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Natural catastrophes and man-made disasters in 2010: a year of devastating and costly events

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Executive summary

Catastrophes claimed nearly 304 000 victims and cost insurers approximately USD 43bn in 2010

Catastrophes killed nearly 304 000 people in 2010. Insured losses rose more than 60% to USD 43bn.

Natural catastrophes and man-made disasters claimed nearly 304 000 victims and resulted in economic losses of close to USD 218bn in 2010. The cost to insurers was more than USD 43bn. In terms of insured losses, 2010 ranks as the seventh highest year since 1970, when *sigma* began collecting catastrophe data. Compared to 2009, insured losses were more than 60% higher in 2010, but still below 2005, the year that insured losses soared after Hurricanes Katrina, Wilma and Rita struck the US.

Over 300 catastrophic events occurred in 2010.

In 2010, 304 catastrophic events occurred, consisting of 167 natural catastrophes and 137 man-made disasters.

The earthquake that struck Haiti and the summer heat wave in Russia killed more than 222 000 and nearly 56 000 people respectively.

Of the nearly 304 000 people who were victims of catastrophic events in 2010, more than 222 000 died in the massive earthquake that struck Haiti in January. The heat wave and wildfires that affected Russia in the summer claimed nearly 56 000 victims due to the combination of the smoke and record high temperatures.

Catastrophes cost society approximately USD 218bn in 2010.

In terms of economic losses, natural catastrophes and man-made disasters cost society approximately USD 218bn in 2010, versus USD 68bn in 2009. Asia suffered the highest economic losses, totalling approximately USD 75bn.

Insured losses were USD 43bn; natural catastrophes cost insurers roughly USD 40bn, while man-made disasters accounted for more than USD 3bn.

Natural catastrophes cost the global insurance industry roughly USD 40bn in 2010, while man-made disasters triggered additional claims of more than USD 3bn. By comparison, overall insured losses totalled USD 27bn in 2009. Despite notably higher than average earthquake losses, overall catastrophe claims in 2010 were roughly in line with the 10-year average due to unusually modest US hurricane losses. Insured losses were highest in North America, where they exceeded USD 15bn.

Earthquakes accounted for almost one-third of insured losses in 2010.

Earthquakes losses accounted for almost one-third of all insured losses in 2010. The earthquake in Chile cost the industry USD 8bn and claimed 562 lives, while the New Zealand earthquake cost insurers more than USD 4bn but resulted in no fatalities. Winter storm Xynthia in northwestern Europe led to insured losses of USD 2.8bn, killing 64 people. Other significant events include a major US storm that caused more than USD 2bn of insured losses and the floods in Australia, which, in 2010, triggered approximately USD 2bn in claims.

Earthquake fatalities and insured losses are rising because of higher population densities and because populations are growing in seismically active areas.

A special chapter on earthquakes in this edition of *sigma* reveals that the number of fatalities and insured losses from earthquakes are rising because population growth and higher population density, especially in urban areas, exposes more people to a single damaging earthquake. Many of the rapidly growing urban areas with high population densities are located in seismically active areas. Due to this, the probability for earthquakes with a high death toll continuously increases, although the seismic threat itself remains unchanged.

Building standards that are strictly enforced, solid infrastructures and disaster relief efforts are essential.

Improved building standards that are strictly enforced, along with good infrastructure and efficient disaster relief efforts have helped mitigate the negative consequences of earthquakes.

2010 was a year of extreme weather events, such as floods of unprecedented scale – in terms of the territory affected and damage suffered – and devastating earthquakes that ranked among the deadliest, costliest and most powerful in history.

Prevention, mitigation, and risk avoidance are important, but financial preparation is also key.

Prevention, mitigation and risk avoidance with measures such as hazard mapping or comprehensive building codes are the most important steps for dealing with catastrophes. But not all risks can be avoided, so preparing for the financial aspects of risks is a key element of any disaster-prone country or region.

Overview of catastrophes in 2010

Selection criteria 2010

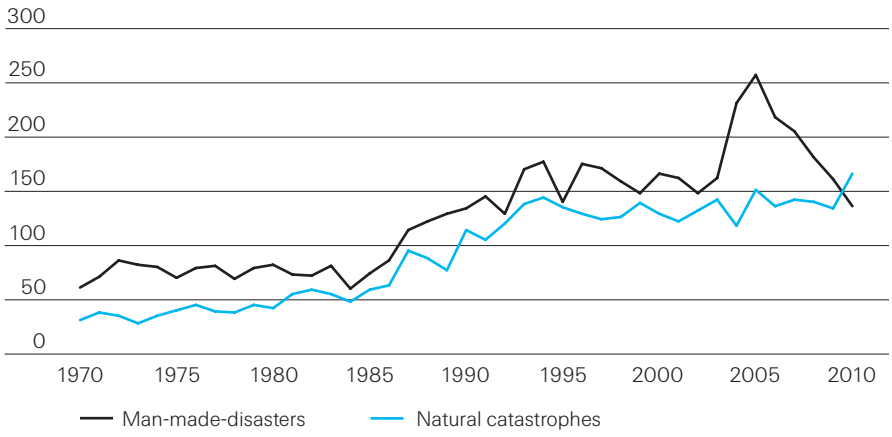
		in USDm
Insured claims:	Maritime disasters	17.4
	Aviation	34.8
	Other losses	43.3
or Total economic losses:		86.5
or Casualties:	Dead or missing	20
	Injured	50
	Homeless	2 000

More than 300 catastrophic events occurred in 2010

Of the 304 catastrophic events that occurred in 2010, 167 were natural catastrophes, while the remaining 137 events were man-made disasters (see Figure 1). Compared to 2009, the number of natural catastrophes increased. In fact, 2010 set a new record for the number of natural catastrophes since *sigma* began collecting catastrophe data. Also for the first time, the number of natural catastrophes exceeded the number of man-made disasters. Since 2005, the number of man-made disasters has continued to decline.

An event is included in the *sigma* statistics if insured claims, total economic losses or the number of casualties exceed a certain limit (refer to the Selection criteria 2010 in the margin). Each year, the claims threshold is adjusted for inflation. Thresholds with respect to casualties – ie the number of people killed, missing, severely injured, or homeless – also make it possible to tabulate events in regions where insurance penetration is low.

Figure 1
Number of events 1970–2010



Source: Swiss Re Economic Research & Consulting

Nearly 304 000 people around the world were victims of catastrophes

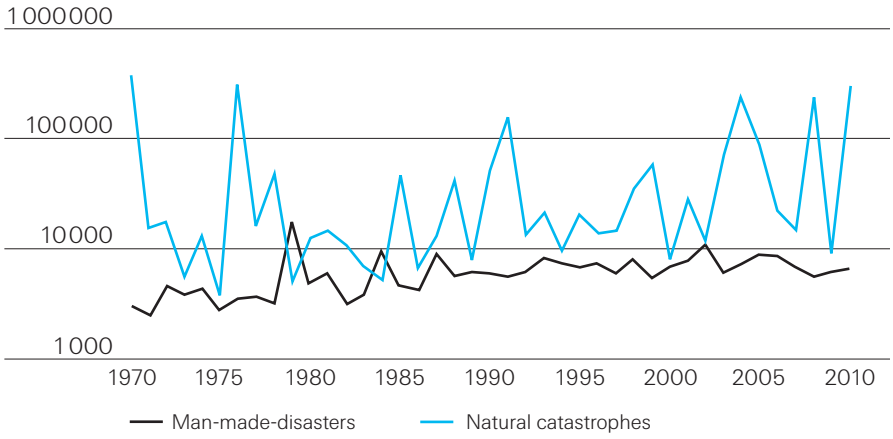
Natural catastrophes and man-made disasters claimed nearly 304 000 lives in 2010.

Natural disasters and man-made disasters claimed approximately 304 000 lives in 2010. More than 297 000 of these people died or were missing due to natural catastrophes, while more than 6 000 were victims of man-made disasters (see Figure 2). 2010 ranks as the third highest year in terms of victims since 1970, when *sigma* began collecting catastrophe data. The number of victims in 2010 was especially high in comparison to 2009, when less than 15 000 people lost their lives to catastrophes and man-made disasters. The deadliest event in 2010 was the Haiti earthquake in January, which claimed more than 222 000 lives.

Man-made disasters claimed 6 446 victims in 2010.

In 2010, 6 446 people were victims of man-made disasters versus 5 970 in 2009. The man-made disasters that claimed the most victims in 2010 were a lead poisoning outbreak at an illegal gold mine in Nigeria in March (400 victims, mainly children), a stampede on a bridge at a festival in Cambodia in November (375 victims), and the collapse of a gold mine in Sierra Leone in March that killed approximately 200 people. Meanwhile, aviation and maritime disasters accounted for more than 800 and 1 100 victims respectively.

Figure 2
Number of victims 1970–2010



Source: Swiss Re Economic Research & Consulting

Total economic losses were estimated at approximately USD 218bn

Total economic losses in 2010 were USD 218bn. Asia was the region with the highest losses at USD 75bn.

Natural catastrophe and man-made disasters cost society approximately USD 218bn in 2010. Economic losses were highest in Asia, where floods of unprecedented dimensions caused damages of approximately USD 75bn. The earthquakes of Chile and Haiti caused losses for Latin America and the Caribbean to soar to more than USD 53bn.

Economic loss estimates from man-made disasters were more than USD 24bn, most of which were attributed to the explosion of the Deepwater Horizon oil rig in April. British Petroleum (BP) stated it had set aside USD 41bn for the event, including punitive damages which are not included in the *sigma* numbers. *sigma* initially allocated approximately USD 20bn to the overall direct economic losses caused by the explosion.

Table 1
Economic loss by region and as a % of GDP

Region	Economic loss in USD m	as a % of GDP
Asia	74 840	0.28%
Latin America and Caribbean	53 378	1.10%
Europe	35 204	0.19%
North America	20 551	0.13%
Oceania/Australia	13 131	0.95%
Africa	337	0.02%
Seas/Space	20 623	–
World Total	218 064	0.31%

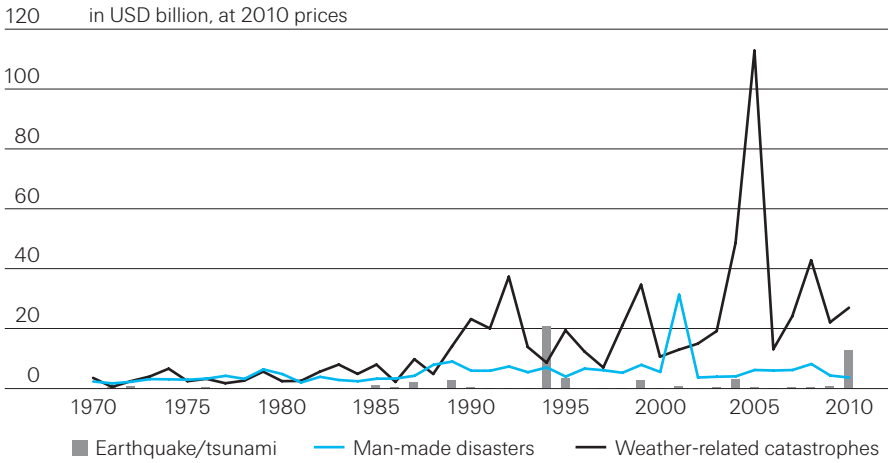
Source: Swiss Re Economic Research & Consulting

Insured losses from catastrophic events were approximately USD 43bn

Insured losses due to natural catastrophes were nearly USD 40bn.

Individuals, companies or state institutions absorbed most of the USD 218bn in total damages caused by catastrophic events in 2010. The cost to insurers was USD 43bn (see Figure 3). Of this amount, natural catastrophes losses accounted for nearly USD 40bn, while man-made disasters accounted for over USD 3bn.

Figure 3
Insured catastrophe losses 1970–2010



Source: Swiss Re Economic Research & Consulting

Ten events triggered insured losses of at least USD 1bn; the earthquake in Chile was the costliest at USD 8bn.

Overall, ten disasters each triggered insured losses of USD 1bn or more in 2010 (see Table 4). With insurance losses of USD 8bn, the earthquake in Chile was the costliest event in 2010, followed by yet another earthquake, which struck New Zealand in September, causing insured losses of more than USD 4.4bn. These two events caused the earthquake losses for 2010 to be the second highest ever, surpassed only by 1994 when the Northridge earthquake struck the US, causing insured losses of USD 21bn (indexed to 2010). Overall, 2010 ranks as the seventh costliest year since *sigma* began collecting data on disasters.

The 2010 North Atlantic hurricane season was active, but resulted in relatively low insured losses.

With nineteen named tropical storms developing into hurricanes – five of which became major hurricanes – the 2010 North Atlantic hurricane season was one of the most active on record. Hurricanes caused extensive damage in Mexico and the Caribbean, but only very moderate damage in the US. This resulted in relatively low hurricane losses when compared to overall insured catastrophe losses.

Insured losses due to man-made disasters were USD 3.6bn

Man-made disasters triggered additional insured losses of USD 3.6bn in 2010
The biggest man-made disaster of 2010 was the explosion of the Deepwater Horizon oil rig in the Gulf of Mexico. Insured losses from this disaster were estimated at USD 1bn without liability losses which are not included in the *sigma* estimates.

Aviation disasters triggered additional insured losses of more than USD 1bn. Two events – a large fire at an airport warehouse in Saudi Arabia in June and the loss of a satellite in October – accounted for more than half of these losses.

Regional overview

Insured and economic losses were highest in North America and Asia respectively. Latin America and the Caribeean had the most victims.

Insured losses were highest in North America, exceeding USD 15bn. However, Asia suffered the highest economic losses, with total damages of approximately USD 75bn. Of the regions, Latin America and the Caribbean had the highest number of victims at more than 225 000.

Table 2
Catastrophes in 2010 by region

Region	Number	Victims	Insured loss (in USDm)	Economic losses (in USDm)	As a % of GDP
North America	36	139	15 348	20 551	0.13%
Latin America and the Caribbean	39	225 784	8 977	53 378	1.10%
Oceania/Australia	7	50	8 860	13 131	0.95%
Europe	37	56 490	6 303	35 204	0.19%
Asia	139	17 955	2 240	74 840	0.28%
Africa	32	2'640	124	337	0.02%
Seas / Space	14	515	1 623	20 623	–
World total	304	303 573	43 475	218 064	0.31%

Source: Swiss Re Economic Research & Consulting

North America

North America (losses in USDm)
Victims 139
Total economic losses 20 551
Insured losses 15 348

In terms of insured losses, North America was the hardest hit region with insured losses of more than USD 15bn.

In terms of insured losses, North America had the highest of the regions with losses of more than USD 15bn in 2010. Losses were primarily caused by harsh weather throughout the year. Hurricane losses were very low. In fact, 2010 was the second consecutive year that hurricanes failed to make landfall; it was the fifth consecutive year without a major hurricane landfall, the last being 2005, when Hurricane Wilma struck Florida.

The year, however, was characterised by large non-hurricane losses. In the US, a May storm triggered insured losses of USD 2bn, while an October storm caused insured property losses of more than USD 2bn. Another storm in March caused insured losses of more than USD 1bn. Severe weather conditions in the US resulted in harsh winter storms, tornadoes, floods, damaging winds and hail. Nine of the twenty costliest events in 2010 occurred in the US. Meanwhile, in Canada, a July hailstorm led to insured losses of more than USD 0.5bn.

Latin America and the Caribbean

Latin America and Caribbean (losses in USDm)
Victims 225 784
Total economic losses 53 378
Insured losses 8 977

Approximately 226 000 people lost their lives in Latin America and the Caribbean in 2010. Most of them (over 220 000) died in the Haiti earthquake in January, which was the second deadliest earthquake of the last forty years, after the Tangshan earthquake, which struck China in 1976. Another 562 people perished in the powerful earthquake in Chile, which was the second largest earthquake - in terms of seismic energy released - since 1970 and the sixth largest ever recorded worldwide. The event triggered claims of USD 8bn, accounting for the majority of insured losses in the region, and caused economic losses of USD 30bn.

The earthquake in Haiti caused further economic losses of USD 10bn, while triggering only USD 100m in insurance claims. These two events caused total insured losses for this region to soar to well above the long-term average.

Hurricanes caused economic losses of more than USD 7bn in Mexico.

The region was also impacted by hurricane-force winds. Hurricanes Alex and Karl wreaked havoc in Mexico, causing total economic losses of more than USD 7bn and insured losses of more than USD 400m.

The region was also affected by a cold wave and harsh weather in Peru, Chile and other South American countries that claimed 522 lives. Another 500 people died during two floods in Brazil and Colombia. Meanwhile, Tropical storm Agatha struck Guatemala and Honduras causing 301 deaths.

Europe (losses in USDm)	
Victims	56 490
Total economic losses	35 204
Insured losses	6 303

Europe

Europe was also significantly affected by disasters in 2010. An unprecedented heat wave and prolonged drought in Russia claimed the lives of nearly 56 000 people during the summer, and triggered a staggering number of wildfires that destroyed large parts of the country's vast woodlands. The main cause of death was the combination of smoke and record high temperatures, which together produced heavy smog that blanketed large urban areas. The wildfires caused estimated economic losses of nearly USD 15 bn, according to government statistics.

Insured losses in Europe were driven by winter storm Xynthia.

In terms of insured losses, the costliest event was winter storm Xynthia which struck France and northwestern Europe in February and cost insurers more than USD 2.7bn. It was the third costliest event in 2010, and caused 64 deaths. The summer floods in France caused additional losses to the insurance industry of more than USD 800m. Meanwhile, further summer floods in Central and Eastern Europe generated additional losses of over USD 1bn. A cold wave at the end of the year also triggered insured losses of USD 262m, although the total cost to society is likely much larger once travel disruption is taken into account.

The volcano eruption in Iceland highlighted the importance of assessing volcanic risk.

Unprecedented travel disruptions throughout Europe were caused by the volcano eruption in Iceland during the spring. Since it did not cause property damage, the event did not trigger property insurance claims. However, the prolonged closure of airports and the cancellation of flights produced considerable economic damage, mainly due to business interruption, which was uninsured. The event underscored how vulnerable interconnected societies can be and raised the issue of assessing volcanic risk.

Oceania/Australia (losses in USDm)	
Victims	50
Total economic losses	13 131
Insured losses	8 860

Oceania/Australia

Natural catastrophes and man-made disasters caused total economic losses of more than USD 13bn in Oceania/Australia. The cost to insurers was approximately USD 9 bn.

The New Zealand earthquake in September 2010 was the costliest insurance event for this region.

With claims of more than USD 4.4 bn, the earthquake that struck New Zealand in September accounted for half of the region's insured losses. While it claimed no victims, it was the second costliest insurance event of 2010 and the third costliest earthquake in history. Insurers paid for most of the USD 5bn in total economic losses caused by this event. The rest of the claims arose from two powerful storms in March, which together cost insurers more than USD 2bn, and from the floods that affected Queensland in December. These floods became the worst floods in the history of Australia.

The flood that occurred in Australia in late 2010 has resulted in the country's largest ever insured loss.

The preliminary estimate of insured property losses arising from the December floods in Queensland, whose assessment was ongoing when *sigma* went to press, was over USD 2bn. The economic cost of the floods was estimated at USD 5bn. Should the preliminary estimates prove accurate, these events will become the costliest disasters ever in Australia based on insured losses. The country was struck by further flood events in January 2011, whose damage was still under assessment as *sigma* went to press.

Despite these devastating catastrophes, the region had just 50 victims, making it the least affected in terms of victims.

Australia's floods highlight the need for comprehensive flood insurance

Since the early 1970s, the provision of personal lines flood insurance has been debated in Australia. For many years, flood damage from overflowing rivers was explicitly excluded from standard Australian insurance policies on the basis that the exposure was difficult to assess. Furthermore, as "storm" damage is usually covered, the insurance industry often found itself paying for losses when floods were triggered by storms, as the distinction between wind, rainfall/flash flood damage and overflow damage is difficult to prove and political pressure can be substantial. For this reason, some insurance companies began to offer comprehensive flood coverage in 2010. Given the pressure on the industry to pay claims, the industry has decided to work with the Insurance Council of Australia to increase flood coverage and to harmonise the terms and conditions of flood policies.

Asia

Asia (losses in USDm)	
Victims	17 955
Total economic losses	74 840
Insured losses	2 240

In terms of total damage to society, Asia was the hardest hit region in 2010. China and Pakistan experienced extraordinary rainfall during the summer, resulting in unprecedented floods affecting the entire length of the country in Pakistan and several large regions in China. More than 6 000 people died as a result. Moreover, flash floods and massive landslides added to the overall damage to dwellings and infrastructure in the affected areas. Entire towns were washed away. More than 2 million houses were destroyed and more than 38 million hectares of farmland were completely flooded, with severe soil erosion occurring in some areas according to the Red Cross. In Pakistan, 20% of the country's agricultural land was affected, severely impairing the livelihood of more than 20 million people. For Pakistan, this was the worst natural disaster in its history. In China, an estimated 230 million people were affected, 15 million of whom became homeless.

Insurers absorbed only a fraction of the USD 53bn economic loss caused by the floods in China.

The overall damage was estimated to be approximately USD 53bn for China and more than USD 6bn for Pakistan. With estimated insured losses of USD 761m, insurers absorbed only a small fraction of the total losses from the floods in China, leaving the rest of the losses to be borne by individuals, government and NGOs.

Cyclone Phet, which struck Oman and Pakistan, triggered additional insured claims of USD 150m and claimed the lives of 39 people. Typhoon Kompasu killed 32 people and cost insurers USD 143bn. An earthquake in Qinghai, China killed 2 968 people, resulting in insured claims estimated at less than USD 1m.

Maritime and mining accidents together claimed more than 1 000 lives in Asia.

The region was also affected by a large number of man-made disasters, namely maritime disasters, in which an estimated 665 people lost their lives. Mining accidents – many of which occurred in illegal mines – claimed 378 lives.

Africa

Africa (losses in USDm)	
Victims	2 640
Total economic losses	337
Insured losses	124

The number of victims in Africa was approximately 2 600. The floods in Uganda and in Central and Western Africa claimed the most lives.

A lead poisining outbreak from illegal gold mining claimed 400 victims, mostly children. Mining accidents caused 320 deaths. Maritime accidents claimed the lives of 410 people, many of whom were illegal immigrants.

2010 – the year of devastating earthquakes

The year's biggest earthquakes

Earthquakes caused 76% of all natural catastrophe-related fatalities in 2010.

Some of the most devastating earthquakes in history occurred in 2010. In fact, nearly 76% of the approximately 297 000 fatalities caused by natural disasters in 2010 were attributed to earthquakes. The most notable of these events in terms of their impact on society were in Chile (M_W 8.8), Indonesia(M_W 7.8 and M_W 7.0), Mexico (M_W 7.2), New Zealand (M_W 7.0), and Haiti (M_W 7.0). The Haiti earthquake, which struck in January 2010, was by far the most deadly, claiming more than 220 000 lives – more than 2% of the Caribbean nation's population. In contrast, the five other earthquakes combined claimed approximately 1100 victims.

The Chile earthquake was much more severe from a seismological point of view than the Haiti and New Zealand earthquakes.

From a seismological point of view, the Haiti and New Zealand events were similar. Both had a moment magnitude (M_W) of 7.0, and each produced a similar amount of seismic energy, thought to be the equivalent of 475 kilotonnes of explosives. Both events also exposed roughly 1 000 km^2 of land to severe shaking for roughly 1 minute. By comparison, the Chile event released roughly 500 times the energy of the Haiti event. It was also 500 times more powerful than the New Zealand event, subjecting an area of roughly 100 000 km^2 to severe shaking for up to 3 minutes.

Chile's earthquake resulted in economic losses of approximately USD 30bn.

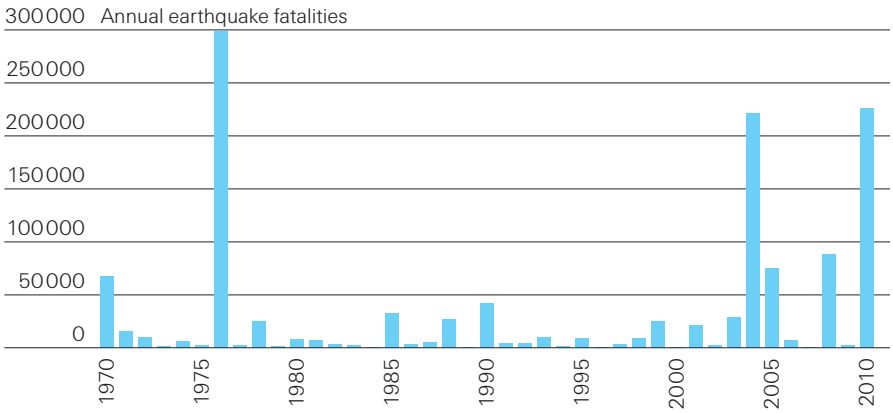
In terms of economic losses, the six aforementioned earthquakes generated damages of more than USD 46bn. The Chile event resulted in the largest economic loss – USD 30bn – which is 15% of the nation's GDP.

Long-term trends in earthquake activity

Since 1970, the 2010 earthquake in Haiti, the 2004 earthquake in Indonesia and the 1976 earthquake in China have been the deadliest.

A review of historical earthquake data dating back to 1970 reveals that the number of fatalities was highest in 1976, 2004 and 2010 (see Figure 4). In December 2004, a massive earthquake struck Indonesia and triggered the deadly tsunami that claimed 220 000 lives, an event that was nearly as deadly as the January 2010 earthquake in Haiti (estimated 220 570 lives lost). Only one other earthquake – the 1976 Tangshan earthquake in China – was as deadly, since 1970, claiming 255 000 lives.

Figure 4
Comparison of annual fatalities due to earthquakes since 1970



Source: Swiss Re Economic Research & Consulting

Two of the three costliest earthquakes since 1970 – in terms of insured losses – occurred in 2010.

In terms of insured losses, 2 of the 3 costliest earthquakes since 1970 occurred in 2010. The Chile event cost insurers approximately USD 8bn, while the New Zealand event led to insured losses estimated at more than USD 4.4bn. Only one event since 1970 has resulted in higher insured losses – the 1994 Northridge earthquake in California – which, at prices of 2010, cost insurers USD 21bn.

2010 was not an unusually active year for earthquakes with a magnitude of 7 to 7.9.

Do the large earthquake losses in 2010 signal a long-term increase in earthquake activity? Since 1900, events with a similar moment magnitude of 7 to 7.9 have occurred about 15 times per year on average (see Figure 5). Most of these events occur in remote regions and do not attract much attention. The number of these types of events can vary significantly from year to year. For instance, 1989 was an extremely calm year with only 5 earthquakes of this magnitude, while 31 such earthquakes occurred in 1943. Any year in which the number of earthquakes of this magnitude falls between 11 and 20 can be considered "normal" from a seismological point of view. In 2010, 21 such events occurred, which is slightly above the "normal" long term range. However, similar levels have occurred repeatedly in the past (eg 25 in 1968, 22 in 1957, 26 in 1950).

Figure 5
Average number of earthquakes per year of magnitude 7 to 7.9 and 8 to 8.9, 1900–2010

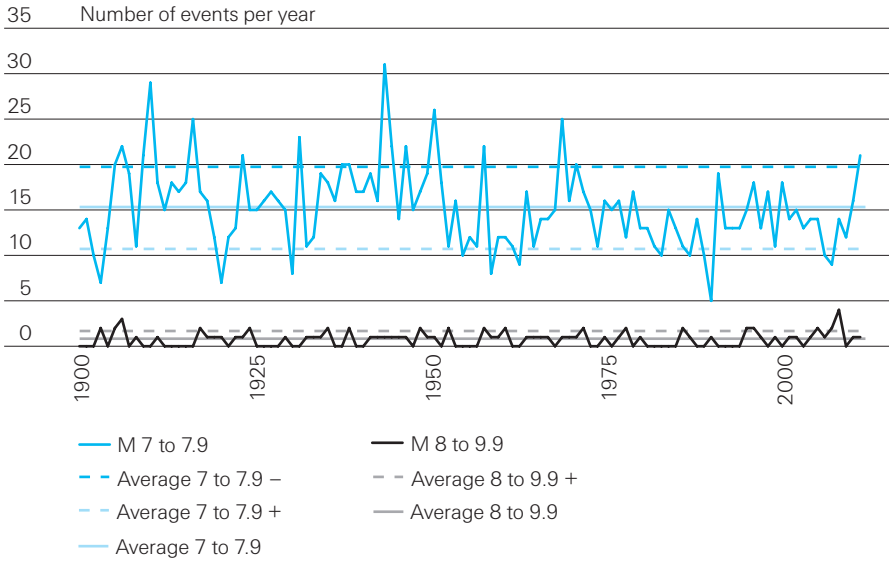
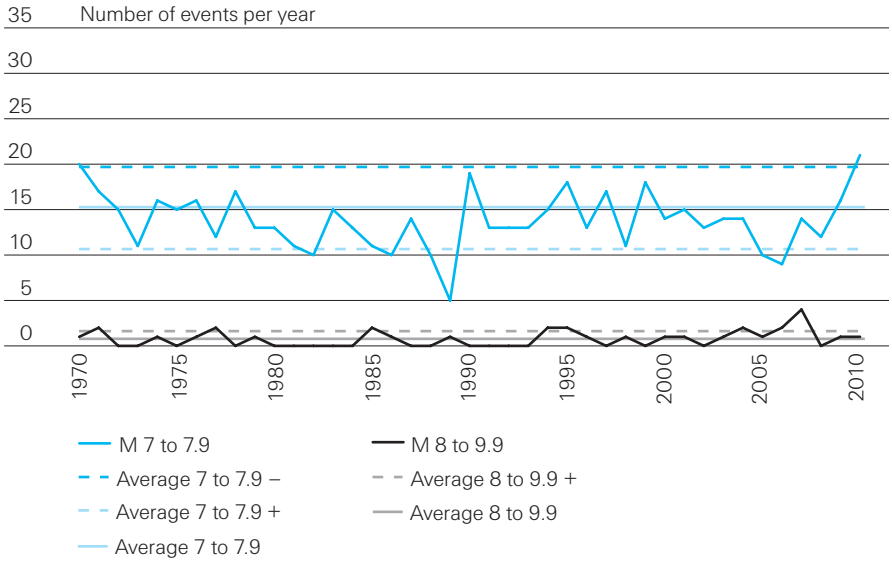


Figure 6
Average number of earthquakes per year of magnitude 7 to 7.9 and 8 to 8.9, 1970–2010

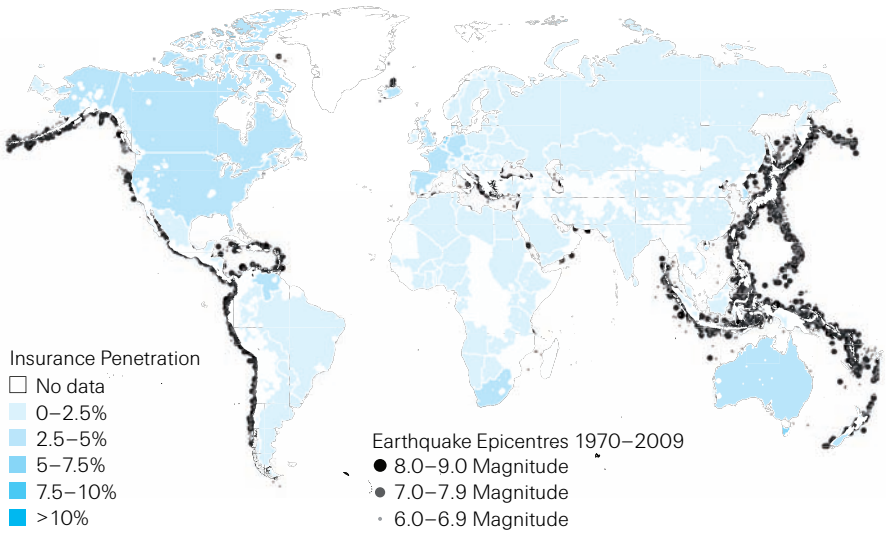


The dashed lines indicate the expected variation according to one standard deviation.
Source: Swiss Re, based on the Centennial and PDE earthquake catalogues provided by the US Geological Survey.

2010 was also not an extraordinary year for earthquakes with a magnitude of 8 or higher.

For larger earthquakes – ie those with a moment magnitude of 8 or higher – 2010 was not an extraordinary year. Since 1900, 82 such events have occurred worldwide, which corresponds to slightly less than 1 event per year. The Chile earthquake was the only event in 2010 with a moment magnitude higher than 8.

Figure 7
Historical epicentres with a moment magnitude of 6 or higher



Source: Swiss Re CatNet
http://www.nxtbook.fr/webapp/nxt/CatNet-Guide/Geoportal/index.php#/0

No long-term trend of increasing earthquake activity has emerged...

Based on these observations, the number of earthquakes in 2010 fell within the expected ranges. In contrast to weather-related natural perils, no long-term trend in global earthquake activity has emerged.

...however, earthquake activity does appear to increase in the surrounding region once a major earthquake occurs.

However, as the 2004 Indonesia earthquake with a moment magnitude of 9.0 has shown, mega earthquakes often result in increased earthquake activity in the surrounding region. In Chile, especially in the areas near the fault rupture of the February 27, 2010 event, the probability of further earthquake activity will remain high for some time. This was seen in the January 2, 2011 earthquake which had a moment magnitude 7.1 in Araucana, Chile – south of Concépcion where the 2010 event occurred. Also, the devastating February 22, 2011 earthquake in Christchurch occurred on the fringes of the September 4, 2010 earthquake. (Re)insurers are likely to take this effect into account when calculating risk-adequate earthquake premiums.

Earthquake fatalities and insured losses are rising because of higher population densities and because populations are growing in seismically active areas.

While global seismic activity was not markedly above average in 2010, the number of fatalities and the size of insured losses have soared. A significant trend has been noted on the exposure side: population growth and higher population density, especially in urban areas, exposes more people to a single damaging earthquake. Moreover, many of the rapidly growing urban areas with high population densities are located in seismically active areas (eg Istanbul, Mexico City, Jakarta, Manila, Tokyo). As a result, the probability of earthquakes with a high death toll continuously increases, although the seismic threat itself remains unchanged.

The deadliest earthquakes tend to occur in emerging market countries, while the costliest earthquakes tend to occur in industrialised regions.

While the deadliest earthquakes typically occur in emerging market countries, the costliest earthquakes in terms of insured losses occur much more often in industrialised regions. The costliest earthquakes for insurers over the past 20 years were in Northridge, California (1994), Concépcion, Chile (2010), Darfield, New Zealand (2010) and Kobe, Japan (1995). A few factors contributed to the large insurance and overall economic losses – eg property exposure and values are increasing around urban areas, leading to an increased potential for large financial losses from a single earthquake. Also, in many markets such as Chile, earthquake insurance penetration is increasing. Therefore, the insurance industry carries an increasing portion of the financial burden to the overall economy. And finally, the increasing technological complexity of industrial processes makes damages to industrial facilities more difficult and costly to fix.

Improved building standards that are strictly enforced, solid infrastructures and disaster relief efforts help mitigate the negative effects of earthquakes.

Fortunately, the death toll in industrialised countries has not risen along with insured earthquake losses. Continuously improved building standards that are strictly enforced, along with good infrastructure and efficient disaster relief efforts have helped mitigate the negative consequences of disasters in these countries. The relatively low number of deaths from the earthquakes in Chile and New Zealand in 2010 is certainly testimony to this.

Lessons learned

The earthquakes in Chile and New Zealand underscored the importance of stringent building codes that are strictly enforced.

As with any large catastrophic event, the earthquakes in 2010 provided a unique learning experience and offered invaluable insights. For example, effective loss prevention measures, such as earthquake-resistant building designs, are one of the key reasons why the Chile earthquake (562 deaths) did not result in more fatalities. This is striking given that the event, which had a moment magnitude of 8.8, was the second largest earthquake - in terms of seismic energy released - since 1970 and the sixth largest ever recorded worldwide. The existence of stringent building codes and their rigorous application in New Zealand proved very effective in saving lives in the September 4, 2010 earthquake. It is too early to determine to what degree this is also applicable to the February 22, 2011 earthquake in Christchurch.

Insurance has become a key pillar for post-disaster financing.

The insurance industry has become a key enabler of post-disaster financing in industrialised countries. Insurers are paying more than one quarter of the total economic cost of the Chile event, and the proportion is even higher in New Zealand. The bulk of the insurance loss in Chile was carried by international (re)insurance companies. The corresponding inflow of capital serves to stimulate the Chilean economy via the reconstruction efforts without putting a large burden on the local insurance industry.

Proper prevention- and post- disaster management remains a challenge in the emerging market countries.

Meanwhile, the devastating event in Haiti reveals that proper prevention- and disaster management remains a challenge in emerging market countries. Given that these countries have virtually no earthquake insurance market, what can be done to reduce the impact of a future earthquake on the population? More comprehensive and stringent building standards should be implemented during reconstruction, especially in hgh risk areas. Swiss Re developed an earthquake hazard map for Haiti immediately following the event that has served as the basis for such decisions (see Box).

An earthquake hazard map for Haiti

The powerful earthquake that struck Haiti on January 12 lasted less than a minute, but the devastation it left behind will impact the country for years to come. To support reconstruction efforts, Swiss Re issued a preliminary seismic hazard map for Haiti based on the available data.

An estimated three million people in Haiti were affected by the earthquake, more than 220 000 people lost their lives, and hundreds of thousands were left without shelter after their homes collapsed.

Haiti sits on a seismically active zone and has a history of earthquakes. Disaster can strike again at any time. Constructing an infrastructure that is better equipped to withstand future quakes will be critical to protecting lives and assets. Earthquake hazard maps are important tools to build this first line of defence. They highlight varying threat levels across Haiti and – as more refined data becomes available – help officials appropriately apply earthquake-resistant building standards for buildings, bridges, roads, utilities, and other structures.

Swiss Re's seismic hazard map for Haiti was revised using its in-house risk models. It uses colour coding to illustrate the risk for potential ground shaking intensities across the country. The map is only indicative of current threat levels. It will be updated as soon as more in-depth research becomes available.

Features and potential use

- The preliminary hazard maps can be used to highlight regional hazard differences within Haiti. The maps also allow comparisons of the hazard levels in Haiti to other regions of the world.
- The maps contain more in-depth fault information than previously developed maps for the same region and therefore provide a more detailed picture of hazard variations across Haiti. This includes preliminary seismological findings gathered after the 2010 Enriquillo fault event.
- The maps can support reconstruction efforts in Haiti until more sophisticated maps are available.

For more details, refer to http://media.swissre.com/documents/Earthquake_Haiti_Factsheet.pdf

Secondary loss agents have increased in importance due to the events in Chile and New Zealand.

For the insurance industry, the events in New Zealand and Chile highlighted the importance of secondary loss agents – ie losses that do not directly result from the ground shaking. These losses significantly contribute to overall losses, but are not sufficiently considered in earthquake risk models. In Chile, the tsunami following the earthquake resulted in a large number of fatalities and led to significant insurance losses. In New Zealand, an effect known as liquefaction played a major part in the unfolding of the overall financial loss. Liquefaction is a phenomenon whereby soil substantially loses strength in response to earthquake shaking, causing it to behave like a liquid. If liquefaction occurs under a building or a highway, severe structural damage will also usually occur. In New Zealand, many property owners not only have to repair or rebuild their homes, but also must restore the land itself. The cost of this is substantial and has exceeded the prediction of available earthquake risk models.

The earthquake in Chile has highlighted the need for insurers to better assess and model certain industrial risks.

The size of insurance claims stemming from industrial exposure in Chile has also come as a surprise and warrants a review of the way the insurance industry assesses and models certain industrial risks. This is especially true for business interruption covers, which compensate companies for loss of profits due to damages to their production facilities. Roughly half of the total insurance payout to industrial facilities in Chile was made for business interruption claims. In certain industry segments, such as pulp and paper, business interruption claims comprise two-thirds of total insurance claims. Large business interruption losses were also observed after previous earthquakes in Japan, where the electronics industry was impacted, and in Turkey, where the automotive industry filed significant business interruption claims.

Tables for reporting year 2010

Table 3
List of major losses in 2010 according to loss category

	Number	in %	Victims[1]	in %	Insured loss[2] (in USD m)	in %
Natural catastrophes	**167**	**54.9%**	**297 127**	**97.9%**	**39 869**	**91.7%**
Floods	69		11 027		6 393	
Storms	63		1 702		20 126	
Earthquakes	13		227 050		12 943	
Droughts, bush fires, heat waves	9		56 276		10	
Cold, frost	10		1 024		397	
Hail	1		28			
Other natural catastrophes	2		20			
Man-made disasters	**137**	**45.1%**	**6 446**	**2.1%**	**3 606**	**8.3%**
Major fires, explosions	**27**	**8.9%**	**783**	**0.3%**	**1 060**	**2.4%**
Industry, warehouses	15		186		824	
Oil, gas	3		137		25	
Hotels	1		30			
Other buildings	5		265			
Other fires, explosions	3		165		210	
Aviation disasters	**16**	**5.3%**	**820**	**0.3%**	**1 070**	**2.5%**
Crashes	14		820		504	
Damage on ground	1				250	
Space	1				317	
Maritime disasters	**27**	**8.9%**	**1 192**	**0.4%**	**1 262**	**2.9%**
Passenger ships	22		1 058		27	
Drilling platforms	2		11		1 235	
Other maritime accidents	3		123			
Rail disasters (incl. cableways)	**7**	**2.3%**	**337**	**0.1%**	**117**	**0.3%**
Mining accidents	**18**	**5.9%**	**903**	**0.3%**	**78**	**0.2%**
Collapse of buildings/bridges	**6**	**2.0%**	**283**	**0.1%**		**0.0%**
Miscellaneous	**36**	**11.8%**	**2 128**	**0.7%**	**18**	**0.0%**
Social unrest	7		285			
Terrorism	21		969			
Other miscellaneous losses	8		874		18	
Total	**304**	**100.0%**	**303 573**	**100.0%**	**43 475**	**100.0%**

Source: Swiss Re Economic Research & Consulting

[1] Dead or missing
[2] Property and business interruption, excluding liability and life insurance losses

Table 4
The 20 most costly insurance losses in 2010

Insured loss[3] (in USD m)	**Victims**[4]	**Date** (start)	**Event**	**Country**
8 000	562	27.02.2010	Earthquake (M_W 8.8) triggers tsunami, over 200 aftershocks	Chile
4 453	0	04.09.2010	Earthquake (M_W 7.0), over 300 aftershocks	New Zealand
2 754	64	27.02.2010	Winter storm Xynthia, winds up to 160 km/h	France, Germany, Belgium et al
2 165	–	04.10.2010	Thunderstorms, tornadoes, hail, floods	United States
2 050	1	23.12.2010	Floods caused by heavy rains, tropical cyclone Tasha	Australia
2 000	–	12.05.2010	Storms, winds up to 130 km/h, hail	United States
1 231	–	13.03.2010	Storm, winds up to 120 km/h, heavy rain, floods	United States
1 079	–	22.03.2010	Storm, winds up to 120 km/h, hail, rain, mudslides	Australia
1 070	–	06.03.2010	Storms, hail, rain, floods	Australia
1 000	11	20.04.2010	Explosion on Deepwater Horizon oil rig	Gulf of Mexico, United States
820	33	30.04.2010	Floods caused by heavy rain, storms	United States
818	25	15.06.2010	Floods, caused by heavy rain	France
785	5	20.07.2010	Storms, floods, hail, tornado	United States
761	2 490	29.05.2010	Floods, mudslides caused by heavy monsoonal rain	China
695	20	10.06.2010	Storms, winds up to 97 km/h, hail, heavy rain, floods	United States
620	20	17.06.2010	Thunderstorms, heavy rains, floods	United States
610	5	10.05.2010	Tornadoes, hail	United States
600	–	09.02.2010	Winter storm, winds up to 80 km/h, snow	United States
591	18	06.08.2010	Floods caused by heavy rain	Germany, Czech Republic et al
> 500	–	12.07.2010	Hailstorm, heavy rain; damage to buildings and cars	Canada

Source: Swiss Re Economic Research & Consulting

Table 5
The 20 worst catastrophes in terms of victims 2010

Victims[6]	**Insured loss**[5] (in USD m)	**Date** (start)	**Event**	**Country**
222 570	100	12.01.2010	Earthquake (M_W 7.0), aftershocks	Haiti
55 630	–	15.06.2010	Heat wave with temperatures up to 40 degrees Celsius	Russia, Czech Republic
2 968	1	14.04.2010	Earthquake (M_W 6.9), aftershocks	China
2 490	761	29.05.2010	Floods, mudslides caused by heavy monsoonal rain	China
1 980	–	21.07.2010	Floods caused by heavy monsoonal rains	Pakistan
1 765	3	08.08.2010	Mudslide caused by heavy rain	China
562	8 000	27.02.2010	Earthquake (M_W 8.8) triggers tsunami, >200 aftershocks	Chile
545	–	25.10.2010	Earthquake (M_W 7.8), triggers tsunami	Indonesia
522	–	17.07.2010	Cold wave with temperatures close to freezing	Peru, Chile, Argentina et al
400	–	25.02.2010	Floods and landslides caused by heavy rain	Uganda
400	–	01.03.2010	Lead poisoning outbreak from illegal gold mining	Nigeria
375	–	22.11.2010	Stampede on a bridge at Festival	Cambodia
327	–	15.07.2010	Floods caused by heavy rains	Nigeria, Ghana, Benin et al
322	–	25.10.2010	Mount Merapi volcano erupts	Indonesia
301	50	29.05.2010	Tropical storm Agatha, winds up to 75 km/h, floods	Guatemala, Honduras, El Salvador
291	–	04.10.2010	Floods caused by monsoonal rain	Indonesia
256	–	04.04.2010	Floods and landslides caused by heavy rain	Brazil
250	–	01.03.2010	Heat wave with temperatures of over 47 degrees Celsius	India
232	7	13.11.2010	Floods caused by heavy rain, tornado, hail, landslides	Colombia
200	–	17.09.2010	Floods and monsoonal rains	India

Source: Swiss Re Economic Research & Consulting

[3] Property and business interruption, excluding liability and life insurance losses; US natural catastrophe figures: with the permission of Property Claim Services (PCS)/ incl. NFIP losses (see page 34 "Terms and selection criteria"). Canada natural catastrophe figures with the permission of Property Claim Services (PCS Canada)
[4] Dead and missing
[5] Property and business interruption, excluding liability and life insurance losses
[6] Dead or missing

Table 6
Chronological list of all natural catastrophes 2010

Floods

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–4.1.	Brazil Rio de Janeiro, Angra dos Reis, Sao Paolo, Minas Gerais	Floods and mudslides caused by heavy rain; collapse of hillside buries bungalows at luxury beach resort	85 dead USD 145m total damage
1.1.–15.1.	Kenya North Rift, South Rift, Nyanza	Floods caused by heavy rains; 6 664 houses, croplands, infrastructure destroyed	40 dead 8 270 homeless
18.1.–22.1.	United States CA (La Conchita), AZ	Floods and mudslides caused by heavy rain, snow	USD 100–300m insured loss*
18.1.–12.3.	Peru, Bolivia Cuzco, Puno, Huancavelica, Ayacucho, Lima, Puno, Chuquisaca, Cochabamba, Beni	Floods and landslides caused by heavy rain; 4 779 houses, 24 schools, 11 756 hectares of crops destroyed	125 dead, 66 missing 422 injured 34 000 homeless PEN 873m (USD 311m) total damage
3.2.–6.2.	Mexico Michoacan, Angangueo	Heavy rain, floods, landslides, cold	43 dead 20 000 homeless MXN 192m (USD 16m) total damage
21.2.–23.2.	Portugal Madeira, Funchal, Curral das Freiras	Floods and mudslides caused by heavy rain, wind; damage to houses, bridges, roads, cars	42 dead, 10 missing 80 injured 600 homeless EUR 135m (USD 181m) insured loss EUR 350m (USD 470m) total damage
22.2.–5.3.	Zambia Lusaka, Lake Tanganyka	Floods caused by heavy rains, landslides	87 dead
22.2.–5.3.	Australia Northern Territory, Queensland	Floods caused by heavy rain; damage to highways and rail lines	20 dead AUD 47m (USD 48m) insured loss
23.2.–1.3.	Indonesia West Java, Bandung, Ciwidey	Floods and landslides caused by heavy rain	35 dead, 9 missing
25.2.–4.3.	Uganda Bududa, Butaleja Katakwi, Amuria, Pallisa, Mbale, Moroto, Nakapiripirit, Sironko, Manafwa, Bukwo, Budaka	Floods and landslides caused by heavy rain	105 dead, 295 missing 8 177 homeless
1.3.–14.5.	Kenya Marsabit, Turkana, Moyale	Floods caused by heavy rain; destruction of cropland, infrastructure; 40 bridges collapsed	94 dead 71 954 homeless
26.3.–31.3.	United States ND, Fargo	Wet snow, storms with winds up to 72 km/h; floods along the Red River	2 dead 60 injured USD 166m total damage
10.3.	China Shaanxi	Landslide caused by heavy snow; 25 houses destroyed	27 dead 152 homeless
11.3.–12.3.	Kazakhstan Aksuisky, Karatalsky	Floods, six dams burst after snow melt; 1 400 private and public buildings, 3 000 hectares of farmland destroyed, 6 000 livestock killed	46 dead 300 injured KZT 5.4bn (USD 37m) total damage
15.3.–16.3.	Angola, Zambia Luanda	Floods and landslides caused by heavy rains	20 dead
26.3.–31.3.	Rwanda Rubavu	Floods, heavy rains, mudslide	14 dead 5 920 homeless
1.4.–6.4.	Peru Huánuco, Chinchao, Ambo, Trujillo, Porvenir	Floods and mudslides caused by heavy rain	68 dead 50 injured
4.4.-12.4.	Brazil Rio de Janeiro, Niteroi	Floods and landslides caused by heavy rain; mudslides bury houses in slums of hill areas	256 dead 403 injured 74 535 homeless USD 200m total damage
30.4.–3.5.	United States TN (Nashville), KY, GA, AR	Floods caused by heavy rain, storms; Country Music Hall of Fame, Grand Ole Opry House flooded	33 dead USD 600m–1bn insured loss* USD 1.5bn total damage

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

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
5.5.–8.5.	Afghanistan Herat, Ghor, Badghis	Floods caused by heavy rains; roads, infrastructure and 10 000 houses damaged	70 dead 40 000 homeless
6.5.–10.5.	Tajikistan Kulob, Khatlon, Kulyab, Muminabad	Floods and mudslides caused by heavy rain; 70 bridges, roads, infrastructure, 10 000 hectares of farmland destroyed	40 dead, 33 missing 300 injured 16 000 homeless TJS 900m (USD 204m) total damage
12.5.–28.5.	Poland, Czech Republic, Slovakia, Germany, Hungary Slaskie, Podkarpackie, Opolskie, Swietokrizyskie, Malopolskie, Krakow, Sandomierz, Warsaw, Upper Silesia, Breslau	Floods caused by heavy rain; Rivers Vistula, Ondava, Hornad, Oder overflow their banks	22 dead 11 injured EUR 188m (USD 252m) insured loss EUR 2.6bn (USD 3.49bn) total damage
14.5.–20.5.	Sri Lanka Colombo, Gampaha, Kalutara, Ambalangoda, Galle, Ratnapura	Floods and mudslides caused by heavy rain, thunderstorms	20 dead 450 000 homeless INR 4.7bn (USD 105m) total damage
29.5.–31.8.	China Fujian, Jiangxi, Hubei, Hunan, Yunnan, Guangdong, Guangxi, Sichuan, Guizhou, Anhui, Shaanxi, Gansu	Floods and landslides caused by heavy monsoonal rain; over 2 000 000 houses destroyed, over 5 000 000 damaged, over 16 000 000 hectares of farmland destroyed, up to 28 provinces affected	At least 1 724 dead, at least 766 missing 15 200 000 homeless CNY 5.02bn (USD 761m) insured loss CNY 345bn (USD 52.4bn) total damage
2.6.–6.6.	Poland, Hungary, Slovakia, Czech Republic	Floods caused by heavy rain, landslides; over 25 000 houses damaged; rivers dykes burst their banks; roads, railway, farmland flooded, crops destroyed	4 dead EUR 282m (USD 378m) insured loss USD 2.05bn total damage
12.6.–17.6.	Bangladesh, Myanmar (Burma), Bay of Bengal Rakhine, Chittagong, Teknaf	Floods and landslides caused by heavy rain; damage to bridges and buildings	112 dead 100 injured 12 000 homeless
15.6.–16.6.	France Var, Arcs, Draguignan, Luc, Muy, Roquebrune sur Argens, Cote d'Azur	Floods caused by heavy rain; damage to cars, homes, businesses and infrastructure	23 dead, 2 missing EUR 610m (USD 818m) insured loss EUR 1.05bn (USD 1.41bn) total damage
19.6.–21.6.	Brazil Alagoas, Quebrangulo, Pernambuco	Floods and mudslides caused by heavy rain; bridges, highways washed away	at least 54 dead, 53 missing 40 000 homeless BRL 1bn (USD 602m) total damage
19.6.–23.6.	Bosnia and Herzegovina Sava River, Brčko, Banja Luka, Tuzla	Floods causes by heavy rains. 4 000 houses flooded. Damage to roads and infrastructure	2 229 homeless BAM 128m (USD 87m) total damage
22.6.–30.6.	Romania, Ukraine Republic of Moldova Suceava, Botosani, Iasi, Sendreni, Chernivtsy, Ivano Frankivsk	Floods caused by heavy rain. In Ukraine: 6 500 houses and 1 908 hectares of farmland flooded, bridges, railways and roads damaged; in Romania: 4 139 houses, 2 452 households, 13 877 wells, 22 722 hectares of farmland, 253 bridges, 31 national roads damaged	27 dead, 5 missing 4 177 homeless
1.7.–3.7.	Romania Arges, Covasna, Galati, Ialomita, Prahova, Tulcea	Floods caused by heavy rain; 1 324 hectares of farmland flooded	23 dead
1.7.–7.7.	Mexico, United States Coahuila, Nuevo Leon, Rio Grande Valley, TX (Laredo, Brownsville, Lubbock, Starr, Hidalgo)	Floods, heavy rain caused by tropical depression/ No 2; over 100 000 houses destroyed	20 dead 80 000 homeless MXN 255m (USD 21m) insured loss USD 141m total damage
6.7.–8.7.	India Assam, Kerala	Floods caused by monsoonal rains; damage to houses, cropland	53 dead 400 000 homeless INR 20bn (USD 447m) total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
15.7.–22.10.	Nigeria, Ghana, Benin, Chad, Mauritania, Burkina Faso, Cameroon, Gambia, Niger, Togo, Ivory Coast, Democratic Republic of Congo	Floods caused by heavy rains	327 dead 917 injured 262 955 homeless USD 150m total damage
16.7.–27.7	Sudan River Nile, Gedaref, White Nile, North Kordofan, North Bahr El Ghazal, Sennar, Central Equatoria, Jonglei	Floods caused by heavy rain; 22 177 houses destroyed	3 dead 12 injured 6 238 homeless
21.7.–8.10.	Pakistan Khyber Pakhtunkhwa, Punjab, Sindh, Balochistan	Floods caused by heavy monsoonal rains; 1 600 000 houses, 22 200 000 hectares of cropland destroyed, 10 860 villages flooded	1 980 dead 2 946 injured 6 000 000 homeless USD 100m insured loss PKR 5 522bn (USD 6.4bn) total damage
23.7.–25.7.	Indonesia Maluku, South Kalimantan	Floods caused by heavy rains, mudslides	21 dead
26.7.–28.7.	Afghanistan Kapisa, Laghman	Floods caused by heavy rains	80 dead
26.7.–17.9.	Colombia Sucre, Cordoba, Atlantico, Bolivar, Antioquia, Magdalena, Guajira	Floods caused by heavy rains, hail, landslides; 618 houses destroyed 132 135 houses damaged	74 dead, 19 missing 149 injured 739 816 homeless COP 13bn (USD 7m) insured loss COP 762bn (USD 397m) total damage
5.8.–8.8.	India Leh, Kashmir	Floods caused by heavy rains, 10 000 houses destroyed, 5 000 000 hectares of cropland flooded	196 dead 200 injured
6.8.–8.8.	Germany, Czech Republic, Poland, Slovakia Bogatynia, Chrastava, Frydlant, Bad Muskau, Neukirchen, Goerlitz	Floods caused by heavy rain; river dykes burst; dam destroyed; houses, buildings, vehicles and one coal mine damaged	15 dead, 3 missing USD 591m insured loss USD 1.37bn total damage
8.8.–9.8.	China Gansu, Zhouqu	Mudslide caused by heavy rain; 67 buildings, 200 hectares of cropland, water pipes, electricity lines destroyed	1 481 dead, 284 missing 47 000 homeless CNY 18m (USD 3m) insured loss CNY 5bn (USD 759m) total damage
17.8.–16.9.	Nicaragua Jinoteca, Masaya, Granada	Floods and landslides caused by heavy rains; 6 492 houses damaged; roads and bridges destroyed; croplands flooded; shortage of food, clean water and basic health services	48 dead 48 000 homeless
21.8.–24.8.	Nepal Sankhuwasabha, Udayapur	Floods caused by monsoonal rains. Lohandra River breached several embankments; over 8 000 houses damaged	138 dead
22.8.–24.8.	Ethiopia Amhara, Afar, Tigray	Floods caused by seasonal rains	19 dead 8 864 homeless
3.9.–8.9.	Guatemala	Floods and over 200 landslides caused by heavy rain; over 75 000 houses damaged, 13 bridges collapsed, highway damaged, croplands destroyed	53 dead 56 injured 50 640 homeless USD 500m total damage
11.9.	Indonesia, Barbados Borneo	Floods caused by heavy rain	10 dead, 14 missing
12.9.–14.9.	Sudan Duk County	Floods caused by heavy rain	2180 homeless
17.9.–27.9.	India Uttar Pradesh, Bihar, Uttarakhand	Floods caused by monsoonal rains; 150 000 houses destroyed, 500 000 hectares of cropland destroyed; damage to transport infrastructure	200 dead 2 000 000 homeless INR 75bn (USD 1.68bn) total damage
20.9.–22.9.	Slovenia, Croatia Savinjska, Posavje, Dolenjska, Primorkso	Floods caused by heavy rains; river overflowed its banks; houses damaged, 30 000 hectares of cropland flooded, damage to infrastructure	4 dead EUR 50m (USD 67m) insured loss EUR 130m (USD 174m) total damage
20.9.	Mexico Villa Guerrero	Landslide caused by heavy rain; houses flooded; highway damaged	25 dead

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
27.9.	Colombia Giraldo, Antioquia	Mudslide caused by heavy rain	30 dead
28.9.–29.9	Mexico Oaxaca (Santa Maria Tlahuitoltepec), Chiapas	Landslide caused by heavy rain; vehicles, livestock, light poles, and over 515 houses, destroyed	44 dead
30.9.–6.10.	China Hainan	Floods caused by heavy rains; 182 towns submerged	1 dead, 3 missing CNY 1.13bn (USD 171m) total damage
2.10.–7.10.	Viet Nam Quang Binh, Ha Tinh, Quang Tri, Nghe An, Thua Thien Hue	Tropical Depression/No 14, heavy rains, floods, landslides; 70 000 houses destroyed, damage to transport infrastructure	64 dead VND 2 750bn (USD 141m) total damage
4.10.–15.10.	Indonesia West Papua	Floods caused by monsoonal rains	173 dead, 118 missing 41 injured 9 011 homeless IDR 700bn (USD 78m) total damage
14.10.–18.10.	Viet Nam Ha Tinh, Nghe An, Quang Binh	Floods caused by heavy rains; 280 000 houses damaged, damage to transport infrastructure	75 dead 18 injured VND 3 000bn (USD 154m) total damage
16.10.	Russia Tuapsinsky, Apsheronsky	Floods caused by heavy rain; 400 houses, cropland, roads, dams, bridges damaged	14 dead, 9 missing 5 000 homeless RUB 2bn (USD 66m) total damage
29.10.–9.11.	Thailand Had Yai, Songkha, Surat Thani, Nakhon Sri Thamarat	Floods caused by monsoonal rains; mudslides; 1 022 422 hectares of farmland damaged	181 dead THB 10bn (USD 332m) total damage
12.11.–14.11.	Belgium, France Brabant, Hainaut	Floods caused by heavy rains, rivers overflow their banks, mudslides; hundreds of buildings flooded, rail traffic suspended	4 dead EUR 50m (USD 67m) insured loss
13.11.–5.12.	Colombia Bolivar, Magdalena, Córdoba, Sucre, Choco, Antioquia, Atlántico, Valle del Cauca	Floods caused by heavy rains, tornado, hail, landslides; 1 431 houses destroyed, 143 434 houses damaged.	144 dead, 88 missing 23 injured 1 614 676 homeless COP 13bn (USD 7m) insured loss COP 567bn (USD 295m) total damage
14.11.–19.11.	Viet Nam Thua Thien Hue, Quang Tri, Quang Nam, Quang Ngai	Flood caused by heavy rains. 110 000 houses, 50 000 hectares of cropland and 156 km of roads damaged	29 dead, 41 missing VND 5 000bn (USD 256m) total damage
24.11.–4.12.	Venezuela Falcón, Miranda, Vargas, Merida, Zulia, Trujillo, Nueva Esparta, Caracas	Floods caused by heavy rains, landslides; 46 000 hectares of farmland destroyed, damage to public infrastructures	35 dead 204 056 homeless USD 170m total damage
26.11.–7.12.	Croatia, Bosnia and Herzegovina, Albania Drina River	Floods caused by heavy rains, landslides; travel disruption	4 dead 3 400 homeless EUR 76m (USD 102m) insured loss EUR 340m (USD 456m) total damage
29.11.–2.12.	Morocco Rabat, Souss Mass Draa, Gharb	Floods caused by torrential rains; damage to highways, railways, disruption to communication lines	32 dead 22 injured 4 000 homeless USD 29m total damage
1.12.–16.12.	India Tamil Nadu, Thanjavur, Nagapattinam, Cuddalore, Tiruvarur	Floods caused by heavy rains	150 dead INR 1bn (USD 22m) total damage
7.12.–11.12.	Panama Chiriquí, Veraguas, Colón, Darién, Coclé	Floods caused by heavy rains, landslides; 145 houses destroyed, more than 1 740 houses damaged; damage to infrastructure, temporary closure of Panama Canal	13 dead 2 720 homeless
23.12.–28.12.	Australia New South Wales, Victoria, Central Queensland	Floods caused by heavy rains, tropical cyclone Tasha; 22 towns affected; extensive damage to property, infrastructures, coal production halted	4 dead AUD 2bn (USD 2.05bn) insured loss AUD 5bn (USD 5.13bn) total damage

Storms

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
17.1.–18.1.	Egypt, Red Sea, Israel, Jordan Sinai, Aswan, Hurghada	Storms, floods caused by heavy rain; damage to roof of Sharm el-Sheik's old airport	12 dead 17 injured 3 500 homeless EGP 200m (USD 34m) total damage
4.2.–6.2.	United States MD, VA, PA, NJ, WV, DC, DE	Winter storm with winds up to 80 km/h, heavy snow, ice; damage to buildings, power outages	USD 100m–300m insured loss* USD 300m total damage
9.2–11.2.	United States PA, MD, VA, DC, DE, NJ, NC, WV	Winter storm with winds up to 80 km/h, snow; aircraft hangar roof collapsed, train derailed	USD 600m–1bn insured loss* USD 1.5bn total damage
23.2.–28.2.	United States PA, NY, NH, NJ, MA, ME, CT, RI, VT	Winter storm with winds up to 151 km/h, heavy snowfall	USD 300m–600m insured loss* USD 500m total damage
27.2–28.2.	France, Germany, Belgium, Luxembourg, Netherlands, Switzerland, Spain, Portugal Pyrenees, Vendee, Charente Maritime, Madeira, Canary Islands	Winter storm Xynthia with winds up to 160 km/h, heavy rain; damage to property, cars, forestry	64 dead 79 injured EUR 2.05bn (USD 2.75bn) insured loss USD 4bn total damage
6.3.–10.3.	Australia New South Wales, Victoria, Melbourne, Ferntree Gully, Tasmania	Storm with winds up to 100 km/h; hail, heavy rain, floods; damage to homes, businesses, vehicles	AUD 1.04bn (USD 1.07bn) insured loss USD 1.33bn total damage
8.3.	Spain Catalonia	Storm, snowfall; power outages	EUR 41m (USD 54m) insured loss EUR 50m (USD 67m) total damage
10.3.–12.3.	Madagascar, Indian Ocean Nosy Varika, Mananjary, Manakara, Vohipeno, Farafangana, Vangaindrano, Ambatondrazaka	Tropical storm Hubert, heavy rains, floods	85 dead, 35 missing 132 injured 38 000 homeless
13.3.–15.3.	United States NJ, NY, MA, CT, PA, RI	Storm with winds up to 120 km/h; heavy rain, floods	USD 1bn–3bn insured loss* USD 1.7bn total damage
22.3.	Australia Western Australia, Perth, Kings Park	Storm with winds up to 120km/h; hail, rain, mudslides; damage to University of Western Australia	AUD 1.05bn (USD 1.08bn) insured loss USD 1.39bn total damage
28.3.–31.3.	United States RI, MA, NC, SC, CT	Storms, hail, heavy rain; floods	USD 100m–300m insured loss* USD 350m total damage
4.4.–6.4.	United States IA, IL, MI, OH, IN	Thunderstorms with winds up to 97 km/h; hail, heavy rain	USD 300m–600m insured loss* USD 500m total damage
13.4.	India, Bangladesh, Bay of Bengal Bihar, West Bengal, North Dinajpur, Rangpur, Kurigram, Nilphamari, Lalmonirhat, Dinajpur, Gaibandha, Sirajganj, Bogra	Tropical storm with winds up to 160 km/h; 200 000 houses destroyed	145 dead 300 injured 1 00 000 homeless
23.4.–25.4.	United States AL, TX, LA, MS (Yazoo), TN, MO, AR	Storm, tornado with winds up to 320 km/h	12 dead USD 100m–300m insured loss* USD 500m total damage
1.5.–2.5.	Bangladesh	Storms, hail; damage to crops	15 dead 50 injured
5.5.–24.5.	China Chongqing, Hunan, Guangdong, Jiangxi, Guizhou, Anhui, Hubei	Storms with winds up to 110 km/h, heavy rain, floods	115 dead, 21 missing 160 injured CNY 130m (USD 20m) insured loss CNY 5.9bn (USD 895m) total damage
7.5.	India Bihar	Thunderstorm, heavy rain, floods	54 dead
7.5.–8.5.	United States NY, OH, PA, NJ	Storms, thunderstorms with winds up to 97 km/h, hail	USD 25m–100m insured loss*

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

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
10.5.	United States OK (Cleveland, Oklahoma City), AR	Tornadoes, hail; damage to buildings, cars	5 dead 58 injured USD 600m–1bn insured loss*
12.5.–16.5.	United States OK, MD, PA, TX, IL	Storm with winds up to 130 km/h, tornadoes, hail, heavy rain, floods	USD 1bn–3bn insured loss*
14.5.	Bangladesh Rajshahi, Kalbaishakhi, Bagmara, Mohanpur	Storm over Rajshahi City; damage to buildings	2 dead 100 injured
20.5.–22.5.	India, Sri Lanka, Bay of Bengal, Indian Ocean Andhra Pradesh, Krishna, Prakasam, Nellore, Guntur, East Godavari, Visakhapatnam	Cyclone Laila with winds up to 155 km/h, heavy rain, floods; 5 800 hectares of crops destroyed	58 dead USD 100m total damage
22.5.–26.5.	United States CO, NE, WY, SD	Storms, tornadoes with winds up to 193 km/h, hail	USD 300m–600m insured loss*
24.5.	India Uttar Pradesh, Allahabad, Unnao, Nawabganj	Storm, hail; dwellings destroyed	12 dead 30 injured 2 000 homeless
29.5.–8.6.	Guatemala, Honduras, El Salvador	Tropical storm Agatha with winds up to 75 km/h, heavy rain, floods, mudslides; over 110 000 houses and other structures destroyed	299 dead, 2 missing 157 injured 155 287 homeless USD 50m insured loss 1.1bn total damage
1.6.–3.6.	United States TX, NE, IA	Storms, flooding, hail, tornadoes, wind	USD 100m–300m insured loss*
4.6.–6.6.	United States MI, MA, OH, IL, IN	Storms with winds up to 112 km/h; hail, heavy rain, floods	USD 100m–300m insured loss* USD 250m total damage
4.6.–7.6.	Oman, Pakistan, Gulf of Oman Sindh, Balochistan, Badin, Thatta, Gwadar	Cyclone Phet with winds up to 120 km/h, heavy rain, floods; damage to bridges, roads	39 dead USD 150m insured loss OMR 300m (USD 779m) total damage
10.6.–16.6.	United States CO, GA, IL, IN, KS, NC, NM, OK, SC	Storms with winds up to 97km/h; hail, heavy rain, floods	20 dead USD 600m–1bn insured loss*
17.6. –20.6.	United States IL, IN, IA, KS, MI, MN, MO, MT, NE	Thunderstorms, heavy rains, floods	20 dead 100 injured USD 600m–1bn insured loss*
21.6.–24.6.	United States CT, IL, IN, NE, NJ, NY, OH, PA, SD, WI	Thunderstorms, heavy rains, floods	USD 300m–600m insured loss*
25.6.–28.6.	United States MIN, OH	Thunderstorms, heavy rains, floods	USD 100m–300m insured loss*
26.6.–30.6.	Mexico, United States, Gulf of Mexico, Guatemala, Nicaragua, El Salvador, Belize Yucatan Peninsula, Soto La Marina, La Pesca, Tamaulipas, TX, Guatemala, Nicaragua, El Salvador	Hurricane Alex with winds up to 165 km/h; heavy rains, floods, mudslides	12 dead MXN 2.58bn (USD 209m) insured loss USD 3.45bn total damage
30.6.–1.7.	United States MT	Storms, hail	USD 100m–300m insured loss*
12.7.	Canada Calgary, part of Southern Alberta	Hailstorm, heavy rain; damage to buildings and cars	>CAD 500m (>USD 500m) insured loss** CAD 650m (USD 654m) total damage
13.7.–17.7.	Philippines, Viet Nam, China Southern Luzon, Hainan Island, Lao	Typhoon Conson/No 1 with winds up to 120 km/h, heavy rains; 3 691 houses, 1 300 hectares of riceland destroyed	114 dead, 52 missing 31 injured USD 145m total damage
17.7.–18.7.	United States MN, IA	Storms, hail, heavy rains	2 dead USD 100m–300m insured loss*

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

** Canada natural catastrophe figures with the permission of Property Claim Services (PCS Canada)

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
20.7.–25.7.	United States CT, IL, IA, MD, MN, NY, PA, VA; WI	Storms, floods, hail, tornado	5 dead USD 600m-1bn insured loss*
22.7.	China, Viet Nam, Hong Kong Wuchuan City, Guangdong, Northern Vietnam, Nghe An, Ha Tinh, Thanh Hoa, Ha Giang, Cao Bang, Lao Cai	Typhoon Chanthu/No 3 with winds up to 126 km/h, heavy rains, floods; 2 915 houses damaged in China	14 dead 5 injured CNY 2.4bn (USD 364m) total damage
8.8.–12.8.	United States IA, MD, MN	Thunderstorms, floods	1 dead USD 100m–300m insured loss*
14.8.	Denmark Zealand	Cloudburst, heavy rains	DKK 1.2bn (USD 216m) insured loss
15.8.	Czech Republic Prague, Bohemia	Thunderstorms, hail; severe damage to houses	EUR 105 (USD 141m) insured loss USD 350m total damage
24.8.	Viet Nam Nghe An, Ha, Quang Binh	Typhoon Mindulle with winds up to 230 km/h; 461 houses destroyed, 89 600 hectares of farmland flooded, over 35 fishing boats sank, 11 ships damaged	14 dead 64 injured 20 700 homeless VND 850bn (USD 44m) total damage
29.8.–4.9.	Antigua and Barbuda, United States, Canada NC, VA, Leeward Islands, Western Head, Halifax, Nova Scotia	Hurricane Earl/No 3 with winds up to 142 km/h; damages to houses, power outages	1 dead USD 50m insured loss
31.8.–2.9.	South Korea, North Korea, Japan Okimawa, Junigami, Nago, Motobu, Yomitan, Incheon, Gyeonggi, Kaesong	Typhoon Kompasu/No 7 with winds up to 185 km/h; over 3 550 houses, 30 000 hectares of farmland destroyed; damage to residential, commercial, industrial buildings and infrastructure, power outages	32 dead KRW 162bn (USD 143m) insured loss KRW 585bn (USD 515m) total damage
6.9.–9.9.	Mexico, United States La Pesca, TX (Brownsville, Austin, Arlington, Dallas, Georgetown, Corpus Christi)	Tropical storm Hermine/No 8 with winds up to 100 km/h, heavy rains, floods; damages to houses, public buildings, power outages	6 dead USD 120m insured loss USD 200m total damage
9.9.	China Shishi City, Fujian, Zhejiang	Typhoon Meranti with winds up to 100 km/h; heavy rains; damage to cropland	3 dead 186 000 homeless CNY 800m (USD 121m) total damage
14.9.–17.9.	Mexico, United States Puerto Bravo, Quintana, Roo State, Yucatan Peninsula, Chetumal, Matamoros, Veracruz, Tabasco, Oaxaca, Puebla	Hurricane Karl/No 6, Category 3 with winds up to 195 km/h, heavy rains, floods, landslides; 160 000 houses damaged or destroyed, damages to transport network, over 952 000 hectares of cropland flooded	22 dead 230 000 homeless MXN 2.5bn (USD 203m) insured loss USD 4.13bn total damage
15.9.–16.9.	United States KS, NY, OH	Thunderstorms, tornadoes, hail, floods	2 dead USD 300m–600m insured loss* USD 500m total damage
18.9.–22.9.	Bermuda, Canada 65 km West of Bermuda, Burin Peninsula	Hurricane Igor with winds up to 150 km/h, heavy rains, floods; hundreds of houses, roads damaged	4 dead USD 140m insured loss USD 201m total damage
18.9.–19.9.	United States MO	Thunderstorms, hail, floods	USD 100m–300m insured loss* USD 210m total damage
19.9.–21.9.	China, Taiwan China (Fujian, Guangdong), Taiwan	Typhoon Fanapi/No 11 with winds up to 169 km/h; heavy rain, floods, landslides; 66 400 hectares of crops flooded, 16 000 houses collapsed; landslide caused damage to a tin mine causing water pollution	135 dead, 61 missing 128 000 homeless TWD 2bn (USD 69m) insured loss USD 800m total damage
29.9.–1.10.	Jamaica, United States, Bahamas, Cuba Kingston, Santiago, Clarendon, MD, NC, NY, PA, VA	Tropical Storm Nicole/No 14, heavy rains, floods, landslides; roads, highways flooded, bridges collapsed, power outages	21 dead 141 homeless USD 135m insured loss USD 333m total damage
4.10.–6.10.	United States AZ	Thunderstorms, tornadoes, hail, floods	USD 1bn–3bn insured loss*
17.10.–23.10.	China, Philippines, Taiwan Maconacon, Palanan, Divilican, Zhangpu City, Fujian	Super Typhoon Megi with winds up to 220 km/h, floods, mudslides; 30 048 houses destroyed	46 dead, at least 4 missing 42 injured USD 100m insured loss USD 701m total damage

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

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
21.10.–24.10.	United States TX	Thunderstorms, tornado with wind up to 217 km/h; floods, hail	USD 25m–100m insured loss*
22.10.	Myanmar (Burma) Magway, Mandalay, Sagaing, Kyaukpyu, Minbya, Myanaung, Myebon, Pauktaw	Cyclone Giri with winds up to 177 km/h; heavy rains, tidal waves; 20 380 houses, 16 185 hectares of riceland destroyed; damage to infrastructure	45 dead, at least 10 missing 49 injured 81 000 homeless USD 57m total damage
26.10.	United States IL, IN, KY, MN, OH, WI	Storms with winds up to 129 km/h, hail, floods, tornadoes	USD 300m–600m insured loss*
30.10.–6.11.	Saint Lucia, Saint Vincent and The Grenadines, Barbados, Trinidad and Tobago, Haiti	Hurricane Tomas/No 11, heavy rains, landslides	55 dead USD 588m total damage
31.10.–2.1.	Italy Veneto, Toscana, Ligura, Valle d'Aosta, Lombardia, Friuli, Sicilia	Storms, floods, mudslides due to heavy rains, rivers overflow their banks; train derailed, houses destroyed, railways, roads damaged	3 dead 5 injured EUR 650m (USD 872m) total damage
31.10.–3.11.	India Andhra Pradesh	Cyclone Jal with winds up to 100 km/h; heavy rains, floods; damage to crops and transport infrastructure	22 dead
29.11.–1.12.	United States MS, SC, GA	Storms, tornadoes	1 dead USD 25m–100m insured loss* USD 100m total damage
17.12.–22.12.	United States CA	Storms, hail, floods	USD 100m–300m insured loss*

Earthquakes

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
12.1.	Haiti Port au Prince, Leogane, Petionville, Gressier, Carrefour, Delmas	Earthquake (M_W 7.0), aftershocks	222 570 dead 300 000 injured 1 200 000 homeless USD 100m insured loss USD 10bn total damage
27.2.	Chile Conception Valparaiso, Santiago, Curico, Chillan, Conception, Talca	Earthquake (M_W 8.8) triggers tsunami and over 200 aftershocks; buildings, bridges, roads destroyed, damage to infrastructure	488 dead,74 missing 500 injured 44 000 homeless USD 8bn insured loss USD 30bn total damage
4.3.	Taiwan Kaohsiung, Taitung, Tainan, Jiayi	Earthquake (M_W 6.4), 19 aftershocks	96 injured TWD 2.6bn (USD 89m) insured loss USD 1bn total damage
8.3.	Turkey Okcular, Bingol, Elazig, Erzincan	Earthquake (M_W 5.9)	51 dead 100 injured
4.4.	Mexico, United States Baja California, Mexicali, CA	Earthquake (M_W 7.2), aftershocks; damage to buildings and infrastructure	2 dead 100 injured 5 000 homeless USD 300m insured loss USD 1.1bn total damage
14.4.	China Tibet, Qinghai, Yushu, Jiegu	Earthquake (M_W 6.9), aftershocks	2 698 dead, 270 missing 12 000 injured 100 000 homeless CNY 4m (USD 1m) insured loss CNY 670m (USD 102m) total damage
15.4.	Iceland, United Kingdom, Ireland, Germany, France, Switzerland, Netherlands	Eruption of Eyiafiallajökull volcano; prolonged airline traffic disruption	USD 1.7bn total damage

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

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
18.4.	Afghanistan Samangan	Earthquake (M_W 5.3), over 2 000 houses destroyed	11 dead 70 injured
16.6.	Indonesia Papua, Yapen Island	Earthquake (M_W 7.0), aftershocks, over 2 500 houses destroyed	17 dead 4 600 homeless
4.9.	New Zealand Darfield, Christchurch, South Island	Earthquake (M_W 7.0), over 300 aftershocks; 500 buildings destroyed, 100 000 buildings and 300–400 farms damaged, damage to roads, railways, irrigation infrastructure	100 injured 400 homeless NZD 5.7bn (USD 4.45bn) insured loss NZD 6.5bn (USD 5.08bn) total damage
25.10.–5.11.	Indonesia Central Java, Yogyakarta	Mount Merapi volcano erupted, 867 hectares of forest destroyed	322 dead 136 686 homeless
25.10.	Indonesia South Pagai, Mentawai Islands	Earthquake (M_W 7.8), triggers tsunami	449 dead, 96 missing 14 983 homeless
3.11.–11.3.	Serbia Kragujevac	Earthquake (M_W 5.3), aftershocks; >6 000 buildings damaged	2 dead 50 injured RSD 11.3bn (USD 143m) total damage

Droughts, bush fires, heat waves

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–1.5.	China Guizhou, Yunnan, Sichuan, Chongqing, Guangxi	Drought; millions of hectares of farmland destroyed	CNY 23.7bn (USD 3.6bn) total damage
8.2.–13.2.	Brazil Santos	Heat wave with temperatures of over 39° Celsius	32 dead
1.3.–20.5.	India Orissa, Rajasthan, Punjab, Haryana	Heat wave with temperatures of over 47° Celsius	250 dead
15.6.–15.8.	Russia, Czech Republic	Heat wave with temperatures up to 40° Celsius, railways, highways closed due to heat	55 630 dead RUB 33bn (USD 1.08bn) total damage
1.7.–18.8.	Russia Voronezh, Belgorod, Ivanovo, Kirov, Nizhny, Novgorod, Moscow	Wildfires caused by drought and prolonged heat wave, smoke pollution in Moscow; 26 739 wildfires destroyed 2 500 houses, 816 515 hectares of forest, 64 000 flights cancelled, damage to transport infra- structure	130 dead 1 500 injured 3 500 homeless USD 15bn total damage
19.7.–25.7.	Japan	Heat wave with temperatures of over 35° Celsius	170 dead
29.7.–30.7.	Finland	Heat wave with temperatures of over 37° Celsius	USD 99m total damage
2.12.–5.12.	Israel Carmel Forest	Forest fire spread by strong, dry winds; bus, 250 houses, 5 000 000 trees destroyed	42 dead ILS 36m (USD 10m) insured loss ILS 200m (USD 56m) total damage
5.12.–6.12.	China Sichuan	Grassland fires spread by strong, dry winds	22 dead

Cold, frost

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–19.1.	China Xinjiang, Altay	Heavy snow, avalanches, cold temperatures of –45° Celsius	20 dead 1 100 injured CNY 650m (USD 99m) total damage
5.1.–23.1.	India Uttar Pradesh, New Delhi, Punjab, Haryana, Bihar	Cold wave with temperatures close to freezing, dense fog	100 dead
7.1.–11.1.	United Kingdom	Cold wave with temperatures below 0° Celsius	28 dead, 3 missing GBP 700m (USD 1.1bn) total damage
7.1.–12.1.	United States TX, GA, OK, MO, NC, AR, AL, FL, SC, LA	Long stretch of below-freezing temperatures; damage to agriculture	USD 100m-300m insured loss* USD 1.38bn total damage
10.1.–25.1.	Romania, Germany, Poland, Czech Republic, Bulgaria, Turkey	Extreme cold weather with temperatures of –35° Celsius	87 dead
8.2.–9.2.	Afghanistan Parwan, Salang Pass	Avalanches hit mountain highway; cars, buses and trucks jammed inside Salang Tunnel	169 dead 130 injured
28.2.–1.3.	China Shangdon	Heavy snow; 5 883 houses and 66 310 hectares of farmland destroyed	CNY 1.64bn (USD 249m) total damage
9.3.	Afghanistan Badakhshan	Avalanche after heavy snowfall	30 dead, 5 missing
17.7.–24.7.	Peru, Chile, Argentina, Uruguay, Bolivia, Paraguay, Brazil	Cold wave with temperatures close to freezing; livestock died	522 dead
26.11.–6.12.	United Kingdom, Germany, Poland, France, Italy, Russia, Albania, Spain, Norway, Denmark, Portugal, Czech Republic, Switzerland	Heavy snow, prolonged period of icy conditions; severe transport disruption	60 dead USD 262m insured loss

Hail

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
10.4.	India Assam, Baksa, Mushalpur	Hailstorm; damage to buildings, crops	28 dead 5 000 homeless

Other natural catastrophes

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
4.1.	Pakistan Gilgit Baltistan, Hunza, Atta Abad	Landslide destroyed 46 houses, blocked Hunza River; damage to Karakoram Highway	20 dead PKR 1.5bn (USD 18m) total damage
12.4.	Peru Ancash	Glacier melts; Hualcan River overflows its banks; 50 houses destroyed	50 injured

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

Table 7
Chronological list of all man-made disasters 2010

Major fires, explosions

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
4.1.	China Hebei	Gas pipeline leak at steel plant	21 dead
11.1.	Australia Victoria, Sommerville	Fire at poultry supplier and producer	
15.1.	Spain Murcia	Fire at food processing plant	
1.2.	United Kingdom Suffolk	Fire at food plant	
7.2.	United States CT, Middletown	Gas explosion at power station	6 dead 16 injured
25.2.	Bangladesh Gazibur	Fire at garment factory	21 dead 50 injured
26.2.	China Guangdong	Fire and explosion at fireworks factory	23 dead 48 injured
23.3.	India West Bengal, Kolkata	Fire at multi-storey house	32 dead 20 injured
10.4.	India Tughlakabad	Fire at warehouse	INR 1Obn (USD 224m) total damage
3.6.	Bangladesh Dhaka, Neemtoli	Fire and explosion of electrical transformer; fire spreads to residential and commercial areas	120 dead 100 injured
11.6.	Russia Kaliningrad	Fire at 3-storey warehouse	
14.7.	Germany Fulda	Fire at paint and coating plant	
15.7.	Iraq Sulaimaniya	Fire at hotel in commercial street	30 dead 22 injured
1.8.–2.8.	South Africa Johannesburg	Fire at retirement home	22 dead
3.8.	Chile Nos, Santiago	Fire at pasta factory	USD 128m total damage
7.8.	Iraq Basra	Electricity generator explodes	45 dead
9.8.	Qatar Mesaieed	Power failure at aluminium factory	
16.8.	China	Explosion at illegal fireworks factory	20 dead, 4 missing 153 injured
9.9.	United States San Bruno, CA	Gas pipeline explosion and fire; 37 houses destroyed	8 dead 60 injured USD 250m total damage
10.9.–13.9.	United States CO (Four Mile Canyon)	Fire at Four Mile Canyon fuelled by winds up to 75km/h; 170 houses, 2 575 hectares of land destroyed	2 injured USD 310m total damage
17.9.	Sri Lanka Karadiyanaru	Explosion at explosives depot	62 dead
27.10.	Myanmar (Burma) Pakkoku	Fire caused by leaking oil pipeline	100 dead 58 injured
15.11.	China Shanghai	Fire at 28-storey residential building	58 dead 71 injured
15.11.	India Laxmi Nagar, New Delhi	Collapse of five-storey building	70 dead 80 injured
8.12.	Chile San Miguel, Santiago	Fire at prison during a riot	83 dead 14 injured
14.12.	Bangladesh Dhaka	Fire at garment factory	29 dead
19.12.	Mexico San Martin Texmelucan, Puebla	Fire in oil pipeline, 32 houses destroyed	29 dead 52 injured 84 homeless

Aviation disasters

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
25.1.	Mediterranean Sea, Lebanon	Ethiopian Airlines Boeing 737 crashes into sea shortly after takeoff	90 dead
10.4.	Russia Smolensk	Polish Air Force Tupolev 154M crashes on approach	96 dead
12.5.	Libya Tripoli International Airport	Afriqiyah Airways A330 crashes upon landing	103 dead 1 injured
17.5.	Afghanistan Hindu Kush Mountains, Salang Pass	Pamir Airways Antonov 24 crashes in heavy fog	44 dead
22.5.	India Mangalore-Bajpe Airport	Air India Express Boeing 737-800 crashes upon landing; catches fire	158 dead 8 injured
10.6.	Saudi Arabia Jeddah airport	Fire at airport warehouse	
27.7.	Saudi Arabia Riyadh	Lufthansa MD11 (D-ALCQ) crashes upon landing	
28.7.	Pakistan Islamabad	Airblue A321 (AP-BJB) crashes upon landing	152 dead
16.8.	Colombia San Andres Island	AIRES Boeing 737-700 crashes upon landing	2 dead 100 injured
24.8.	China Yichun Lindu Airport	Embraer 190LR crashes upon landing	42 dead
25.8.	Democratic Republic of Congo Bandundu	Filair Bi-Turbopropulseur Let-410 crashes on landing	20 dead
3.9.	United Arab Emirates Dubai	UPS Boeing 747F crashes at military base; catches fire	2 dead
29.10.	Space	Loss of Eutelsat's W3B satellite	
4.11.	Cuba Guasimal	Aero Caribbean ATR-72-212 crashes in Guasimal	68 dead
5.11.	Pakistan Karachi	Jahangir Siddiqui Beechcraft 1900 crashes shortly after takeoff	21 dead
15.12.	Nepal Okhaldhunga	Tara Air Twin Otter crashes shortly after takeoff	22 dead

Maritime disasters

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
27.1.	Indian Ocean, Indonesia Aru islands	Ferry sinks in stormy weather	7 dead, 27 missing
7.3.–8.3.	Cameroon Bakassi	Overloaded boat capsizes in the Gulf of Guinea	24 dead
26.3.	South Korea Yellow Sea, Baengnyeong Island	Navy ship sinks after explosion	46 dead
7.4.	Rwanda Nyamunini Island	Boat capsizes on Lake Kivu during storm	21 dead 19 injured
20.4.–22.4.	Gulf of Mexico, United States LA, MS, AL, FL	Explosion on Deepwater Horizon oil rig causing the drilling platform to sink; 166 937 m^3 of oil spilled	11 dead 17 injured USD 1bn insured loss USD 20bn total damage
13.5.	Caribbean Sea, Venezuela Mariscal Sucre	Semi-submersible gas exploration rig Aban Pearl sinks	
26.5.	Peru Loreto, Santa Rosa	Overloaded ferry Camila sinks in the Amazon river	At least 21 dead, 15 missing
29.5.	Italy Naples	Fire on passenger ferry	
7.6.	Indian Ocean, Mozambique Cabo Delgado	Boat carrying illegal immigrants capsizes	49 dead

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
8.6.	Bangladesh Sunamganj	Boat capsizes during storm	18 dead, at least 19 missing
14.6.	India Uttar Pradesh, Dubahar, Ballia	Overloaded boat capsizes on the Ganges river	62 dead
28.7.	Congo, Democratic Republic of (DRC) Kasai river, Bandundu	Boat carrying illegal immigrants capsizes on Kasai river	140 dead
1.8.	Uganda Lake Albert	Overloaded boat capsizes on Lake Albert	33 dead, 17 missing
5.9.	Congo, Democratic Republic of (DRC) Ruki River, Equateur Province	Overloaded boat capsizes on Ruki river	70 dead
15.9.	Indian Ocean, Bay of Bengal, India Muriganga river	Boat carrying tourists capsizes	20 dead, at least 14 missing
27.9.	Indian Ocean, Arabian Sea, Gulf of Aden, Somalia Gulf of Aden	Boat carrying illegal immigrants capsizes	21 dead
5.10.	Myanmar (Burma) Irrawaddy Delta	Ferry carrying school children and teachers capsizes	19 dead, 3 missing
10.10	India Bihar, Buxar, Ganges river	Overloaded passenger ship capsizes on the Ganges river	36 dead, 2 missing
20.10.	Indonesia Palue Island, East Nusa Tenggara	Karya Terang ferry capsizes during bad weather	22 dead
30.10.	India Ghoramara island, West Bengal	Pilgrims boat capsizes hitting a sand bar on Buriganga river	54 dead, 73 missing
30.10.	Indian Ocean, Bay of Bengal, India Kolkata, Bay of Bengal	Ferry carrying pilgrims capsizes	79 dead, 50 missing
10.11.	Philippine Sea, Japan Okinawa	Cargo sinks off Okinawa Island	1 dead, 20 missing
16.11.	Mozambique Lake Niassa	Boat carrying illegal immigrants capsizes on Lake Niassa	15 dead, 20 missing
13.12.	Antarctic Ocean, New Zealand Southern Ocean	Fishing boat capsizes on Southern Ocean	22 dead
15.12.	Australia Christmas Island	Boat carrying asylum seekers capsizes	30 dead, 18 missing 5 injured
16.12.–19.12.	Indian Ocean, South China Sea, Viet Nam South China Sea	22 fishing vessels capsize due to strong winds	5 dead, 51 missing
18.12.	Bangladesh Surma river	Boat capsizes on Surma river after colliding with a cargo ship	37 dead

Rail disasters including cableways

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
15.2.	Belgium Brussels, Halle, Vlaams-Brabant	Head-on collision of two commuter trains	18 dead 171 injured
28.5.	India West Bengal, Kharagpur, Tata Naga	13 coaches of Jnaneswari Express train derail: oncoming goods train rams derailed coaches	148 dead 180 injured
23.6.	Republic of Congo Pointe Noire	Four coaches of a passenger train derail and plunge into ravine	54 dead 97 injured

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
19.7.	India Bengal	Collision between two trains	61 dead 100 injured
17.8.	Germany Lambrecht	Train crashes into garbage truck	
20.9.	India Shivpuri	Collision between two trains	22 dead 45 injured
2.10.	Indonesia Pemalang	Collision between two trains at Petarukan station	34 dead 40 injured

Mining accidents

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
6.1.	China Hunan, Xiangtan	Fire at coal mine	30 dead
1.3.–15.3.	China Inner Mongolia, Luotuo Mountain	Flood at coal mine after heavy rain	32 dead
15.3.	China Henan, Zhengzhou, Xinmi	Fire at coal mine	25 dead
19.3.	Sierra Leone Baomahun	Collapse of gold mine	200 dead
28.3.	China Shanxi	Flooding of Wangjialing coal mine	38 dead 115 injured
31.3.	China Henan, Luoyang, Yichuan	Gas explosion at coal mine	At least 43 dead
5.4.	United States WV, Montcoal	Explosion at coal mine	27 dead 2 injured
8.5.	Russia Siberia, Kemerovo, Mezhdurechensk	Explosions at Raspadskaya coal mine	66 dead, 22 missing 129 injured
13.5.	China Guizhou	Gas explosion at illegal coal mine	21 dead
17.5.	Turkey Zonguldak	Gas explosion at Karadon coal mine	28 dead 8 injured
16.6.	Colombia Antioquia	Gas explosion at San Fernando coal mine	73 dead
21.6.	China Henan, Pingdingshan	Explosion at coal mine	47 dead
29.6.	Ghana Accra, Ashaiman	Dunkwa Akyempim mine collapse due to heavy rain	At least 88 dead, 20 missing
17.7.	China Hancheng, Shaanxi	Fire at coal mine	28 dead
6.8.	China Lingnan	Fire at gold mine	23 dead
16.10.	China Yuzhou City, Henan	Gas explosion at coal mine	37 dead
19.11.–25.11.	New Zealand South Island	Gas explosions at coal mine	29 dead
7.12.	China Mianchi County, Henan	Explosion at coal mine	26 dead

Collapse of buildings/bridges

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
19.2.	Morocco Meknes	Collapse of mosque minaret	41 dead 70 injured
4.3.	India Uttar Pradesh	Stampede at temple in Kripaluji Maharaj's ashram	63 dead 125 injured
1.6.	Bangladesh Dhaka, Begunbari	Collapse of five-storey building	25 dead 50 injured
24.7.	China Henan	Collapsed bridge due to overcrowding	49 dead, 17 missing
11.8.	Nigeria Abuja	A multi-storey building collapses	23 dead
27.10.	Afghanistan Jalga	Building collapses during wedding ceremonies	65 dead

Miscellaneous

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
1.1.	Pakistan Lakki Marwat	Car bomb explodes in crowded volleyball stadium	101 dead 60 injured
20.1.	Mexico Durango	Riots at prison	24 dead
18.2.	Pakistan Terah valley	Suicide bomb attack outside a mosque	29 dead 50 injured
25.2.	Mali Timbuktu	Stampede at mosque	24 dead 55 injured
1.3.–20.6.	Nigeria Zamfara, Anka, Bungudu	Lead poisoning outbreak from illegal gold mining	400 dead
8.3.	Pakistan Punjab, Lahore	Suicide bomb attack on a police intelligence unit	15 dead 60 injured
12.3.	Pakistan Lahore	Two suicide bombings in residential area and shopping district	45 dead 120 injured
29.3.	Russia Moscow	Bomb explosions at the metro stations Lubyanka und Park Kultury	40 dead 160 injured
5.4.	Pakistan Lower Dir, Timergarah	Suicide bomb attack on a political party rally	38 dead 100 injured
7.4.–8.4.	Kyrgyzstan Bishkek	Clashes between demonstrators and police	75 dead 1500 injured
10.4.	Thailand Bangkok	Clashes between security forces and anti-government protestors	21 dead 312 injured
19.4.	Pakistan North West Frontier, Peshawar	Suicide bomb attacks protest rally at Qissa Khwani Bazaar	24 dead 42 injured
22.4.	Thailand Bangkok	Clashes between military troops and anti-government protestors	3 dead 75 injured
13.5.–16.5.	Thailand Bangkok	Clashes between military troops and anti-government protesters; over 30 buildings damaged	24 dead 198 injured THB 30bn (USD 995m) total damage
19.5.–20.5.	Thailand Bangkok, Udon Thani, Khon Kean	Clashes between military troops and anti-government protestors	41 dead 346 injured
20.5.	France Paris	Art robbery; five paintings stolen from Museum of Modern Art	EUR 120m (USD 161m) total damage
28.5.	Pakistan Lahore	Bomb attacks on two mosques	80 dead 107 injured
10.6.	Afghanistan Kandahar, Arghandab	Suicide bombing at wedding party	56 dead 70 injured
10.6.–14.6.	Kyrgyzstan Osh, Jalalabat, Batken	Riots between ethnic communities	118 dead 600 injured

Date	Country Place	Event	No. of victims/amount of total damage in original currency and (USD)
1.7.	Pakistan Lahore	Suicide bombings at shrine	50 dead
9.7.	Pakistan Mohmand Agency	Suicide bombings at tribal meeting	105 dead
15.7.	Iran Zahedan	Suicide bombings at mosque	27 dead 270 injured
24.7.	Germany Duisburg	Stampede at Loveparade 2010	21 dead 500 injured
11.8.	Uganda Kampala	Series of bombs explode on World Cup Final gatherings	84 dead 114 injured
1.9.	Pakistan Lahore	Series of bomb explosions in Lahore	38 dead
2.9.	Pakistan Lahore	Series of suicide bombings in mosques	35 dead
3.9.	Pakistan Quetta	Suicide bombing at religious procession	65 dead 150 injured
7.9.	Pakistan Kohat	Suicide bombing at police station	20 dead 50 injured
4.10.	Hungary Ajka, Kolontar	Toxic leak at aluminium factory	9 dead 150 injured 7 120 homeless USD 103m total damage
11.11.	Pakistan Karachi	Suicide bombing at government building	20 dead
22.11.	Cambodia Koh Pich, Phnom Penh	Stampede on bridge during a festival	375 dead 758 injured
2.12.	Nigeria Lagos	Fuel tanker explodes on motorway	21 dead
10.12.	Pakistan Khyber-Pakhtunkhwa, Hangu	Suicide bombing at hospital	20 dead
24.12.	Nigeria Jos	Series of bomb explosions at churches on Christmas Eve	32 dead 74 injured
25.12.	Pakistan Khar, Bajaur	Suicide bombing at UN food distribution centre	45 dead

Tables showing the major losses 1970–2010

Table 8
The 40 most costly insurance losses 1970–2010

Insured loss[7] (in USD m, indexed to 2010)	**Victims**[8]	**Date** (start)	**Event**	**Country**
72 302	1 836	25.08.2005	Hurricane Katrina; floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
24 870	43	23.08.1992	Hurricane Andrew; floods	US, Bahamas
23 131	2 982	11.09.2001	Terror attack on WTC, Pentagon and other buildings	US
20 601	61	17.01.1994	Northridge earthquake (M 6.6)	US
20 483	136	06.09.2008	Hurricane Ike; floods, offshore damage	US, Caribbean: Gulf of Mexico et al
14 876	124	02.09.2004	Hurricane Ivan; damage to oil rigs	US, Caribbean; Barbados et al
14 028	35	19.10.2005	Hurricane Wilma; floods	US, Mexico, Jamaica, Haiti et al
11 266	34	20.09.2005	Hurricane Rita; floods, damage to oil rigs	US, Gulf of Mexico, Cuba
9 295	24	11.08.2004	Hurricane Charley; floods	US, Cuba, Jamaica et al
9 041	51	27.09.1991	Typhoon Mireille/No 19	Japan
8 043	71	15.09.1989	Hurricane Hugo	US, Puerto Rico et al
8 000	562	27.02.2010	Earthquake (M_W 8.8) triggers tsunami	Chile
7 794	95	25.01.1990	Winter storm Daria	France, UK, Belgium, NL et al
7 594	110	25.12.1999	Winter storm Lothar	Switzerland, UK, France et al
6 410	54	18.01.2007	Winter storm Kyrill; floods	Germany, UK, NL, Belgium et al
5 951	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands et al
5 941	38	26.08.2004	Hurricane Frances	US, Bahamas
5 326	64	25.02.1990	Winter storm Vivian	Europe
5 290	26	22.09.1999	Typhoon Bart/No 18	Japan
4 723	600	20.09.1998	Hurricane Georges; floods	US, Caribbean
4 453	–	04.09.2010	Earthquake (M_W 7.0)	New Zealand
4 439	41	05.06.2001	Tropical storm Allison; floods	US
4 390	3 034	13.09.2004	Hurricane Jeanne; floods, landslides	US, Caribbean: Haiti et al
4 139	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
3 800	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 695	70	10.09.1999	Hurricane Floyd; floods	US, Bahamas, Columbia
3 586	59	01.10.1995	Hurricane Opal; floods	US, Mexico, Gulf of Mexico
3 538	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
3 315	25	24.01.2009	Winter storm Klaus	France, Spain
3 142	45	27.12.1999	Winter storm Martin	Spain, France, Switzerland
2 963	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 799	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria et al
2 754	64	27.02.2010	Winter storm Xynthia	France, Germany, Belgium at al
2 723	26	20.10.1991	Forest fires which spread to urban areas, drought	US
2 710	–	06.04.2001	Hail, floods, tornadoes	US
2 653	135	26.08.2008	Hurricane Gustav, floods; offshore damage	US, Caribbean, Gulf of Mexico et al
2 616	4	25.06.2007	Floods caused by heavy rain	UK
2 581	30	18.09.2003	Hurricane Isabel	US, Canada
2 528	39	05.09.1996	Hurricane Fran	US
2 494	20	03.12.1999	Winter storm Anatol	Denmark, Sweden, UK et al

Source: Swiss Re Economic Research & Consulting

[7] Property and business interruption, excluding liability and life insurance losses;
US natural catastrophe figures: with the permission of Property Claim Services (PCS)/incl. NFIP losses (see page 34 "Terms and selection criteria")
[8] Dead or missing

Table 9
The 40 worst catastrophes in terms of victims 1970–2010

Victims[9]	**Insured loss**[10] (in USD m, indexed to 2009)	**Date** (start)	**Event**	**Country**
300 000	–	14.11.1970	Storm and flood catastrophe	Bangladesh, Bay of Bengal
255 000	–	28.07.1976	Earthquake (M 7.5)	China
222 570	100	12.01.2010	Earthquake (M_W 7.0)	Haiti
220 000	2 309	26.12.2004	Earthquake (M_W 9), tsunami in Indian Ocean	Indonesia, Thailand et al
138 300	–	02.05.2008	Tropical cyclone Nargis; Irrawaddy Delta flooded	Myanmar (Burma), Bay of Bengal
138 000	3	29.04.1991	Tropical cyclone Gorky	Bangladesh
87 449	371	12.05.2008	Earthquake (M_W 7.9) in Sichuan, aftershocks	China
73 300	–	08.10.2005	Earthquake (M_W 7.6); aftershocks, landslides	Pakistan, India, Afghanistan
66 000	–	31.05.1970	Earthquake (M 7.7); rock slides	Peru
55 630	–	15.06.2010	Heat wave in Russia	Russia
40 000	192	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	287	04.02.1976	Earthquake (M 7.5)	Guatemala
19 737	123	26.01.2001	Earthquake (M_W 7.6) in Gujarat	India, Pakistan, Nepal et al
19 118	1 309	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 in the north	India, Bangladesh
15 000	131	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	288	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	653	19.09.1985	Earthquake (M 8.1)	Mexico
9 475	–	30.09.1993	Earthquake (M 6.4) in Maharashtra	India
9 000	669	22.10.1998	Hurricane Mitch in Central America	Honduras, Nicaragua et al
6 425	3 538	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	43	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, Indonesia 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	1 286	05.03.1987	Earthquake; oil pipeline damaged	Ecuador
5 000	678	23.12.1972	Earthquake (M 6.3) in Managua	Nicaragua

Source: Swiss Re Economic Research & Consulting

[9] Dead or missing
[10] Property and business interruption, excluding liability and life insurance losses

Terms and selection criteria

A natural catastrophe is caused by natural forces.

Natural catastrophes

The term "natural catastrophe" refers to 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.

A man-made or technical disaster is triggered by human activities.

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). In Tables 6 and 7 (pages 16–31), all major natural catastrophes and man-made disasters and the associated losses are listed chronologically.

Losses due to property damage and business interruption that are directly attributable to major events are included in this study.

Total losses

For the purposes of the present *sigma* study, total losses are all the financial losses directly attributable to a major event, ie 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, insured and uninsured. Total loss figures do not include indirect financial losses – ie loss of earnings by suppliers due to disabled businesses, estimated shortfalls in gross domestic product, and non-economic losses, such as loss of reputation or impaired quality of life.

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.

The term "losses" refer to insured losses, but do not include liability.

Insured losses

"Losses" refer to all insured losses except liability. Leaving aside the liability losses, on one hand, allows a relatively swift assessment of the insurance year; on the other hand, however, it tends to understate the cost of man-made disasters. Life insurance losses are also not included.

NFIP flood damage in the US is included.

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, and homeless – also make it possible to tabulate events in regions where the insurance penetration is below average.

Thresholds for insured losses and casualties in 2010

For the 2010 reporting year, the lower loss thresholds were set as follows:

Insured losses:

Maritime disasters	USD 17.4m
Aviation	USD 34.8m
Other losses	USD 43.3m

or Total economic losses: USD 86.5m

or Casualties:

Dead or missing	20
Injured	50
Homeless	2 000

Losses are determined using year-end exchange rates and are then adjusted for inflation.

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 exchange rate. To adjust for inflation, these USD values are extrapolated using the US consumer price index to give current (2010) 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 1 045.7m
Insured loss at 2009 prices: USD 1 324.2m

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 2010 prices of USD 1 348m, 2% more than with the standard *sigma* method. The reason for the difference is that the value of the GBP rose by 5% against the USD in the period 2000-2010, ie more than the difference in inflation between the US (26.6%) and the UK (23%) over the same period.

Figure 8
Alternative methods of adjusting for inflation, by comparison

Floods UK
29 October–10 November 2000

	GBPm	Exchange rate USD/GBP	USDm	US inflation USDm
Original loss	700.0	1.4939	1 045.7	1 045.7
Level of consumer price index 2000	93.1			172.2
Level of consumer price index 2010	114.4			218.1
Inflation factor	1.230			1.266
Adjusted for inflation to 2010	860.8	1.5657	1 347.8	1 324.2
Comparison			102%	100%

Source: Swiss Re Economic Research & Consulting

Changes to loss amounts of previously published events are updated in the *sigma* database.

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 when an event appears in the table of the 40 most costly insured losses or the 40 disasters with the most fatalities since 1970 (See Tables 8 and 9 on pages 32–33).

Information on individual events is not available.

In the chronological lists of all man-made disasters, the insured losses are not shown for data protection reasons. However, the total of these insured losses is included in the list of major losses in 2010 according to loss category. *sigma* does not provide further information on individual insured losses or about updates made to published data.

Newspapers, direct insurance and reinsurance periodicals, specialist publications and other reports are used to compile this study.

Sources
Information is collected from newspapers, direct insurance and reinsurance periodicals, specialist publications (in printed or electronic form) and reports from insurers and reinsurers.[11] 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 in the impressum).

Table 10
Exchange rates used when converting total damage and/or insured losses

Exchange rate used,[12] national currency per USD

Country	Currency	Exchange rate, end 2010
Australia	AUD	0.9756
Bosnia	BAM	1.4700
Brazil	BRL	1.6600
Canada	CAD	0.9937
China, PRC	CNY	6.5898
Colombia	COP	1920.0000
Denmark	DKK	5.5549
Egypt	EGP	5.8050
Europe	EUR	0.7454
Hungary	HUF	207.4840
Indonesia	IDR	9010.0000
Israel	ILS	3.5416
India	INR	44.7150
Kazakhstan	KZT	147.3700
Mexico	MXN	12.3340
New Zealand	NZD	1.2801
Oman	OMR	0.3850
Peru	PEN	2.8066
Pakistan	PKR	85.6450
Russia	RUB	30.5270
South Korea	KRW	1134.9000
Thailand	THB	30.1450
Tadjikistan	TJS	4.4031
Taiwan, ROC	TWD	29.1566
United Kingdom	GPB	0.6387
USA	USD	1.00
Vietnam	VND	19497.5000
Serbia	RSD	79.0400

Source: Swiss Re Economic Research & Consulting

[11] Natural catastrophes in the US: 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 printed or used for any purpose, including use as a component in any financial instruments, without the express consent of ISO.
[12] The losses for 2010 were converted to USD using these exchange rates. No losses in any other currencies were reported.

Recent *sigma* publications

2011	No 1	Natural catastrophes and man-made disasters in 2010: a year of devastating and costly events
2010	No 1	Natural catastrophes and man-made disasters in 2009: catastrophes claim fewer victims, insured losses fall
	No 2	World insurance in 2009: premiums dipped, but industry capital improved
	No 3	Regulatory issues in insurance
	No 4	The impact of inflation on insurers
	No 5	Insurance investment in a challenging global environment
	No 6	Microinsurance – risk protection for 4 billion people
2009	No 1	Scenario analysis in insurance
	No 2	Natural catastrophes and man-made disasters in 2008: North America and Asia suffer heavy losses
	No 3	World insurance in 2008: life premiums fall in the industrialised countries – strong growth in the emerging economies
	No 4	The role of indices in transferring insurance risks to the capital markets
	No 5	Commercial liability: a challenge for businesses and their insurers
2008	No 1	Natural catastrophes and man-made disasters in 2007: high losses in Europe
	No 2	Non-life claims reserving: improving on a strategic challenge
	No 3	World insurance in 2007: emerging markets leading the way
	No 4	Innovative ways of financing retirement
	No 5	Insurance in the emerging markets: overview and prospects for Islamic insurance
2007	No 1	Insurance in emerging markets: sound development; greenfield for agricultural insurance
	No 2	Natural catastrophes and man-made disasters in 2006: low insured losses
	No 3	Annuities: a private solution to longevity risk
	No 4	World insurance in 2006: premiums came back to "life"
	No 5	Bancassurance: emerging trends, opportunities and challenges
	No 6	To your health: diagnosing the state of healthcare and the global private medical insurance industry
2006	No 1	Getting together: globals take the lead in life insurance M&A
	No 2	Natural catastrophes and man-made disasters 2005: high earthquake casualties, new dimension in windstorm losses
	No 3	Measuring underwriting profitability of the non-life insurance industry
	No 4	Solvency II: an integrated risk approach for European insurers
	No 5	World insurance in 2005: moderate premium growth, attractive profitability
	No 6	Credit and surety: solidifying commitments
	No 7	Securitization – new opportunities for insurers and investors
2005	No 1	Natural catastrophes and man-made disasters in 2004: more than 300 000 fatalities, record insured losses
	No 2	World insurance 2004: growing premiums and stronger balance sheets
	No 3	Insurers' cost of capital and economic value creation: principles and practical implications
	No 4	Innovating to insure the uninsurable
	No 5	Insurance in emerging markets: focus on liability developments

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