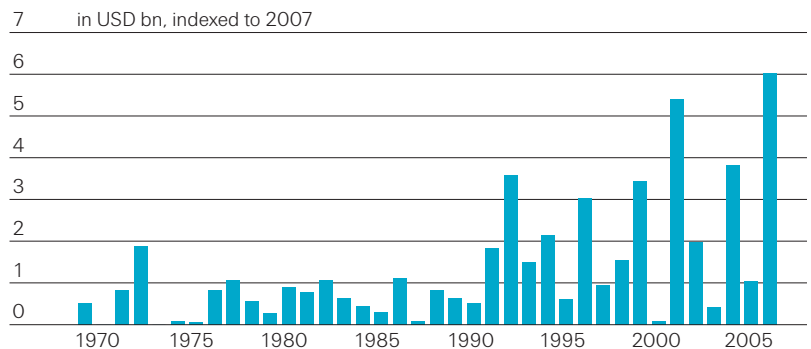
Increasing flood losses

Flood losses have been rising by 7% annually in real terms since 1970.

Figure 4
Global insured flood losses 1970–2007

Insured flood losses rise worldwide

In addition to the UK, other regions such as Central Europe, Mexico, Australia and Africa were hit by extreme floods in 2007. Since 1970, insured flood losses worldwide (see Figure 4) have risen in USD by 12% annually (or 7% when adjusted for inflation).



There are obvious explanations for the rise in the loss trend, such as the increase in insured values and vulnerability (eg subterranean garages, IT in cellars, underground electricity supply networks).

The increase in temperature associated with climate change is leading to an increase in the number of large flood events.

The higher temperature is speeding up the water cycle in the atmosphere.

Global warming is also contributing to losses. It is believed that higher temperatures are speeding up the hydrologic cycle, which in turn is triggering heavier rainfall and increasing the number and severity of flood events.³

According to the research, warm air can store more water vapour than cold air. It then produces more water as it evaporates, which returns to the earth's surface in the form of precipitation. The link between the air temperature and absolute air humidity is exponential: a 10% rise in temperature from 10 °C increases the maximum storable amount of vapour by 6% per volume unit of air; at 20 °C the storage capacity rises by 12%. More humidity also means that more energy is available to push up air masses: the air masses therefore rise higher and cool down faster. This results in an increase in the number and extremity of precipitation events and increased hail. At higher temperatures, winter precipitation falls more often in the form of rain than snow. As plants give off almost no evaporation in winter, the earth is therefore faster saturated. The rain runs off immediately, resulting in more floods.

³ See IPCC Synthesis Report Topic 3 pages 8/9 of the Fourth Assessment Report "Climate Change 2007".

Climate change is changing the general weather pattern.

Climate models show that climate change can also alter general weather patterns.

- In 2007, the jet stream over Europe was located more to the south than normal. This shift explains the floods in the UK and Central Europe.
- Another phenomenon, which is also cited in connection with global warming, is the increase in the Genoa low pressure system over the past 10 years (Vb-weather regime) during the summer. This weather system was responsible for the floods in 1997 (ie Czech Republic, Poland and Germany), in 2002 (ie summer floods in Europe) and in 2005 (ie Switzerland, Germany and Austria).
- Warmer weather conditions may also be intensifying summer monsoons in Europe. A warmer spring and early summer, such as in 2007, increase the difference in temperature between the land and (colder) water, which in turn increases the amount of water vapour transported from the sea to the mainland. This in turn triggers more rainfall (eg similar to the monsoon rains in Asia).

In 2007, insured flood losses in the UK reached their highest level ever.

Very high flood losses in the UK

The floods that swept across the UK during the summer of 2007, causing 165 000 claims and a total loss amount of USD 4.8bn, will go down in the annals of British insurance history as the year of the highest-ever flood losses.

Unstable general weather conditions over the British Isles, which boosted the passage of several waves of low pressure from the Atlantic in June and July, was the reason for the heavy rainfall. 360 mm of rain fell in the UK, which was the highest level of precipitation since 1914, when records of precipitation were first kept. In addition to the high total amount of rainfall, a number of new 24-hour precipitation records were set.

Two waves of extreme precipitation in June...

The first rainfall records were broken on 15 June in North Yorkshire. The second wave of extreme rainfall took place on 25 June – again in the northeast of England. Within 24 hours, the rainfall in some areas exceeded the average rainfall for the entire month of June. The heavy rains, which had already saturated the ground, led to a number of flash floods and rivers began to overflow their banks. The cities of Sheffield, Doncaster and Hull were hit the hardest, along with other regions across Yorkshire. The high water levels rapidly receded in most areas. The floods eventually led to thousands of claims totalling USD 2.8bn.

... and a third substantial rainfall in July

On 20 July, another active front passed over the UK, this time hitting the south of England, and unleashing an unprecedented amount of rainfall. Some measurement stations in Oxfordshire recorded a sixth of their average annual rainfall within the space of 24 hours. This rain once again fell on saturated ground, with most of it running off directly. Due to the generally wet spring and summer, river levels were already elevated and had almost reached the limit of their harmless discharge capacity. The extreme rainfall resulted in record river levels (eg the Avon at Evesham reached its highest level since 1848; the confluence of the Avon and Severn rivers at Tewkesbury reached its highest level in 247 years). The most affected areas were Gloucester, Tewkesbury and Cheltenham as well as the West Oxfordshire region along the Thames. Total losses arising from the July event reached almost USD 2bn.

Probabilistic flood loss models are still relatively new.

Flood cover underpriced

Over the course of the last few years, insurance associations, reinsurers and risk consultants have developed a whole series of probabilistic⁴ flood models targeting the European market. The development of probabilistic models always follows the same approach: the historic observation period is extended using statistical procedures.

Below-average flooding from the 1960s to the 1980s

However, historical horizons that are too long offer no advantages if the measurement series are cyclical and/or are subject to trends. From the 1960s to the 1980s, Europe reported a below-average incidence of floods. Therefore, most flood models attribute too much weight to this period. Only the last third of the historic time series (ie 1990 until today) adequately reflects present conditions. The high number of loss events with large modelled return periods within the past 10 years (see Table 2) leads us to conclude that the current models underestimate event frequency. In the UK, for example, three events in the past 10 years clearly exceeded the 10-year return period. Although this is possible from the statistical point of view, it clearly indicates an above-average frequency of floods that is not adequately factored into today's model.

⁴ Probabilistic models make it possible to quantify the cumulative effects across regions and countries and to simulate the impact of changes in insurance conditions. Insurance conditions often change after major events, which is why probabilistic simulations are preferable to as-if analyses.

Table 2
Modelled return periods of large flood losses from the last 10 years

Country	Date	Insured loss USD m (indexed to 2007)	Expected return period (years)
UK	April 1998	317	5
	October 2000 ⁵	1 260	20
	June 2007 ⁶	2 488	35
Czech Republic	July 2007	1 991	25
	July 1997	571	30
Germany	July/August 2002	1 451	80
	July/August 2002	1 900	45
Italy/Switzerland	October 2000	542	25
France	September 2002	846	5
	December 2003	952	15
Indonesia (Jakarta)	January 1996	168	8
	January 2002	230	20
	January 2007	400	30
Switzerland	August 2005	2 252	40

As *sigma* converts the losses to USD at the exchange rates valid in the event year, there may be some distortion in the proportions between the individual losses. The British pound, for example, increased in value by 33% against the USD during the 2000–2007 period, rising from 1.49 to 1.99, which makes the losses sustained in 2000, expressed in USD, seem (too) low when compared with the losses sustained in 2007 (see page 43 on indexation methodology).

Source: Swiss Re

Flood events often occur in a series.

Another critical point in risk assessment is that most models implicitly assume that the individual events occur independently of each other. The models make insufficient allowance for the fact that floods often occur in clusters. This means that the expected losses are additionally undervalued, especially in stop-loss and second event covers, if this is not explicitly corrected. The fact that the events are correlated in time plays a key role in the series of floods that occurred in 2000 and 2007 in the UK and in the flood events that occurred in Europe during the summer of 2002.

If we analyse the data, we can see that, just like windstorms, heavy rainfall is brought on by certain weather conditions. As soon as such weather conditions persist, a series of rainfall events occurs, which results in subsequent flooding. During such periods, as mentioned earlier, flood events are likely because the ground is already saturated with rain water.

Flood losses are heavily influenced by climate change, though it is possible to protect against floods.

It is to be expected that climate change will have a bigger influence on flood losses than on those related to wind. The ground's limited capacity to absorb water is reduced further by the increase in built-up areas, the sealing of land, intensive agriculture, deforestation etc, which increases the amount of water flowing into rivers.

⁵ Only the event of 29 October to 10 November 2000. There was another smaller event in the UK between 10 October and 14 October 2000.

⁶ Only the event of 25–28 June 2007 (according to Swiss Re's event definition, there were two flood events in the UK in June 2007: from 15–22 June and from 25–28 June).

On the other hand, there are ways of reducing losses: unlike windstorms, human beings can influence floods by means of intelligent, integrated flood protection measures (eg opening up water meadows, increasing natural floodplains, constructing flood control reservoirs and improving the quality of building structures). The most efficient way of protecting against floods is to take action where the rain falls, as the losses accumulate downstream. Flood protection is, however, limited in scope: once the discharge rates that the protection measure has been designed to withstand are exceeded, losses rise very sharply.

Natural catastrophes and politics

Modest state intervention in the UK

Although each country adopts its own approach, private insurers in the UK automatically cover flood risks under a fire policy. However, it is left to the discretion of the insurer to reflect the risk in the premium price. Exceptions include highly exposed areas, which insurers have been able to exclude from flood coverage since 2000. State intervention is thus relatively modest.

Flood risk is automatically covered in UK fire policies.

Flood insurance in the UK

Since 1961, UK insurers have been obliged to include flood and other natural perils in fire policies. Building insurance policies for private individuals and small companies carry a small deductible of GBP 50, and there are no special loss limits. There are also no tariffs, and risk-appropriate premiums are charged. Combining flood and fire cover combats the problem of anti-selection and permits the formation of a large risk community. This gives rise to relatively moderate premium rates compared, to other countries, where flood cover is only offered as an option.

Insurers provide cover only if the state invests in prevention.

However, British insurers seek to provide natural perils cover automatically only if the state invests in the appropriate prevention measures. The flood events of 2000 resulted in a high loss burden because the flood protection in many towns failed. This uncovered weaknesses in the UK's flood protection measures. The Association of British Insurers (ABI) have since called on the government to invest more money in flood protection. The government did partially comply with this request in the wake of the events of 2007.

Since 2000, the fire-flood insurance link has been relaxed. Insurers are now permitted to exclude flood cover in new policies if the insured property is located in a high-risk zone (ie a flood within 75 years).

Surge in the number of state catastrophe insurance programmes in the US

In some US states, government intervention is of a more direct nature. Some raised concerns when, after last year's developments in Florida, the state increased its sales of catastrophe covers. The state's sale of catastrophe covers at below-market prices and the financing of them – with either indirect subsidies from other insurance lines or taxpayers' money – create problems for private commercial insurers. Other concerns about the approach adopted in Florida include the non-sustainable nature of the financing and the indiscriminate levels of compensation, which, in some cases, are extended to affluent homeowners, but not necessarily to those most in need of financial assistance. Moreover, non-risk-appropriate insurance prices also wrongly incentivise people to continue investing in highly-exposed areas.

The Citizens Property Insurance Corporation (CPIC) is Florida's biggest insurer.

Increase in state insurance programmes in the US

In 2007, the Florida legislature passed a law that massively expanded the scope of the Citizens Property Insurance Corporation (CPIC), a primary insurer, and the Florida Hurricane Catastrophe Fund (FHCF), a reinsurer. Thanks to this new law, prices were reduced and the CPIC could offer cover at prices that did not reflect the level of risk involved. The criteria for entitlement were adjusted so as to widen access to the services offered and to supplement the product range with corporate insurance and multi-peril cover. At the end of September 2007, the total sum insured by CPIC was USD 506bn, thereby making it the biggest insurer in Florida. CPIC insured more than 1.4m people and provided predominantly storm risk cover. As CPIC's premiums for risks located near the coast are below risk-based market prices, policies with high risks are subsidised by other policyholders. Currently, all holders of property policies in Florida are subjected to a loading to finance CPIC's deficit from 2005⁷. A recently published report⁸ indicates that although owners of houses worth USD 1m and more make up only 2% of policyholders, they represent approximately 10% of CPIC's loss potential.

The Florida Hurricane Catastrophe Fund (FHCF) provides USD 28bn in reinsurance coverage.

At the same time, the reinsurance cover provided by FHCF has been increased substantially from USD 16bn to USD 28bn. As in the case of CPIC, the premiums are below risk-based market premiums and – in the absence of an appropriate capital base – the potential shortfall is being financed by levying additional premiums (assessments) after the loss event.

The fact that Florida's finance director is currently considering reducing state capacity again indicates the possible start of a reversal in this trend.

⁷ The state National Flood Insurance Program (NFIP) also needed USD 21bn to finance losses in 2005 that were not covered by premiums or reserves.

⁸ The Brookings Institution Policy Brief #150 (March 2006).

Catastrophe aid in Germany

Germany has neither mandatory coverage nor state insurers, and often generous aid is provided to victims of flood damage. Despite being highly desirable for sociopolitical reasons, this approach could have negative consequences, such as those in Florida.

Germany sets up EUR 7.1bn fund to rebuild flooded areas.

Catastrophe aid following the 2002 summer floods in Germany

To cope with the losses from the flood events of summer 2002, the German government set up an emergency aid fund for flood victims to supplement the immediate aid of EUR 0.5bn already provided. The fund earmarked EUR 7.1bn to finance the reconstruction of the areas affected by the floods. The government pledged additional funds of EUR 1.2bn for the reconstruction of infrastructure.

Widespread criticism of payouts

Although the emergency aid was intended to be a rapid and unbureaucratic solution for the flood victims, it was not well-received by the public. Many people complained that the amount of aid paid out bore no relation to the actual damage sustained. For example, companies received maximum emergency aid of EUR 15 000, which, in many cases, only covered a small portion of their total loss. In other cases, people with little damage received large payouts.

Many private households and companies also received support from the emergency fund for flood victims after receiving immediate relief. Even though this aid was paid out shortly after the catastrophe and funds were also approved in 2002, many victims were only compensated months later in 2003.

To finance the reconstruction relief, Germany had to postpone its long-awaited tax reforms and increase some direct taxes (eg corporation tax from 25% to 26.5%).

Indices for the transfer of insurance risks

Insurance-linked securities have become extremely popular.

To cope financially with the cost of catastrophe losses, insurers are increasingly making use of financial market instruments such as insurance-linked securities (ILS) – eg cat bonds. They are also offering industry loss warranties (ILW) and cat swaps.

The outstanding volume of non-life ILS bonds rose from USD 0.7bn in 1997 to approximately USD 15bn by the end of 2007, which translates into an annual growth rate of more than 35%. The market issuance for non-life ILS bonds was nearly USD 8bn in 2007. An estimated USD 7bn to 12bn of additional insurance protection was sold in 2007 in the form of ILWs and cat swaps. Exchange-traded derivatives are still in their infancy, but are gaining in popularity.

ILWs, cat bonds and cat swaps are triggered by specific indices.

Instruments for the transfer of insurance risks to the capital market

Industry loss warranties (ILW) offer reinsurance protection. They feature two triggers – an insurance-loss trigger based on the actual loss incurred by the buyer, and an industry-loss trigger based, for example, on data provided by Property Claim Services (PCS). Individual ILW transactions provide cover ranging from USD 1m to 250m.

Cat bonds are a form of securitisation used to transfer natural catastrophe risks to the capital markets. To make the transaction worthwhile, the volume of a single issue is normally at least USD 100m.

Cat swaps are made-to-measure derivatives traded over-the-counter; they require less documentation and are triggered at a lower level of payouts than bonds. Cat swaps have been issued for storms, earthquakes, aviation losses and terrorism, as well as for mortality, longevity and multi-peril covers. Cat swaps do not necessarily provide reinsurance coverage.

Characteristic features of these financial market instruments are conditional payment obligations – in return for a fee or premium paid by the insurer – that are linked to specific events or triggers. For the risk to be transferred to the capital markets, it is important that the investors accept the index.

What criteria must an index fulfil for it to be deemed a suitable vehicle for transferring insurance risks to the financial market?

An index is an objectively defined parameter that is capable of being quantified within an appropriate period of time, in this case, following the occurrence of an insurable event. Indices are provided by both the public and the private sector.

A loss index must be clearly defined and capable of being quantified quickly and objectively when an insured event occurs.

In order for it to be accepted by the relevant financial market players, an index needs to satisfy different requirements:

- The index must be transparent, ie it has to be observable, quantifiable and clearly defined.
- The values of the index should be published without significant delay so that financial transactions can be processed speedily.
- The index should be accurate and reliable, and be subjected to as little revision as possible.
- The more independent and credible the index provider, the greater the benefit of the index, as this will help diminish the inherent subjective risk (moral hazard) and increase the reliability of the index.
- Moreover, an index's usefulness increases with length of history. Long-term historic values enable the correlation between the index and past loss events to be analysed and calculated precisely.⁹
- In addition, the more often an index is updated, the greater its benefit will be. An index that is updated frequently (in real time, daily, or monthly) can be correlated to specific events quicker and more precisely.

There are five basic types of payment triggers:

- An indemnity trigger is based on the actual recorded losses of the cover buyer (the sponsor).
- An industry index trigger is based on an industry-wide loss index. In the USA, Property Claim Services (PCS), a division of ISO Properties, Inc, carries out a survey of all participating insurers in the wake of a catastrophe event with the aim of estimating insured losses. PCS then makes this data available to market participants for a fee.
- A pure parametric trigger is based on physical indicators actually recorded for the event in question (eg the magnitude of an earthquake, or windspeeds).
- A parametric index trigger is an optimised version of the purely parametric trigger and is based on more complex formulas and numerous detailed recorded indicators.
- A modelled loss trigger is one where estimated losses are determined by feeding given physical parameters into a model which then calculates the overall loss.

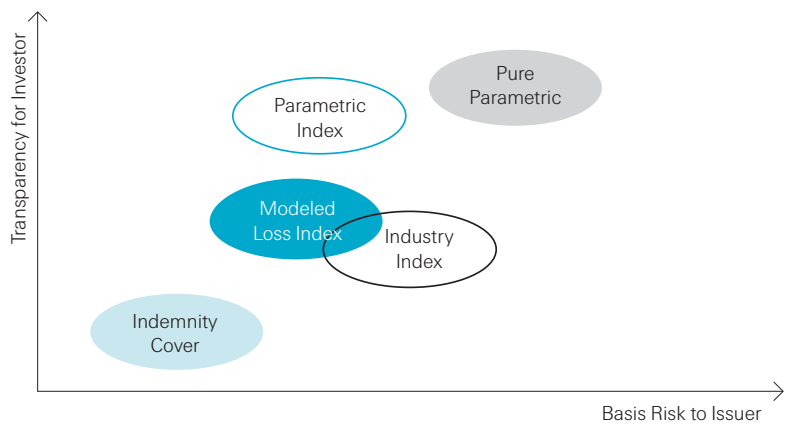
⁹ This does not apply to parametric triggers, as historic events can normally be replicated.

Initiative to create a loss index in Europe

Although Europe does not have a recognised loss index, help is on the way.

A recent European initiative aims to develop indices capable of measuring the scale of natural catastrophes in Europe. The initiative was launched through the Chief Risk Officer Forum and is supported by numerous major (re)insurance companies. The aim of the initiative is to develop a data service capable of promptly providing estimates of insured European natural catastrophe losses. The information could be used to develop industry loss indices for use with insurance-related financial instruments such as ILWs, cat bonds and cat swaps.

Figure 5
Transparency and basis risk for different types of triggers



Source: Swiss Re Capital Markets

The triggers feature varying levels of basis risk and degrees of transparency.

The triggers used to transfer insurance risks feature varying degrees of transparency and basis risk (see Figure 5). The basis risk is the risk of the index or trigger failing to correlate with the paid loss – ie the lower the correlation, the greater the basis risk. Even if parametric and industry-index triggers still dominate when it comes to cat bonds and ILW transactions, claims or indemnity-related indices are once again coming to the fore.

Special exchanges have now been set up for trading in insurance-linked derivatives.

Though insurance were first traded on the stock markets as early as the 1990s, trading was discontinued due to lack of interest. In recent times, special exchanges have been set up once again to support trading in index-based insurance risks.

- In collaboration with Gallagher Re, New York Mercantile Exchange (NYMEX) has founded an exchange based on an index of total losses in the US insurance sector as estimated by PCS; earthquake and terrorism losses are excluded.
- In conjunction with Carvill, Chicago Mercantile Exchange (CME) has established an exchange for trading in derivative instruments that are geared to an index which records the windspeed and radius of hurricanes at landfall.
- Insurance Futures Exchange Services Ltd (IFEX) has started trading in catastrophe event-linked futures (ELFs) on the Chicago Climate Futures Exchange (CCFE). The IFEX derivatives are based on an index of PCS losses – the trigger must be a named hurricane. Each of these markets offers derivatives for some or all regions of the US – eg the whole of the US, Florida, North Atlantic Coast, etc.

Indices are set to play a key role in the transfer of insurance risks to the capital markets.

The use of indices is becoming ever more widespread in the context of insurance-related financial instruments. It is expected that indices will play a key role in the development of insurance-related financial instruments and in simplifying trade in insurance risks, as well as the transfer of these risks to the capital markets.

Tables for reporting year 2007

Table 3
List of major losses in 2007 according to loss category

	Number	in %	Victims ¹¹	in %	Insured loss ¹⁰ (in USD m)	in %
Natural catastrophes	142	42.4%	14 630	67.9%	23 269	84.4%
Floods	53		5 798		6 022	
Storms	57		6 729		14 318	
Earthquakes	9		636		437	
Droughts, bush fires, heat waves	7		745		1 310	
Cold, frost	10		487		940	
Hail	3		7		242	
Tsunami	1		152			
Other natural catastrophes	2		76			
Man-Made disasters	193	57.6%	6 923	32.1%	4 295	15.6%
Major fires, explosions	34	10.1%	611	2.8%	2 145	7.8%
Industry, warehouses	15		163		1 170	
Oil, gas	9		195		975	
Department stores	2		32			
Other buildings	8		221			
Aviation disasters	19	5.7%	732	3.4%	1 239	4.5%
Crashes	10		710		100	
Damage on ground	4		22		296	
Space	5				843	
Shipping disasters	52	15.5%	2 180	10.1%	582	2.1%
Freighters	3		46		35	
Passenger ships	38		2 096		50	
Tankers	4				86	
Drilling platforms	2		26		68	
Other shipping accidents	5		12		343	
Rail disasters (incl. cableways)	14	4.2%	220	1.0%		0.0%
Mining accidents	19	5.7%	909	4.2%	62	0.2%
Collapse of buildings/bridges	11	3.3%	393	1.8%		0.0%
Miscellaneous	44	13.1%	1 878	8.8%	267	1.0%
Social unrest	5		793			
Terrorism	14		513		12	
Other miscellaneous losses	25		572		255	
Total	335	100.0%	21 553	100.0%	27 564	100.0%

¹⁰ Property and business interruption, excluding liability and life insurance losses

¹¹ Dead and missing

Table 4

The 20 most costly insurance losses 2007

Insured loss ¹² (in USD m)	Victims ¹³	Date (start)	Event	Country
6 097	54	18.01.2007	Winter storm Kyrill with winds up to 190 km/h; floods	Germany, UK, NL, Belgium et al
2 488	4	25.06.2007	Floods caused by heavy rain	UK
1 991	3	20.07.2007	Floods caused by heavy rain	UK
1 568	23	13.04.2007	Storm, rain, hail, floods	US
1 100	8	21.10.2007	Witch urban forest fires in California	US
957	9	07.06.2007	Storm with winds up to 125 km/h, rain; floods	Australia
649	88	06.06.2007	Cyclone Gonu with winds up to 170 km/h	Oman, Iran, Gulf of Oman
500	26	23.08.2007	Thunderstorms, hail; floods	US
500	20	01.03.2007	Storms, tornadoes, hail	US
450	80	31.01.2007	Torrential rain; 70% of city of Jakarta flooded	Indonesia
450	36	16.08.2007	Hurricane Dean with winds up to 230 km/h	Jamaica, Mexico, Martinique et al
450	25	28.10.2007	Floods caused by heavy rain, storms	Mexico
350	3	29.08.2007	Typhoon Fitow/No 9 with winds up to 140 km/h	Japan
340	24	09.12.2007	Winter storm, freezing rain, snow; power failure	US
300	1	08.08.2007	Heavy rain, floods, landslides	Switzerland, Italy, Germany
300	11	16.07.2007	Niigata earthquake (M_w 6.6)	Japan
299	–	15.06.2007	Floods caused by heavy rain	UK
260	12	04.05.2007	Tornadoes, thunderstorms, hail	US
na ¹⁴	–	20.03.2007	Explosion and fire at chemical plant	Japan
na	–	21.12.2007	Loss of helium pressure at Rascom-QAF1 satellite	Space

¹² Property and business interruption, excluding liability and life insurance losses

US natural catastrophe figures: with the permission of Property Claim Services (PCS)/incl. NFIP flood losses (see page 42 "Terms and selection criteria")

¹³ Dead and missing

¹⁴ na: not available

Table 5
The 20 worst catastrophes in terms of victims 2007

Victims ¹⁵	Insured loss (in USD m) ¹⁶	Date (start)	Event	Country
4 234	–	15.11.2007	Cyclone Sidr with winds up to 240 km/h; floods	Bangladesh, India
1 500	–	16.07.2007	Floods caused by heavy rain	India, Bangladesh
678	–	02.08.2007	Floods and landslides caused by monsoon rains	Bangladesh
600	–	07.08.2007	Floods caused by heavy rain	North Korea
600	–	30.12.2007	Riots, arson after disputed election results	Kenya
550	–	19.06.2007	Heat wave in Southern Europe	Hungary, Romania, Greece et al
519	100	15.08.2007	Earthquake (M _w 8), more than 300 aftershocks	Peru
340	–	26.06.2007	Cyclone Yemyin; heavy rain, floods	Pakistan
280	–	01.01.2007	Cold wave with temperatures falling to near freezing	Bangladesh, India, Nepal et al
232	150	02.09.2007	Hurricane Felix with winds up to 260 km/h; floods	Nicaragua, Honduras et al
228	–	23.06.2007	Thunderstorms with heavy rain, flooding	Pakistan
215	–	27.06.2007	Floods and landslides caused by heavy rain	China
213	–	29.10.2007	Hurricane Noel with winds up to 128 km/h; floods	Dominican. Rep., Haiti, Cuba et al
199	na ¹⁷	17.07.2007	TAM Airbus 320 overruns wet runway, catches fire	Brazil
172	–	17.08.2007	Coal mine flooded after torrential rain	China
170	–	08.07.2007	Floods caused by heavy rain	China
158	–	18.07.2007	Floods and mudslide caused by heavy rain	China
152	–	02.04.2007	Earthquake (M _w 8.1) triggers tsunami	Salomon Islands
150	–	03.08.2007	Overloaded boat capsizes in stormy weather	North Atlantic, Sierra Leone
146	–	10.07.2007	Floods and landslides caused by heavy rain	Nepal

¹⁵ Dead and missing

¹⁶ Property and business interruption, excluding liability and life insurance losses

¹⁷ na: not available

Table 6

Chronological list of all natural catastrophes 2007

Floods

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
1.1.–17.1.	Burundi Bubanza, Cibitoke, Karuzi	Floods caused by heavy rain	4 dead 23 000 homeless
2.1.–17.1.	Indonesia, Philippines North Sulawesi	Floods and landslides caused by heavy rain	47 dead, 9 missing 9 injured
3.1.–14.2.	Mozambique, Malawi Zambezia, Sofala, Manica, Tete, Shire, Karonga	Floods caused by heavy rain; 5 000 houses and 450 000 hectares of crops destroyed	40 dead 68 000 homeless USD 71m total damage
4.1.–22.1.	Brazil Rio de Janeiro, Minas Gerais, São Paulo	Floods and landslides caused by heavy rain, landslides	48 dead 11 000 homeless USD 125m total damage
10.1.–24.1.	Angola, Zambia Luanda, Cacuaco	Floods caused by heavy rain; Zambezi River Basin flooded	114 dead 28 000 homeless
10.1.–28.2.	Bolivia Chuquisaca, Santa Cruz, Cochabamba, La Paz, Beni	Floods and landslides caused by heavy rain; 80 000 hectares of crops destroyed	35 dead 70 000 homeless USD 90m total damage
12.1.–17.1.	Malaysia Johor, Batu Pahat, Kota Tinggi	Floods caused by torrential rain; damage to Endau-Rompin Forest Reserve	15 dead 30 000 homeless MYR 2bn (USD 605m) total damage
23.1.–10.2.	Peru Junin, Chanchamayo	Flood and landslides caused by heavy rain	20 dead, 80 missing 200 injured
31.1.–18.2.	Indonesia Bogor, Depok, Bekasi, Tangerang	Floods caused by torrential rain; 70% of Jakarta flooded, damage to infrastructure, industry, agriculture	80 dead 200 000 homeless USD 450m insured loss USD 971m total damage
11.2.–16.2.	India Rajasthan, Uttar Pradesh	Floods caused by heavy rain, hail and storm	40 dead 8 injured
4.3.–6.3.	Indonesia Flores Island, East Nusa	Floods and landslides caused by heavy rain	34 dead, 40 missing 21 injured
6.3.–11.6.	Colombia Córdoba, Chocó, Bolívar	Floods and landslides caused by heavy rain	48 dead, at least 17 missing
10.3.–3.4.	Afghanistan, Tajikistan Faryab, Badakhshan	Heavy rain, snowmelt caused avalanches and landslides; losses to agriculture and livestock	114 dead 49 injured
25.3.–30.3.	Yemen Hadhramout	Floods caused by heavy rain	36 dead 18 injured
14.4.	Thailand Yan Ta Khao, Trang	Flash floods at waterfalls Sai Rung and Prai Sawan caused floods in low-lying areas	38 dead
26.4.–2.5.	Colombia Tolima, Ibague	Mudslides caused by heavy rain	24 dead 35 injured 2 000 homeless
2.5.–7.5.	Sri Lanka Colombo	Floods caused by heavy rain; parts of main Galle Road washed away	16 dead 2 000 homeless
4.5.	Afghanistan Badakhshan	Flash floods caused by heavy rain	24 dead
20.5.–26.5.	China Chongqing, Sichuan	Heavy rain, lightning, floods, land- and mudslides	7 dead 50 injured CNY 573m (USD 78m) total damage

6.6.–14.6.	China Guangdong, Hunan, Guangxi, Guizhou, Jiangxi, Fujian	Floods, mudslides caused by storms with heavy rain; 69 000 houses, 136 000 hectares of crops destroyed	21 dead, 3 missing 279 injured 158 000 homeless CNY 1.47bn (USD 201m) total damage
7.6.–8.6.	Switzerland Canton of Berne, Emmental	Floods caused by heavy rain, thunderstorms with hail	3 dead CHF 50m (USD 44m) insured loss
10.6.–18.6.	Bangladesh Chittagong	Floods, landslides caused by heavy rain; homes buried under mud, inundation of garment factories	130 dead 100 injured 1 000 homeless BDT 1bn (USD 14m) total damage
15.6.–22.6.	United Kingdom North Yorkshire, Leeds, Wakefield	Floods caused by heavy rain	GBP 150m (USD 299m) insured loss GBP 225m (USD 448m) total damage
21.6.–3.7.	India Andhra Pradesh, Kerala, Karnataka, Maharashtra	Floods, landslides caused by heavy monsoon rains	144 dead
25.6.–28.6.	United Kingdom Yorkshire, Hull, Sheffield, Doncaster, Humberside, East Riding, Rotherham, Barnsley	Floods caused by heavy rain; commercial and domestic properties, roads, railway tracks, and agricultural land flooded	4 dead 1 500 homeless GBP 1.25bn (USD 2.49bn) insured loss GBP 1.88bn (USD 3.73bn) total damage
27.6.–17.8.	China Anhui, Hubei, Shaanxi, Henan, Jiangsu, Shandong	Heavy rainfall, floods and landslides; 50 000 homes, 100 000 hectares of crops destroyed	154 dead, 61 missing 4 000 injured 346 500 homeless CNY 2.56bn (USD 350m) total damage
1.7.–20.9.	Uganda, Ethiopia, Kenya, Rwanda	Floods and landslides in East Africa caused by heavy rain; roads and bridges destroyed	62 dead 90 000 homeless
1.7.–13.7.	India Gujarat, Madhya Pradesh, Orissa	Floods caused by heavy rain	42 dead, 10 missing
4.7.–17.9.	Ghana, Togo, Burkina Faso, Niger, Mali, Mauritania, Nigeria, Benin	Floods in West Africa caused by heavy rain; buildings, farmland, roads and bridges destroyed	140 dead 280 000 homeless
8.7.–18.7.	China Sichuan, Chongqing	Floods and landslides caused by heavy rain	136 dead, 34 missing 3 000 injured
8.7.–30.8.	Sudan Khartoum, Uniti, North Kordofan, Sennar, Kassala	Floods caused by heavy rain; Nile River bursts its banks	113 dead 335 injured 200 000 homeless USD 300m total damage
10.7.–23.8.	Nepal Terai	Floods and landslides caused by heavy rain; damage to infrastructure, roads, bridges, buildings	146 dead 330 000 homeless NPR 2m total damage
16.7.–25.8.	India, Bangladesh West Bengal, Bihar, Uttar Pradesh, Assam, Kolkata, Dhaka	Floods caused by monsoon rain; Brahmaputra River bursts its banks; homes, industry, 825 000 hectares of farmland flooded	1 500 dead 3 500 000 homeless USD 320m total damage
18.7.–22.7.	China Yunnan, Tengchong	Floods caused by heavy rain; mud slide at Xiaojiangping dam	150 dead, 8 missing CNY 132m (USD 18m) total damage
20.7.–31.7.	United Kingdom Gloucestershire, West Oxfordshire, Tewkesbury, Cheltenham, Gloucester, Midlands	Floods caused by heavy rain; parts of the Severn, Avon and Thames rivers burst their banks, damage to infrastructure, agriculture	3 dead GBP 1bn (USD 1.99bn) insured loss GBP 1.5bn (USD 2.99bn) total damage

22.7.–27.7.	Indonesia Sulawesi, Morowali	Floods and landslides caused by heavy rain	74 dead 30 injured
29.7.–3.8.	China Henan	Floods and landslides caused by heavy rain	78 dead, 18 missing
2.8.–24.8.	Bangladesh	Floods and landslides caused by monsoon rains; roads, 700 000 hectares of land flooded	678 dead 10 800 homeless USD 84m total damage
6.8.–11.8.	China Shaanxi, Ankang	Floods and landslides caused by heavy rain; 15 000 houses, 6 000 hectares of farmland destroyed	20 dead, at least 37 missing CNY 280m (USD 38m) total damage
7.8.–15.8.	North Korea North Hwanghae, South Hamgyong, Kangwon	Floods caused by heavy rain; over 40 000 homes, 800 public buildings, 540 bridges, and 200 000 hectares of farmland destroyed	at least 450 dead, at least 150 missing 4 350 injured 100 000 homeless
8.8.–10.8.	Switzerland, Italy, Germany Cantons of Jura, Solothurn, Baselland, Aargau, Vaud	Floods and landslides caused by rain; river banks burst; houses, roads, and railway tracks flooded; losses to agriculture	1 dead 8 injured CHF 340m (USD 300m) insured loss
9.9.–20.9.	India Andhra Pradesh, Karnataka	Floods caused by heavy rain; National Highway flooded	60 dead
18.9.–21.9.	Slovenia Zelezniki, Skofja, Loka, Cerkno	Floods and mudslides caused by heavy rain, storm; damage to residential houses, infrastructure, Franja partisan clinic destroyed	6 dead EUR 200m (USD 292m) total damage
1.10.–17.11.	Colombia Magdalena, Sucre, Bolívar	Floods caused by heavy rain	29 dead 52 injured 23 000 homeless
2.10.–16.10.	Haiti Cabaret	Floods caused by heavy rain; damage to infrastructure, buildings, cars	33 dead 3 000 homeless
10.10.–23.10.	Costa Rica, Nicaragua, Honduras, Guatemala	Floods and landslides caused by heavy rain in Central America	37 dead, 2 missing USD 11m total damage
25.10.–26.10.	Congo, Democratic Republic of (DRC) Kinshasa	Floods and landslides caused by heavy rain; damage to roads, bridges, crops	30 dead 100 injured
27.10.–2.11.	Vietnam Quang Nam, Thua Thien-Hue, Quang Binh, Quang	Floods caused by heavy rain	77 dead, 6 missing 42 injured USD 300m total damaged
27.10.–29.10.	Philippines Bicol	Floods and landslides caused by heavy rain	20 dead
28.10.–10.11.	Mexico Tabasco, Chiapas, San Juan Grijalva	Floods, landslides caused by heavy rain, storms; more than 90% of municipal Villahermosa flooded	8 dead, 17 missing 500 000 homeless USD 450m insured loss USD 4.5bn total damage
7.12.–18.12.	Malaysia Johor, Pahang, Kelantan, Terengganu	Floods caused by heavy rain; roads, palm oil producing areas submerged	26 dead 24 000 homeless MYR 1.2bn (USD 363m) total damage
19.12.–5.1.	Zambia, Zimbabwe, Mozambique Mazabuka	Floods caused by heavy rain; several bridges washed away	27 dead 3 000 homeless
24.12.–28.12.	Indonesia Java, Karanganyar, Wonogiri	Floods and landslides caused by heavy rain	120 dead

Storms

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
18.1.–20.1.	Germany, United Kingdom, Netherlands, Belgium, Austria, France, Czech Republic, Poland	Winter storm Kyrill with winds up to 190 km/h, floods; losses to infrastructure, agriculture, forestry, marine: MSC Napoli stranded	47 dead, 7 missing EUR 4.17bn (USD 6.1bn) insured loss USD 10bn total damage
2.2.	United States FL	Tornadoes with winds up to 265 km/h, thunderstorms, hail; damage to 2 200 houses	20 dead USD 100–300m insured loss*
20.2.–23.2.	Mozambique, Reunion, Mauritius Bazaruto, Vilanculos	Cyclone Favio with winds up to 204 km/h; floods, damage to buildings, infrastructure	10 dead 70 injured 40 000 homeless
1.3.–2.3.	United States AL, GA	Storms, tornadoes, hail; high school building, hospital destroyed	20 dead USD 300–600m insured loss USD 600m total damage
15.3.–18.3.	Madagascar Antalaha, Ambanitelo, Andranofosty, Anfofa, Anlanazana, Antakotako	Cyclone Indlala with winds up to 166 km/h, heavy rain; vanilla farms, rice fields flooded	80 dead 5 injured 16 000 homeless USD 240m total damage
22.3.–23.3.	Bangladesh Bhola, Lalmohon	Tropical storm	10 dead 100 injured
23.3.–24.3.	United States NM, OK, TX	Tornadoes, hail, floods	16 injured USD 25–100m insured loss USD 80m total damage
13.4.–17.4.	United States TX, DE, CT, GA, LA, MA, ME, MD, MS, NH, NJ, NY NC, PA, RI, SC, VT, VA	Storm with winds up to 130 km/h, heavy rain, hail, floods; power outages	23 dead USD 1.57bn insured loss USD 2bn total damage
25.4.–26.4.	United States, Mexico TX, Rio Grande	Storms and tornadoes with winds up to 240 km/h	10 dead 80 injured 200 homeless
2.5.–3.5.	United States TX, Dallas – Fort Worth	Thunderstorms with winds up to 160 km/h	60 homeless USD 100–300m insured loss USD 140m total damage
4.5.–8.5.	United States KS, IA, MN, MO, SD	Tornadoes, thunderstorms, hail; town of Greensburg almost completely destroyed by tornado	12 dead 40 injured USD 100–300m insured loss USD 350m total damage
11.5.–12.5.	India Uttar Pradesh, Sultanpur	Thunderstorm with heavy rain	27 dead 24 injured
14.5.–15.5.	Bangladesh, Myanmar (Burma), Cox's Bazar	Tropical cyclone Akash with winds up to 120 km/h; floods	at least 3 dead, 50 missing
21.5.–24.5.	United States MN, IA, KS, TX, WI	Thunderstorms, hail, tornadoes with winds up to 128 km/h	USD 100–300m insured loss USD 300m total damage
5.6.	Canada Alberta, Calgary, Edmonton, St. Albert	Storms and floods	CAD 48m (USD 49m) insured loss CAD 88m (USD 89m) total damage
6.6.–8.6.	Oman, Iran Gulf of Oman, Hormuzgan, Kerman, Sistan-Baluchestan, Muscat, Bandar Abbas	Cyclone Gonu with winds up to 170 km/h, heavy rain; roads flooded, damage to shipping, disruption to oil exports	61 dead, 27 missing 9 injured OMR 250m (USD 649m) insured loss USD 3.9bn total damage

* Loss ranges for natural catastrophes in the US in Table 6: defined by Property Claim Services (PCS)

7.6.–10.6.	Australia NSW, Hunter Region, Newcastle, Singleton, Maitland	Storm with winds up to 125 km/h, heavy rain causes severe flooding; coal freighter Pasha Bulker runs aground	9 dead AUD 1.09bn (USD 957m) insured loss AUD 1.58bn (USD 1.38bn) total damage
7.6.–9.6.	United States OH, WI, PA, Akron, Cincinnati	Storm, tornadoes, hail	USD 100–300m insured loss USD 250m total damage
20.6.–22.6.	United States IA, NM, WI	Storms and hail, rain	USD 100–300m insured loss
20.6.–21.6.	Switzerland, Germany Cantons of Berne, Schwyz, Einsiedeln	Thunderstorms with winds up to 130 km/h, heavy rain; landslides	4 dead CHF 195m (USD 172m) insured loss
23.6.–24.6.	Pakistan Karachi	Thunderstorms with heavy rain; over 500 homes destroyed	228 dead 186 injured
26.6.–11.7.	Pakistan Baluchistan, Sindh, North West Frontier, Kech, Gwadar	Cyclone Yemyin, heavy rain, floods; dam bursts, 200 000 houses washed away	340 dead 300 000 homeless PKR 100bn (USD 1.62bn) total damage
8.7.–17.7.	Japan, Guam Kyushu Island, Shikoku, Honshu, Okinawa	Typhoon Man-yi/No 4 with winds up to 175 km/h; cargo ship Tai Tong 7 sinks	4 dead, 7 missing 70 injured JPY 7.5bn (USD 67m) insured loss
16.7.–18.7.	United States IA, IL, MI	Thunderstorms, hail, flooding	USD 25–100m insured loss
18.7.–23.7.	China Chongqing, Shandong, Jinan	Storms, heavy rain; floods and landslides: over 29 500 houses, 183 000 hectares of crops destroyed	74 dead, 9 missing 142 injured CNY 2.4bn (USD 329m) total damage
20.7.	Pakistan North West Frontier	Thunderstorms, lightning, heavy rain; flooding	80 dead
20.7.–22.7.	Germany North Bavaria, Erlangen	Thunderstorms with heavy rain, hail, flooding	10 injured USD 120m insured loss USD 160m total damage
29.7.–4.8.	Japan Kyushu, Honshu, Miyazaki, Kagoshima	Typhoon Usagi/No 5; heavy rain, floods, landslides	18 injured USD 150m insured loss USD 225m total damage
30.7.–2.8.	China Xinjiang	Storms and heavy rain; floods and landslides	29 dead, 2 missing CNY 600m (USD 82m) total damage
5.8.–9.8.	China, Philippines, Taiwan Guangdong, Zhejiang	Tropical storm Pabuk/No 6, heavy rain; floods, landslides, over 3 700 homes destroyed	11 dead CNY 1.34bn (USD 183m) total damage
7.8.–9.8.	United States OH, PA, IL, KS, MO	Thunderstorm with winds up to 125 km/h, heavy rain, hail	USD 100–300m insured loss USD 170m total damage
7.8.–11.8.	Vietnam Ha Tinh, Quang Binh, Dak Lak, Nghe An	Tropical storm, heavy rain, flooding; 1 850 houses, 66 400 hectares of crops destroyed	74 dead, 9 missing 130 injured VND 2.2bn total damage
9.8.–10.8.	Pakistan Karachi	Storm, torrential rain, floods	44 dead 20 injured
10.8.–11.8.	United States MN, WI	Storms with winds up to 120 km/h, hail	USD 100–300m insured loss USD 200m total damage
12.8.–20.8.	Taiwan, China, Philippines Guangdong, Fujian, Zhejiang, Jiangxi, Hunan	Typhoon Sepat/No 8 with winds up to 205 km/h, torrential rain, landslides; 60 000 hectares of crops destroyed	39 dead, 9 missing 60 injured CNY 134m (USD 18m) insured loss USD 700m total damage
13.8.–14.8.	United States MN, WI	Thunderstorms, hail	USD 100–300m insured loss USD 300m total damage

16.8.–23.8.	Jamaica, Mexico, Martinique, Guadeloupe, Saint Lucia, Cayman Islands, Haiti, Dominica, Dominican Republic, Belize	Hurricane Dean with winds up to 230 km/h; severe damage to fruit plantations	36 dead USD 450m insured loss USD 2.25bn total damage
16.8.–19.8.	United States TX, OK, MO	Tropical storm Erin with winds up to 132 km/h, flooding	26 dead
23.8.–24.8.	United States IL, CO, MI, MN, WI, OH, Chicago	Thunderstorms with winds up to 110 km/h, hail; flooding	26 dead 40 injured USD 300–600m insured loss USD 700m total damage
28.8.–30.8.	China Yunnan, Sichuan, Yibin	Storms with heavy rain, floods and landslides	31 dead, 9 missing
29.8.–8.9.	Japan Honshu, Hokkaido, Nagano, Tokyo	Typhoon Fitow/No 9 with winds up to 140 km/h; heavy rains, flooding	2 dead, 1 missing 59 injured USD 350m insured loss USD 525m total damage
2.9.–12.9.	Nicaragua, Honduras, Guatemala, Grenada, Belize, Aruba	Hurricane Felix with winds up to 260 km/h; floods, landslides: 19 000 homes, over 500 000 hectares of forest destroyed	102 dead, 130 missing 220 000 homeless USD 150m insured loss USD 900m total damage
13.9.–17.9.	South Korea Jeju Island, South Jeolla	Typhoon Nari/No 11, heavy rain; 10 000 hectares of crops flooded	20 dead 2 injured 600 homeless KRW 65.2bn (USD 70m) total damage
16.9.–19.9.	China, Taiwan, North Korea, Japan Zhejiang, Fujian, Jiangsu, Anhui, Pjongjang	Typhoon Wipha/No 12 with winds up to 240 km/h, heavy rain, flooding; 23 600 homes, 8 000 public buildings, 109 000 hectares of crops destroyed	7 dead, 4 missing USD 200m insured loss USD 963m total damage
20.9.–21.9.	United States MN, ND	Storms, hail and floods	USD 100–300m insured loss USD 230m total damage
30.9.–18.10.	Vietnam, Philippines, Thailand, China, Laos, People's Democratic Republic, Nghe An	Typhoon Lekima/No 14 with winds up to 130 km/h, heavy rain, landslides; 9 500 houses destroyed, 30 000 hectares of rice, 115 000 hectares of crops flooded	110 dead, 9 missing 90 injured 125 000 homeless VND 2 000bn (USD 125m) total damage
2.10.–8.10.	Taiwan, China, Nantou, Tainan, Hualien, Zhejiang, Fujian	Typhoon Krosa/No 15 with winds up to 240 km/h, heavy rain; 3 500 homes, fish farms, farmland destroyed	5 dead, 3 missing 67 injured USD 200m insured loss USD 1.13bn total damage
15.10.–17.10.	Bangladesh Chittagong, Cox's Bazar	Storms, heavy rain, landslides; 18 trawlers missing in Bay of Bengal	at least 10 dead, 100 missing 150 injured BDT 137m (USD 2m) total damage
21.10.–23.10.	United States CA	Santa Ana winds	USD 100–300m insured loss USD 300m total damage
29.10.–4.11.	Dominican Republic, Haiti, Cuba, Bahamas, Jamaica Hispaniola, Port-au-Prince	Hurricane Noel with winds up to 128 km/h; heavy rain, floods, landslides; damage to rice, cocoa plantations	148 dead, 65 missing 14 injured 62 000 homeless USD 30m total damage
5.11.–15.11.	Vietnam, Philippines, Binh Dinh, Quang Ngai, Quang Nam, Khanh Hoa	Typhoon Peipah/No 21, heavy rain, floods	50 dead, at least 8 missing 70 injured USD 350m total damage
12.11.–20.11.	Papua New Guinea, Australia, Coral Sea Oro, Milne Bay	Tropical cyclone Guba, heavy rain, floods	71 dead, 50 missing
15.11.–23.11.	Bangladesh, India Bay of Bengal, Bagerhat, Barguna, Patuakhali, Pirojpur, Barisal, Jhalokati, Dhaka	Cyclone Sidr, winds up to 240 km/h, floods; 500 000 homes, 647 500 hectares of crops destroyed, over 1.5m livestock lost	3 363 dead, 871 missing 34 500 injured 2 000 000 homeless USD 2.31bn total damage

20.11.–27.11.	Philippines Luzon, Bicol	Typhoon Mitag/No 23 with winds up to 148 km/h; floods	11 dead, 18 missing 6 injured PHP 203m (USD 5m) total damage
20.11.–28.11.	Philippines, South China Sea Luzon, Mindanao	Typhoon Hagibis/No 24 with winds up to 129 km/h	22 dead 10 injured PHP 30m (USD 1m) total damage
2.12.–4.12.	United States OR, WA	Storm with winds up to 160 km/h, rain, mud- and snow slides	17 dead 28 injured USD 100–300m insured loss
11.12.–14.12.	Dominican Republic, Puerto Rico, Haiti	Tropical storm Olga with winds up to 80 km/h; floods and landslides caused by heavy rain	25 dead

Earthquake

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
6.3.	Indonesia, Malaysia, Singapore West Sumatra, Solok, Tanah Datar, Padang	Earthquake (M_t 6.3), aftershock (M_t 6.1); damage to infrastructure, over 4 000 houses destroyed	72 dead 632 injured USD 5m insured loss USD 200m total damage
25.3.	Japan Ishikawa, Toyama, Niigata, Wajima	Earthquake Noto Hanto (M_w 6.9); several aftershocks: 300 buildings destroyed	1 dead 200 injured 1657 homeless JPY 2.5bn (USD 22m) insured loss USD 250m total damage
3.6.	China Yunnan, Puer	Earthquake (M_s 6.4); over 300 aftershocks	3 dead 313 injured USD 10m insured loss CNY 2.5bn (USD 342m) total damage
16.7.	Japan Niigata, Nagano, Toyama, Honshu	Niigata earthquake (M_w 6.6); houses, roads, bridges destroyed, damage to Kashiwazaki-Kariwa nuclear power plant	11 dead 1000 injured USD 300m insured loss USD 3bn total damage
2.8.	Russia Yuzhno-Sakhalinsk, Nevelsk	Earthquake (M_s 6.2) causes mudslide; 220 apartment houses, 29 social and cultural facilities destroyed	2 dead 12 injured 7 500 homeless USD 420m total damage
15.8.	Peru Ica, Lima, Pisco, Chinchu, Paracas, San Vicente de Cañete	Earthquake (M_w 8), more than 300 aftershocks; 52 200 houses destroyed, damage to public buildings	519 dead 1291 injured 139 521 homeless USD 100m insured loss USD 2bn total damage
12.9.	Indonesia Sumatra, Bengkulu, Padang	Earthquake (M_w 8.4); several aftershocks	23 dead 88 injured USD 500m total damage
14.11.	Chile Tocopilla, Mejillones, Maria Elena	Earthquake (M_w 7.7), aftershocks; over 1200 homes destroyed	2 dead 115 injured 15 000 homeless USD 100m total damage
25.11.	Indonesia Sumbawa Island, Raba, Bima, Dompu	Earthquake (M_w 6.5), several aftershocks	3 dead 55 injured

Drought, bush fires, heat waves

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
8.1.	United States CA	Forest fire spreads to Malibu beachside: 6 mansions destroyed	USD 60m insured loss
8.6.–13.6.	India, Pakistan Rajasthan, Uttar Pradesh	Heat wave with temperatures of over 50 degrees Celsius	120 dead
19.6.–25.7.	Hungary, Romania, Greece, Austria	Heat wave in southern Europe	550 dead
24.6.–2.7.	United States CA, Sierra Nevada, South Lake Tahoe	Angora bush fire; 1 250 hectares of land, 256 homes destroyed	USD 150m insured loss
23.8.–30.8.	Greece Peloponnese Peninsula, Iliia, Euboea Island, Olympia	Huge forest fires; over 1 600 km ² forest, olive groves, farmland, over 1 500 homes destroyed	67 dead 4 000 homeless EUR 1.2bn (USD 1.75bn) total damage
21.10.–24.10.	United States CA, San Diego, Los Angeles, Malibu, Tijuana	Witch urban forest fires; over 2 800 properties destroyed, 2 480 hectares of land burnt	8 dead 64 injured USD 1–3bn insured loss USD 2bn total damage
24.11.–27.11.	United States CA, Malibu	Corral bush fire; 2 000 hectares of land, 53 homes destroyed	USD 315m total damage

Cold, frost

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
1.1.–28.1.	Bangladesh, India, Nepal, Pakistan	Cold wave with temperatures close to freezing	280 dead
12.1.–17.1.	United States IL, KS, MO, OK, TX, IA	Winter storm, freezing rain; power outages	55 dead USD 100–300m insured loss USD 500m total damage
13.1.–15.1.	United States AZ, CA, NV	Winter storm, cold temperatures; damage to citrus plantations	USD 25–100m insured loss USD 1bn total damage
13.2.–15.2.	United States NJ, NY, OH, PA	Winter storm, heavy snow, ice cause power outages	USD 100–300m insured loss USD 140m total damage
23.2.–25.2.	United States AR, IA, TX	Winter storm with winds up to 180 km/h, tornadoes, cold, snow	4 dead 27 injured USD 100–300m insured loss USD 300m total damage
3.3.–5.3.	China Liaoning	Heavy storm and snow; 10 000 hectares of indoor grain, vegetables, fruit destroyed	14 dead CNY 3bn (USD 411m) total damage
11.3.–14.3.	India Jammu and Kashmir	Cold wave; snow, thunderstorms with heavy rain, lightning	66 dead 25 injured
21.5.–23.5.	South Africa Eastern Cap, Gauteng	Cold weather with temperatures below zero degrees, snow, ice; fatalities due to exposure or in fires	22 dead
9.12.–11.12.	United States IA, IL, KS, MO, NE, OK	Winter storm, freezing rain, snow; power outages	24 dead 2 injured USD 300–600m insured loss
23.12.–26.12.	United States IA, NE, CO, MI, WI, WY	Winter storm with winds up to 109 km/h, snow, ice	22 dead

Hail

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
22.4.–26.4.	China Guizhou	Hailstorms; severe damage to agriculture	3 dead 200 injured USD 60m total damage
25.5.–29.5.	Germany Berlin	Hail and storms; damage to buildings	3 dead EUR 45m (USD 66m) insured loss
9.12.	Australia NSW, Sydney	Hail and storm; flooding, damage to cars, buildings	1 dead 30 injured AUD 201m (USD 176m) insured loss

Tsunami

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
2.4.	Solomon Islands, South Pacific Ocean Sasamunga, Gizo, Simbo	Earthquake (M _w 8.1) triggers tsunami; government, business buildings, hospital destroyed	at least 52 dead, 100 missing 6 000 homeless

Other natural catastrophes

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
31.3.	Pakistan Hindu Kush, Chitral	Heavy snowfall, homes buried by avalanches	29 dead, 14 missing 3 injured
20.11.	China Hubei, Badong	Landslide on mountainside buries National Highway	31 dead, 2 missing 1 injured

Table 7
Chronological list of all man-made disasters 2007

Major fires, explosions

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
4.1.	France Biganos	Fire at paperboard production plant	insured loss na**
27.1.	Belgium Ertvelde	Fire at chemical plant	insured loss na
16.2.	United States TX, Sunray	Fire and explosion at oil refinery	insured loss na
23.2.	Latvia Alsunga	Fire at home for disabled	25 dead 5 injured
6.3.	Bangladesh Chittagong	Fire in Boubazar slum area	21 dead 10 injured
10.3.	Russia Volgograd	Fire at oil refinery	insured loss na
19.3.–20.3.	Russia Krasnodar	Fire at nursing home	62 dead 30 injured
20.3.	Japan Joetsu	Explosion and fire at chemical plant	17 injured insured loss na
25.3.	Mozambique Maputo	Explosions of bombs, mines at ammunition and arms depot	117 dead 450 injured
8.4.	United States NY	Fire at 17-storey Bronx apartment building	53 injured
12.4.	Spain Navarra	Fire at car manufacturer	insured loss na
15.4.	Denmark Blans	Fire at slaughterhouse	insured loss na
11.5.	China Hebei, Cangzhou	Explosion at chemical factory	5 dead 105 injured
9.6.	North Korea North Pyongan	Explosion of fuel pipeline	110 dead
29.6.	United States KS, Coffeyville	Heavy rain causes flooding and crude oil leakage at oil refinery	insured loss na
5.7.	China Liaoning, Tianyingji	Explosion at karaoke bar, 2-storey building collapses	25 dead, 33 missing
17.7.	Netherlands	Fire at manufacturer of frozen products	insured loss na
6.8.	Saudi Arabia Al-Jubail	Explosion at petrochemical plant	insured loss na
16.8.	United States MS, Pascagoula	Fire at oil refinery	insured loss na
17.8.	United Arab Emirates Sharjah	Fire at manufacturer of automotive, industrial, marine lubricants	insured loss na
30.9.	Japan Osaka, Moriguchi	Fire at battery manufacturer	insured loss na
8.10.	Australia Sydney	Fire at sausage processing plant	insured loss na
9.10.	Netherlands Almere	Fire at distribution centre	insured loss na
13.10.	Ukraine Dnepropetrovsk	Gas explosion in residential area; 7 single-storey houses, 2 multi-storey buildings damaged	23 dead 19 injured
19.10.	Philippines Manila	Explosion at Glorietta shopping mall	11 dead 100 injured

** na: not available

21.10.	China Fujian, Hushi	Fire at shoe factory	37 dead 19 injured
22.10.	India Jammu and Kashmir	Fire in Margie Village destroys more than 160 houses	100 injured
26.10.	Switzerland Härkingen	Fire at mail sorting centre	insured loss na
4.11.	Russia Tula, Velye Nikolskoye	Fire at retirement home	32 dead
18.11.	Saudi Arabia Haradh-Uthmaniyah	Explosion of Haradh-Uthmaniyah gas pipeline	40 dead 10 injured
12.12.	China Zhejiang, Wenzhou	Fire at 28-storey department store Wenfu Mansion	21 dead 2 injured
21.12.	Japan Kamisu-city	Fire at petrochemical plant	4 dead insured loss na
25.12.	Nigeria Lagos, Abagbo, Iru	Explosion of oil pipeline	45 dead

Aviation disasters

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
1.1.	Indonesia South Sulawesi, Makassar Strait	Adam Air Boeing 737-400 crashes into sea during storm	102 missing
9.1.	Iraq Balads	Aeriantur Antonov 26B-100 crashes in heavy fog on landing approach	34 dead 1 injured
30.1.	Pacific Ocean CA, Long Beach	Explosion on launch platform destroying SeaLaunch rocket and on-board NSS-8 satellite	insured loss na
4.3.	Space	Failure of imaging system due to electronics malfunction	insured loss na
7.3.	Indonesia Java, Yogyakarta-Adisutjipto Airport	Garuda Indonesia Airways Boeing 737-400 overruns runway on landing, catches fire	22 dead 50 injured insured loss na
19.4.	United Arab Emirates Abu Dhabi, Gamco	3 aircraft destroyed in hangar fire	insured loss na
5.5.	Cameroon Douala	Kenya Airways Boeing 737 crashes in mangrove swamp	114 dead insured loss na
3.6.	Sierra Leone Lungi, International Airport	Paramount Airlines Mi-8 helicopter explodes and crashes on landing	22 dead
25.6.	Cambodia Phnom Damrey	PMT Air Antonov 24 crashes into mountain	22 dead
17.7.	Brazil São Paulo, Congonhas Airport	TAM Airbus 320 overruns wet runway, runs onto an adjacent road, hits petrol station and cargo terminal; catches fire	199 dead insured loss na
9.8.	French Polynesia	Air Moorea DHC-6 Twin Otter 300 crashes into the sea shortly after take-off	20 dead
20.8.	Japan Okinawa-Naha Airport	China Airways Boeing 737 catches fire after landing; explosion in centre of aircraft	2 injured insured loss na
5.9.	Kazakhstan Baikonur	Proton launch failure of Japanese satellite JCSAT II	insured loss na
16.9.	Thailand Phuket, International Airport	One-Two-Go Airlines MD-82 crashes while landing; catches fire	90 dead 40 injured insured loss na
4.10.	Congo, Democratic Republic of (DRC) Kinshasa	Malift Air Antonov 26 crashes into residential area	50 dead 25 injured
15.11.	France Toulouse-Blagnac Airport	Airbus A340-600 rolls forward during engine run-ups	9 injured insured loss na

21.11.	Space	Attitude control problem on Express AM-22 satellite	insured loss na
30.11.	Turkey Isparta	Atlasjet Airlines MD-83 crashes in mountainous terrain	57 dead insured loss na
21.12.–24.12.	Space	Loss of helium pressure on Rascom-QAF1 satellite	insured loss na

Shipping disasters

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
14.1.	Mediterranean Sea, Italy Sicily, Strait of Messina	Collision of hydrofoil Segesta Jet and container ship Susan Borchard	4 dead 99 injured insured loss na
18.1.	India Mahabubnagar	Overloaded passenger boat capsizes on Krishna River	43 dead, 21 missing
3.2.	North Atlantic, Cameroon Mabeta	Overloaded boat carrying immigrants capsizes	63 dead, 20 missing
13.2.	Arabian Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants capsizes	112 dead
17.2.	Mediterranean Sea Samos	Boat carrying illegal immigrants sinks	at least 5 dead, 20 missing
20.2.	India Kerala	Boat capsizes on Periyar River	22 dead, 16 missing 10 injured
22.2.	Indian Ocean, Indonesia North Jakarta, Tanjung Priok	Fire on board ferry Levina I	54 dead, 23 missing
1.3.	Caribbean Sea, Haiti	Boat carrying illegal immigrants catches fire and capsizes	5 dead, 49 missing 2 injured
8.3.	Belgium Antwerp	Container ship Repubblica di Genova capsizes in Verrebroek dock	insured loss na
8.3.	East China Sea, China Tianjin Port	Collision between dredger WD Fairway and container ship MSC Joanna	insured loss na
24.3.	Myanmar (Burma) Yangon	Boat capsizes on river	16 dead, 12 missing
29.3.	North Atlantic Gulf of Guinea, Conakry	Overloaded boat capsizes in rough weather	46 dead
5.4.–6.4.	Mediterranean Sea, Greece Bay of Santorini	Cruise liner Sea Diamond hits reef and sinks	2 missing insured loss na USD 1.3bn total damage
8.4.	East China Sea, China Taizhou Bay, Zhejiang	Collision between cargo ships Harvest and Jin Hai Kun	20 missing
12.4.	North Sea Shetlands	Supply vessel Bourbon Dolphin capsizes and sinks in bad weather	3 dead, 5 missing insured loss na
14.4.	Arabian Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants capsizes and sinks	62 missing
4.5.	Caribbean Sea, Turks and Caicos Islands	Boat carrying illegal immigrants capsizes in rough weather	61 dead, 15 missing
10.5.	South Atlantic, Congo, Democratic Republic of (DRC)	Fire on oil platform	3 dead 1 injured insured loss na
1.6.	Uganda Kyatu Island	Overloaded boat capsizes on Lake Victoria	30 dead
25.6.	East China Sea, Taiwan Kaohsiung	Vessel – under construction – sinks when moved from shipyard to dry dock	insured loss na
5.7.	Congo, Democratic Republic of (DRC) Idjwi Island	Collision of two boats on Lake Kivu	9 dead, 22 missing
10.7.	Indian Ocean, Indonesia Manipa, Maluku	Passenger ship Wahai Star sinks in stormy weather	at least 14 dead, 36 missing

18.7.	North Atlantic Canary Islands	Boat carrying illegal immigrants capsizes in rough seas	50 missing
3.8.	North Atlantic Sierra Leone	Overloaded boat capsizes in stormy weather	50 dead, 100 missing
6.8.	India Bihar, Samastipur	Overloaded boat capsizes on Ganges	13 dead, 50 missing
5.9.	Nepal Banke, Kanchanpur	Boat capsizes on Rapti River	13 dead, 18 missing
3.10.	Nigeria Kebbi, Dandi	Collision of two boats on Dole-Kaina River	38 dead, 48 missing 8 injured
13.10.	North Atlantic, Gambia Tanji	Boat capsizes in rough weather	32 dead
15.10.–21.10.	North Pacific Ocean, Mexico	Boat carrying illegal immigrants capsizes during tropical storm Kiko	15 dead, 9 missing
16.10.–5.11.	North Atlantic, Mauritania Nouadhibou	Boat carrying illegal immigrants runs aground; passengers die of cold, thirst, hunger	56 dead
18.10.	South Pacific Ocean, Sulawesi, Buton Island	Overloaded ferry Acita 03 capsizes	31 dead, 29 missing 20 injured
18.10.–24.10.	North Atlantic, Cape Verde	Boat carrying illegal immigrants capsizes	7 dead, 50 missing 1 injured
23.10.	North Pacific Ocean, Gulf of Mexico, Mexico Tabasco, Campeche	Collision of oil rig and drilling platform in stormy weather	21 dead, 2 missing
25.10.	South Pacific Ocean Sulawesi, Roksi Asikin	Sailboat sinks	30 missing
7.11.	North Pacific Ocean, United States CA, San Francisco Bay	Freighter Cosco Busan hits Bay Bridge; over 260 000 litres of oil spilled	insured loss na USD 100m total damage
11.11.	Black Sea Sea of Azov, Kerch Strait	Tanker Volgoneft 139 capsizes during storm; over 3 000 tons of oil spilled, up to 15 000 birds die	USD 251m total damage
13.11.	Myanmar (Burma)	Overloaded boat capsizes on Chindwin River	23 missing
21.11.	Red Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants capsizes	64 dead
28.11.	East China Sea, Taiwan	Bulk carrier MV Mezzanine sinks in rough seas	26 missing 1 injured
30.11.	Red Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants capsizes	30 dead, 69 missing
7.12.–8.12.	Gulf of Aden, Yemen Bab el-Mandeb Strait	Collision between oil tanker Samco Europe and freighter MSC Prestige	insured loss na
7.12.–12.12.	East China Sea, South Korea Yellow Sea, South Chungcheong, Taeon	Collision between crane barge ship and oil tanker Hebei Spirit; 10 000 tons of crude oil spilled, 212 marine farms, 15 bathing beaches polluted	insured loss na USD 330m total damage
8.12.	North Atlantic, Morocco Ad Dakhla	Boat carrying illegal immigrants capsizes	50 missing
8.12.	North Atlantic, Senegal Dakar	Boat carrying illegal immigrants runs aground	40 dead 20 injured
9.12.	Congo, Democratic Republic of (DRC)	M/B Lipamboli capsizes on Congo River	40 dead
10.12.	Mediterranean Sea, Aegean Sea, Izmir	Overloaded boat carrying illegal immigrants capsizes in rough weather	50 dead, at least 29 missing 6 injured
15.12.	Red Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants capsizes	58 dead, 37 missing
16.12.	Red Sea, Gulf of Aden, Yemen	Boat carrying illegal immigrants hits rock and sinks	97 missing
19.12.	Congo, Democratic Republic of (DRC)	Overloaded boat capsizes on Tshuapa River	45 dead

19.12.	Arabian Sea, Persian Gulf, United Arab Emirates	Fire in engine room of dredger Vasco da Gama	insured loss na
21.12.	North Atlantic, Cuba Straits of Florida, Havana	Boat carrying illegal immigrants hits reef and capsizes	8 dead, 17 missing
21.12.	Andaman Sea, Thailand Ranong	Overloaded boat carrying illegal immigrants capsizes	22 dead

Rail disasters (incl. cableways)

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
14.1.	Thailand Thonburi, Hua Hin	Head-on collision of two trains	3 dead 93 injured
15.1.	Indonesia Central Java, Banyumas	One coach of passenger train derailed; plunges off bridge into dry riverbed	5 dead 100 injured
14.2.	Congo, Democratic Republic of (DRC) Katanga, Mokambo	Freight train derailed	22 dead 9 injured
5.4.	France Paris, Gare de l'Est	Commuter train hits rail buffer	58 injured
21.4.	Indonesia West Java, Garut	Passenger train derailed; three coaches fall into ravine	70 injured
12.7.	Greece Athens, Sepolia	Collision between commuter train and freight train	53 injured
17.7.	Ukraine Lviv	Freight train derailed; leakage of phosphorus gas	80 injured
2.8.	Congo, Democratic Republic of (DRC) Kasai Occidental, Kananga	Seven coaches of freight train derail	100 dead 102 injured
9.8.	Zimbabwe Harare	Collision between commuter and goods train	1 dead 50 injured
30.8.	Brazil Rio de Janeiro	Passenger train crashes into a slow-moving empty train	8 dead 60 injured
6.10.	Cuba Granma, Yara	Passenger train crashes into bus on level crossing	29 dead 75 injured
9.10.	Pakistan Lahore, Narang Mandi	Express train crashes into bus on level crossing	12 dead 50 injured
30.11.	United States Chicago	Passenger train hits a stationary freight train	71 injured
19.12.	Pakistan Mehrappur	15 coaches of passenger train derail	40 dead 250 injured

Mining accidents

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
7.1.	Congo, Democratic Republic of (DRC) Kasai Oriental, Tshikapa	Diamond mine collapses after heavy rain	13 dead, 30 missing
17.1.	China Inner Mongolia	Flooding of Haolaigou iron ore mine	29 dead
4.2.	Colombia Santander, Sardinata	Gas explosion at La Preciosa coal mine	32 dead
10.2.	China Henan, Tianchi	Fire at coal mine	24 dead 4 injured
3.3.	Colombia Sardinata	Explosion at El Tabia coal mine	32 dead

10.3.	China Liaoning, Fushun	Flooding and gas leakage at coal mine	22 dead, 7 missing
18.3.	China Shanxi, Chengqu	Gas explosion at Miaojiang coal mine	21 dead
19.3.	Russia Kemerowo, Novokuznetsk	Gas explosion at Ulyanovskaya mine	108 dead, 2 missing
28.3.	China Shanxi, Yipingyuan, Linfen	Explosion at Yujialing coal mine	26 dead 1 injured
5.5.	China Shanxi, Puxian, Linfen	Gas explosion at Pudeng coal mine	28 dead, 2 missing 23 injured
24.5.	Russia Kemerovo, Kusbass	Explosion at Yubileynaya coal mine	39 dead 6 injured
17.8.	China Shandong, Xintai	Flooding of Huayuan coal mine; dyke burst due to torrential rain	172 missing
2.10.	South Africa Welkom	Fire in St Helena mine	23 dead
13.10.	Colombia Cauca, Suárez	Gold mine collapses due to landslide	22 dead 24 injured
8.11.	China Guizhou, Nayong	Methane gas leak at coal mine	35 dead 7 injured
14.11.	Australia Victoria, Yallourn	Torrential rain, Latrobe River bursts its banks; wall of coal mine collapses due to water pressure	insured loss na
18.11.	Ukraine Donetsk	Methane gas explosion at Zasiadko coal mine	88 dead, 12 missing 31 injured
26.11.	Ecuador Azuay	Explosion of dynamite store at Liga de Ore mine	7 dead, 30 missing 40 injured
5.12.	China Shanxi, Linfen	Gas explosion at Xinyao coal mine	105 dead 18 injured

Collapse of buildings/bridges

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
30.1.	India Pakhlia, Punjab	Roof of house collapses during procession	50 injured
11.2.–15.2.	Pakistan North West Frontier	Thatched roofs of buildings collapse due to heavy rain, storm	36 dead 40 injured
19.3.	Guinea Gueckedou	Collapse of bridge; overloaded truck falls into river	70 dead 15 injured
23.5.	India Tamil Nadu, Tirupur	Boundary wall of bar adjoining vacant plot collapses	27 dead 5 injured
18.7.	India Maharashtra, Mumbai	Collapse of seven-storey building	29 dead 15 injured
1.8.	United States MN, Minneapolis	Collapse of freeway bridge	9 dead, 20 missing 60 injured
13.8.	China Hunan, Fenghuang	328-meter span bridge over Tuojiang River collapses: bridge was under construction	64 dead
9.9.	India Hyderabad	Highway overpass – under construction – collapses	20 dead
26.9.	Vietnam Can Tho	Bridge – under construction – collapses	64 dead 80 injured VND 40bn (USD 2m) total damage
24.11.	Bangladesh Patuakhali, Kalapara	Bridge collapses under weight of crowd of more than 3000 people	4 dead, 20 missing 100 injured
24.12.	Egypt Alexandria	Collapse of 12-storey residential building	26 dead, 4 missing

Miscellaneous

Date	Country Place	Event	No of victims/amount of damage in original currency and (USD)
30.1.	China Hubei, Xiaogan	Poisoning due to toxic chemical leakage from a tanker	1 dead 127 injured
18.2.	India Panipat, Dewana	Two bombs explode on Samjhauta Express train	68 dead 34 injured
18.2.–26.2.	Uganda Kooome Islands, Mukono	Alcohol poisoning due to locally-brewed gin	37 dead
18.2.	Thailand Yala, Narathiwat, Songkhla, Pattani	28 near-simultaneous bomb explosions at public areas	7 dead 54 injured insured loss na
12.3.	China Shanghai	Chlorine gas leakage at Shanghai's World Expo construction site	59 injured
22.3.	Arabian Sea, Gulf of Aden, Yemen	Smugglers force illegal immigrants to jump overboard	31 dead, 90 missing
6.4.	Arabian Sea, Gulf of Aden, Yemen	Smugglers force illegal immigrants to jump overboard	34 dead
11.4.	Algeria Algiers, Bab Ezzouar	Explosion of two car bombs in front of government building and police station	33 dead 57 injured
16.4.	China Guizhou, Xifeng	Leakage of sulphur dioxide at chemical fertilizer plant	300 injured
16.4.	United States VA	Shooting on campus of Virginia Tech University	33 dead 15 injured
18.4.	China Liaoning, Tieling	Ladle filled with molten metal falls on ground, engulfing adjacent room	32 dead 6 injured
24.4.	China Liaoning, Shalingzhen	Poisoning due to benzene-laden paint used for school furniture	400 injured
28.4.	Pakistan North West Frontier, Charsadda	Suicide bomb attack at public rally	28 dead 52 injured
6.5.	Israel Jerusalem	Stampede at soccer game	50 injured
12.5.–13.5.	Pakistan Karachi	Clashes between opposition political parties	41 dead
15.5.	Pakistan North West Frontier, Peshawar	Suicide bombing at Marhaba hotel	24 dead 30 injured
16.5.	Mexico Sonora, Cananea	Gunfight between suspected members of drug gang and police	22 dead
22.5.	Turkey Ankara	Suicide bombing in front of shopping mall	6 dead 100 injured
11.6.	United States LA	Blowout at gas well	insured loss na
25.6.–28.6.	Nepal Palpa	Poisoning due to anti-elephantiasis medicine	500 injured
10.7.–11.7.	Pakistan Islamabad	Military forces storm the Red Mosque complex following a week-long siege	105 dead
19.7.	Pakistan Balochistan, Hub	Suicide car bomb attack on bus passing through main bazaar	30 dead 30 injured
23.7.	Spain Barcelona	Power blackout; 350 000 business and residential customers affected	insured loss na EUR 100m (USD 146m) total damage
23.7.	Brazil Ponte Nova	Riots in prison	25 dead
4.8.	Japan Hitachi Naka	Power outage at a semiconductor production plant	insured loss na
13.8.	Russia Veliky Novgorod	Bomb explosion; passenger train derailed	60 injured RUB 215m (USD 9m) total damage

20.8.	China Shandong	Molten aluminium spill in foundry	16 dead 59 injured
25.8.	India Hyderabad	Bombs explode at leisure park and restaurant	43 dead 50 injured
4.9.	Pakistan Rawalpindi	2 suicide bombing attacks on military bus and market area	25 dead 60 injured
15.9.–18.9.	Peru Desaguadero, Carancas	Powerful fumes emanate from crater caused by a meteorite	200 injured
20.9.–22.9.	Pakistan Karachi	Poisoning due to alcohol laced with methanol	41 dead 27 injured
26.9.–27.9.	Myanmar (Burma) Rangoon	Clashes between police and demonstrators	9 dead 100 injured
2.10.	China Chongqing, Qijiang	Arson attack on crowded bus	27 dead 11 injured
18.10.	Pakistan Karachi	Suicide bombing as former prime minister Benazir Bhutto travels through streets packed with supporters	139 dead 240 injured
21.10.	Arabian Sea, Gulf of Aden, Yemen	Smugglers force illegal immigrants to jump overboard	66 dead, 38 missing
30.10.	Peru Ancash	Electrical failure at copper-zinc mine	insured loss na
1.11.	North Sea, Norway	Ship's anchor damages gas pipeline	insured loss na
1.11.	Red Sea, Gulf of Aden, Yemen	Smugglers force illegal immigrants to jump overboard	40 dead 78 injured
4.11.	Argentina Santiago del Estero	Riots and subsequent arson in prison	34 dead 9 injured
17.11.	Brazil Alagoas, Maceio	Prison uprising after failed escape attempt	5 dead 70 injured
11.12.	Algeria Algiers	Two suicide car bombings at UN offices and court building	34 dead 170 injured
21.12.	Pakistan North West Frontier, Sherpao	Suicide bombing at mosque	56 dead 100 injured
27.12.	Pakistan Rawalpindi	Suicide bombing kills former prime minister Benazir Bhutto after campaign rally	20 dead 40 injured
28.12.	Pakistan Sindh	Riots after death of Benazir Bhutto; 800 shops, 27 railway stations, 13 polling stations burned	38 dead 89 injured USD 10m total damage
30.12.–3.1.08	Kenya Nairobi, Mombasa, Eldoret, Kisumu	Clashes across the country over disputed election results	600 dead 1000 injured 250 000 homeless USD 1bn total damage

Tables on the major losses 1970–2007

Table 8
The 40 most costly insurance losses 1970–2007

Insured loss ¹⁸ (in USD m, indexed to 2007)	Victims ¹⁹	Date (start)	Event	Country
68 515	1 836	25.08.2005	Hurricane Katrina; floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
23 654	43	23.08.1992	Hurricane Andrew; floods	US, Bahamas
21 999	2 982	11.09.2001	Terror attack on WTC, Pentagon and other buildings	US
19 593	61	17.01.1994	Northridge earthquake (M 6.6)	US
14 115	124	02.09.2004	Hurricane Ivan; damage to oil rigs	US, Caribbean: Barbados et al
13 339	35	19.10.2005	Hurricane Wilma; torrential rain, floods	US, Mexico, Jamaica, Haiti et al
10 704	34	20.09.2005	Hurricane Rita; floods, damage to oil rigs	US, Gulf of Mexico, Cuba
8 840	24	11.08.2004	Hurricane Charley	US, Cuba, Jamaica et al
8 599	51	27.09.1991	Typhoon Mireille/No 19	Japan
7 650	71	15.09.1989	Hurricane Hugo	US, Puerto Rico et al
7 413	95	25.01.1990	Winter storm Daria	France, UK, Belgium et al
7 223	110	25.12.1999	Winter storm Lothar	Switzerland, UK, France et al
6 097	54	18.01.2007	Winter storm Kyrill; floods	Germany, UK, NL, Belgium et al
5 659	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands et al
5 650	38	26.08.2004	Hurricane Frances	US, Bahamas
5 066	64	25.02.1990	Winter storm Vivian	Europe
5 031	26	22.09.1999	Typhoon Bart/No 18	Japan
4 492	600	20.09.1998	Hurricane Georges; floods	US, Caribbean
4 220	41	05.06.2001	Tropical storm Allison; heavy rain, floods	US
4 174	3 034	13.09.2004	Hurricane Jeanne; floods, landslides	US, Caribbean: Haiti et al
3 937	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
3 614	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 515	70	10.09.1999	Hurricane Floyd; heavy rain, floods	US, Bahamas, Columbia
3 508	167	06.07.1988	Explosion on platform Piper Alpha	UK
3 411	59	01.10.1995	Hurricane Opal; floods	US, Mexico, Gulf of Mexico
3 365	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
2 989	45	27.12.1999	Winter storm Martin	Spain, France, Switzerland
2 818	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 662	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria et al
2 589	26	20.10.1991	Forest fires which spread to urban areas, drought	US
2 577	–	06.04.2001	Hail, floods and tornadoes	US
2 488	4	25.06.2007	Heavy rainfall, floods	UK
2 443	30	18.09.2003	Hurricane Isabel	US, Canada
2 404	39	05.09.1996	Hurricane Fran	US
2 372	20	03.12.1999	Winter storm Anatol	Denmark, Sweden, UK et al
2 365	4	11.09.1992	Hurricane Iniki	US, North Pacific Ocean
2 282	–	29.08.1979	Hurricane Frederic	US
2 255	49	19.08.2005	Heavy rainfall, floods and landslides	Switzerland, Germany et al
2 217	23	23.10.1989	Explosion in petrochemical plant	US
2 196	220 000	26.12.2004	Earthquake (M _w 9), tsunamis in Indian Ocean	Indonesia, Thailand et al

¹⁸ Property and business interruption, excluding liability and life insurance losses

US natural catastrophe figures: with the permission of Property Claim Services (PCS)/incl. NFIP flood losses (see page 42 “Terms and selection criteria”)

¹⁹ Dead and missing

Table 9

The 40 worst catastrophes in terms of victims 1970–2007

Victims ²⁰	Insured loss (in USD m, indexed to 2007) ²¹	Date (start)	Event	Country
300 000	–	14.11.1970	Storm and flood catastrophe	Bangladesh
255 000	–	28.07.1976	Earthquake (M 7.5)	China
220 000	2 196	26.12.2004	Earthquake (M _w 9), tsunami in Indian Ocean	Indonesia, Thailand et al
138 000	3	29.04.1991	Tropical cyclone Gorky	Bangladesh
73 300	–	08.10.2005	Earthquake (M _w 7.6); aftershocks, landslides	Pakistan, India, Afghanistan
66 000	–	31.05.1970	Earthquake (M 7.7); landslides	Peru
40 000	183	21.06.1990	Earthquake (M 7.7); landslides	Iran
35 000	–	01.06.2003	Heat wave and drought in Europe	France, Italy, Germany et al
26 271	–	26.12.2003	Earthquake (M 6.5) destroys 85% of Bam	Iran
25 000	–	07.12.1988	Earthquake (M 6.9)	Armenia, ex-USSR
25 000	–	16.09.1978	Earthquake (M 7.7) in Tabas	Iran
23 000	–	13.11.1985	Volcanic eruption on Nevado del Ruiz	Colombia
22 084	273	04.02.1976	Earthquake (M 7.5)	Guatemala
19 737	117	26.01.2001	Earthquake (M _w 7.6) in Gujarat	India, Pakistan, Nepal et al
19 118	1 210	17.08.1999	Earthquake (M _l 7) in Izmit	Turkey
15 000	–	11.08.1979	Macchu dam burst in Morvi	India
15 000	–	01.09.1978	Floods following monsoon rains	India, Bangladesh
15 000	125	29.10.1999	Cyclone 05B devastates Orissa state	India, Bangladesh
11 069	–	25.05.1985	Tropical cyclone in Bay of Bengal	Bangladesh
10 800	–	31.10.1971	Floods in Bay of Bengal and Orissa state	India
10 000	274	12.12.1999	Floods, mudflows and landslides	Venezuela, Colombia
10 000	–	20.11.1977	Tropical cyclone in Andrah Pradesh	India, Bay of Bengal
9 500	621	19.09.1985	Earthquake (M 8.1)	Mexico
9 475	–	30.09.1993	Earthquake (M 6.4) in Maharashtra	India
9 000	636	22.10.1998	Hurricane Mitch in Central America	Honduras, Nicaragua et al
6 425	3 365	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
6 304	–	05.11.1991	Typhoons Thelma and Uring	Philippines
6 000	–	02.12.1984	Accident in chemical plant in Bhopal	India
6 000	–	01.06.1976	Heat wave, drought	France
5 778	41	27.05.2006	Earthquake (M _l 6.3); Bantul almost completely destroyed	Indonesia
5 422	–	26.06.1976	Earthquake (M 7.1)	Papua New Guinea et al
5 374	–	10.04.1972	Earthquake (M 6.9) in Fars	Iran
5 300	–	28.12.1974	Earthquake (M 6.3)	Pakistan
5 112	–	15.11.2001	Floods and landslides caused by heavy rain	Brazil
5 000	1 223	05.03.1987	Earthquake; oil pipeline damaged	Ecuador
5 000	645	23.12.1972	Earthquake (M 6.3) in Managua	Nicaragua
5 000	–	30.06.1976	Earthquake in West Irian	Indonesia
4 500	–	10.10.1980	Earthquake in El Asnam	Algeria
4 375	–	21.12.1987	Ferry Dona Paz collides with oil tanker Victor	Philippines
4 234	–	15.11.2007	Cyclone Sidr in Gulf of Bengal; floods	Bangladesh, India

²⁰ Dead and missing²¹ Property and business interruption, excluding liability and life insurance losses

Natural catastrophes

The term “natural catastrophe” is taken to mean an event caused by natural forces. Such an event generally results in a large number of individual losses involving many insurance policies. The scale of the losses resulting from a catastrophe depends not only on the severity of the natural forces concerned, but also on man-made factors such as building design or the efficiency of disaster control in the afflicted region. In this *sigma* study, natural catastrophes are subdivided into the following categories: floods, storms, earthquakes, droughts/forest fires/heat waves, cold waves/frost, hail, tsunami and other natural catastrophes.

Man-made disasters

This study categorises as “man-made” or “technical” disasters major events associated with human activities. Generally, a large object in a very limited space is affected which is covered by a small number of insurance policies. War, civil war and war-like events are excluded. *sigma* subdivides man-made disasters into the following categories: major fires and explosions, aviation and space disasters, shipping disasters, rail disasters, mining accidents, collapse of buildings/bridges and miscellaneous (including terrorism). Tables 6 and 7 on pages 23 and 32 list all major natural catastrophes and man-made disasters and the associated losses.

Total losses

For the purposes of the present *sigma* study, total losses are all the financial losses directly attributable to a major event, that is to say damage to buildings, infrastructure, vehicles, etc. The term also includes losses due to business interruption as a direct consequence of the property damage. A figure identified as “total damage” or “economic loss” includes all damage, whether insured or not. Total loss figures do not include indirect financial detriments such as loss of earnings suffered by suppliers to disabled businesses, nor any estimated shortfall in gross domestic product, nor non-economic losses such as loss of reputation or impaired quality of life.

Property damage and business interruptions directly attributable to a catastrophe

The amount of the total losses is a general indication only.

Generally, total (or economic) losses are estimated and communicated in very different ways. As a result, they are not directly comparable and should be seen only as an indication of the general order of magnitude.

Insured losses

Insured losses

“Losses” in the sense of *sigma* comprise all insured losses except liability. Leaving aside the liability losses on the one hand allows a relatively swift assessment of the insurance year but, on the other, tends to understate the cost of man-made disasters. Life insurance losses are likewise not included.

NFIP flood damage in the US

NFIP flood damage in the US

The *sigma* catastrophe database also includes flood damage covered by the National Flood Insurance Program (NFIP) in the US, provided that it fulfils the *sigma* selection criteria.

Selection criteria

sigma has been publishing tables listing major losses since 1970. Thresholds with respect to casualties – the number of dead, missing, severely injured, homeless – also make it possible to tabulate events in regions where the insurance penetration is below average.

Thresholds in 2007

For the 2007 reporting year, the lower loss thresholds were set as follows:

Insured losses:

Shipping	USD 16.6m
Aviation	USD 33.1m
Other losses	USD 41.1m

or Total losses: USD 82.2m

or Casualties:

Dead or missing	20
Injured	50
Homeless	2000

Adjustment for inflation, changes to published data, information

sigma converts all losses for the occurrence year not given in USD into USD using the end-of-year rate. To take account of inflation, these USD values are extrapolated using the US consumer price index to give current (2007) values. This can be illustrated by examining the insured property losses arising from the floods which occurred in the UK between 29 October and 10 November 2000: Insured loss at 2000 prices: USD 1045.7m
Insured loss at 2007 prices: USD 1259.7m

US consumer price index used to adjust for inflation

Alternatively, were one to adjust the losses in the original currency (GBP) for inflation and then convert them to USD using the current exchange rate, one would end up with an insured loss at 2007 prices of USD 1567.9m, 24% more than with the standard *sigma* method. The reason for the difference is that the value of the GBP rose by 33% against the USD in the period 2000–2007, ie more than the difference in inflation between the US (20.5%) and the UK (12.5%) over the same period.

Figure 6
Alternative method of adjusting for inflation, by comparison

Floods UK

29 October – 10 November 2000

	GBPm	Exchange rate		US inflation	
		USD/GBP	USDm	USDm	
Original loss	700.0	1.4939	1045.7	1045.7	
Level of consumer price index 2000	93.1			172.2	
Level of consumer price index 2007	104.7			207.4	
Inflation factor	1.125			1.205	
Adjusted for inflation to 2007	787.6	1.9906	1567.9	1259.7	
Comparison			124%	100%	

If changes to the loss amounts of previously published events become known, *sigma* takes these into account in its database. However, these changes only become evident where an event appears in the table of the 40 most costly insured losses or of the 40 disasters with the most fatalities since 1970 (Tables 8 and 9, pages 40/41).

sigma editors do not provide information on individual events

In the chronological lists of all man-made disasters, the insured losses are given by *sigma* as "not available" (na) for data protection reasons. However the total of these insured losses is included in the list of major losses in 2007 according to loss category. *sigma* editors do not provide further information on individual insured losses or about updates made to published data.

Sources

Information is collected from newspapers, direct insurance and reinsurance periodicals, specialist publications (in printed or electronic form) and reports from insurers and reinsurers.²² In no event shall Swiss Re be liable for any loss or damage arising in connection with the use of this information (see the copyright information on page 2).

Table 10
Exchange rates used when
converting insured losses

Exchange rate used ²³ , National currency per USD		
Country	Currency	Exchange rate, end 2007
Australia	AUD	1.1389
Canada	CAD	0.9869
China	CNY	7.3041
Denmark	DKK	5.1001
Euroland	EUR	0.6840
Japan	JPY	111.72
Norway	NOK	5.4298
Oman	OMR	0.3850
Switzerland	CHF	1.1322
UK	GBP	0.5024
United Arab Emirates	AED	3.6727
US	USD	1.0000

²² Natural catastrophes in the USA: Those *sigma* figures which are based exclusively on estimates of Property Claim Services (PCS), a unit of the Insurance Services Office, Inc (ISO), are given for each individual event in ranges defined by PCS. The estimates are the property of ISO and may not be reprinted or used for any purpose, including use as a component in any financial instruments, without the express consent of ISO.

²³ The insured losses for 2007 were converted to USD using these exchange rates. No losses in any other currencies were reported.

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Swiss Reinsurance Company
Economic Research & Consulting
Mythenquai 50/60
P.O. Box
8022 Zurich
Switzerland

Telephone +41 43 285 2551
Fax +41 43 285 4749
sigma@swissre.com