



sigma

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Natural catastrophes and man-made disasters in 2011: historic losses surface from record earthquakes and floods

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Published by:
Swiss Reinsurance Company Ltd
Economic Research & Consulting
P.O. Box
8022 Zurich
Switzerland

Telephone +41 43 285 2551
Fax +41 43 282 0075
E-mail: sigma@swissre.com

New York Office:
55 East 52nd Street
41st Floor
New York, NY 10055

Telephone +1 212 317 5400
Fax +1 212 317 5455

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

Telephone + 852 25 82 5703
Fax + 852 25 11 6603

Authors:
Lucia Bevere
Telephone +41 43 285 9279

Rudolf Enz
Telephone +41 43 285 2239

Jens Mehlhorn
("Submerged hot spots" chapter)
Telephone +41 43 285 4304

Toru Tamura
("Integrating tsunami risk in catastrophe
modelling" box)
Telephone +81 3 3272 4689

Editor:
Jessica Villat Córdova
Telephone +41 43 285 5189

Managing editor:
Dr Kurt Karl,
Head of Economic Research & Consulting,
is responsible for the *sigma* series.

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Executive summary

Catastrophes claimed approximately 35 000 victims and cost insurers approximately USD 116bn in 2011

Catastrophes claimed approximately 35 000 lives in 2011. Insured losses more than doubled since 2010 to USD 116bn.

Natural catastrophes and man-made disasters claimed about 35 000 lives and resulted in economic losses of over USD 370bn in 2011. The cost to insurers was approximately USD 116bn; insured losses were the second highest on record since *sigma* began collecting natural catastrophe data in 1970.

Over 300 catastrophic events were recorded in 2011.

In 2011, 325 catastrophic events occurred, 175 of which were natural catastrophes and 150 were man-made disasters.

More lives were lost in the Japan earthquake than in any other event in 2011.

Of the approximately 35 000 people who perished in catastrophic events in 2011, over 19 000 lives were lost in the major earthquake that struck northeastern Japan in March. Tropical Storm Washi in the Philippines, and floods in Brazil and Thailand also claimed the lives of more than 3 000 people combined.

Catastrophes cost society over USD 370bn in 2011.

In terms of economic losses, natural catastrophes and man-made disasters cost society over USD 370bn in 2011, the highest amount ever recorded, versus USD 226bn in 2010. The historic earthquake in Japan alone caused at least USD 210bn in damage. As a result, Asia was the hardest hit region, with economic losses of over USD 260bn.

Insured losses were USD 116bn overall. Natural catastrophes cost insurers close to USD 110bn and man-made disasters accounted for the remaining USD 6bn.

Natural catastrophes cost the global insurance industry roughly USD 110bn in 2011, while man-made disasters triggered additional claims of about USD 6bn. By way of comparison, insured losses overall amounted to USD 48bn in 2010. Most of the losses arose from the earthquakes in Japan and New Zealand, followed by the flood in Thailand, and from a record-breaking tornado season in the US. Hurricane losses remained moderate in the US, keeping overall insured losses below the 2005 figure. Insured losses were highest in Asia, where they exceeded USD 49bn.

A USD 254bn gap between insured and non-insured economic losses points to a widespread lack of insurance.

The over USD 254bn gap between the total economic loss and the insured loss in 2011 suggests that a lack of insurance cover continues to leave many individuals, companies, and governments financially vulnerable to catastrophic events. The upward trend in total economic losses from natural catastrophes and man-made disasters over the past two decades, and the highest ever catastrophe-related economic losses recorded in 2011, indicate the increasing importance of maintaining adequate coverage.

The flood in Thailand triggered an unprecedented USD 12bn in insured losses.

A special chapter on flooding in this edition of *sigma* reveals that flood loss potential can be just as high as that of earthquakes and storms. Owing to Thailand's growing role in the global manufacturing supply chain, the flood there triggered an estimated USD 12bn in insured claims, the highest freshwater flood loss ever recorded,¹ mainly for damage to commercial properties and business interruption. A combination of factors – large affected areas, high concentration of property values, high insurance penetration, and insufficient pre-disaster risk preparedness – multiplied the loss.

Other parts of the globe could be exposed to similar potential losses. More extensive risk mitigation measures and a better analysis of manufacturing supply-chains are needed going forward.

The event in Thailand is a painful reminder that, given the high risk of flooding in many countries, other parts of the globe could be prone to similarly high losses. On the one hand, businesses, governments, and societies at large should increasingly consider more stringent natural catastrophe and man-made disaster risk prevention and mitigation measures, especially in emerging countries of growing significance to the interconnected global economy. On the other hand, the insurance industry would do well to further examine the implications of global supply-chains for a more holistic risk assessment going forward.

¹ In this *sigma* ranking, only losses from events where floods are the primary peril are counted. Losses from secondary perils, such as tsunamis following earthquakes, or floods due to storms, are counted with the respective primary peril.

Overview of catastrophes in 2011

More than 300 catastrophic events occurred in 2011

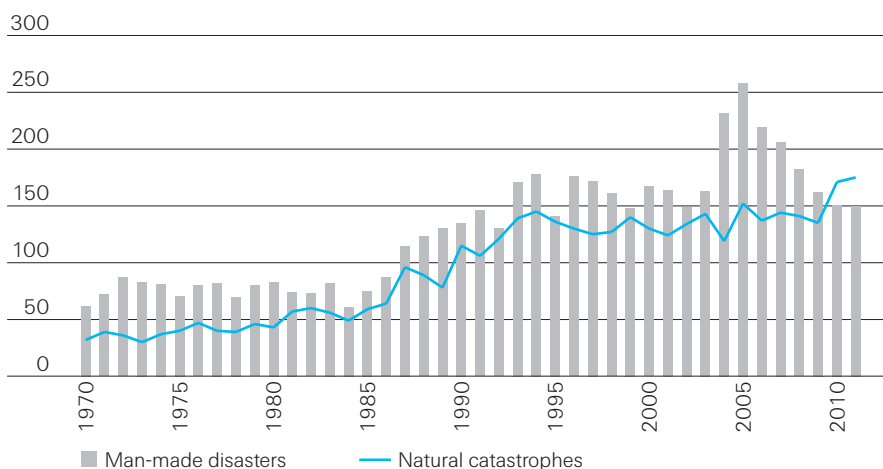
Event selection criteria, 2011

		Threshold in USDm
Insured losses (claims):	Maritime disasters	18.0
	Aviation	35.9
	Other losses	44.6
or Total economic losses:		89.2
or Casualties:	Lost or missing lives	20
	Injured	50
	Homeless	2000

The number of catastrophic events rose slightly in 2011. Out of the 325 catastrophic events that occurred in 2011, 175 were natural catastrophes, while the remaining 150 events were man-made disasters (see Figure 1). In 2011, for the second consecutive year, the number of man-made disasters was lower than the number of natural catastrophes. Since 2005, man-made disasters have been declining.

An event is included in the *sigma* statistics if insured claims, total economic losses, or the number of casualties exceed a certain threshold (refer to the event selection criteria for 2011 in the margin). Each year, the claims threshold is adjusted for inflation. Thresholds with respect to casualties – ie the number of lives lost or missing, or the number of people severely injured or made homeless due to an event – make it possible to tabulate catastrophic events in regions where insurance penetration is low.

Figure 1
Number of events 1970–2011



Source: Swiss Re Economic Research & Consulting

Approximately 35 000 people around the world were victims of catastrophes

The Japan earthquake and tsunami accounted for most of the almost 35 000 lives lost globally due to natural catastrophes and man-made disasters in 2011.

Natural catastrophes claimed the greatest number of lives, and the count is still increasing as the tally of victims from the famine in Africa rolls in.

Man-made disasters claimed approximately 6 000 victims in 2011.

The Arab Spring caused a high loss of lives.

Maritime and aviation disasters accounted for approximately 2 000 and 500 victims, respectively.

2011 ranks as the 16th highest year in terms of victims since 1970, when *sigma* began collecting catastrophe data. Almost 35 000 people lost their lives due to natural catastrophes and man-made disasters in 2011. While overall this is more than double the lives lost in 2009, it is considerably less than in 2010, the year that the Haiti earthquake claimed 220 000 lives. The deadliest event in 2011 was yet another earthquake: the Japan seism and tsunami in March claimed more than 19 000 lives. However, thanks to Japan's remarkable achievements in stringent building code enforcement and risk preparedness, fewer lives were lost in Japan's combined earthquake and tsunami compared to the significantly lower magnitude earthquake only event in Haiti.

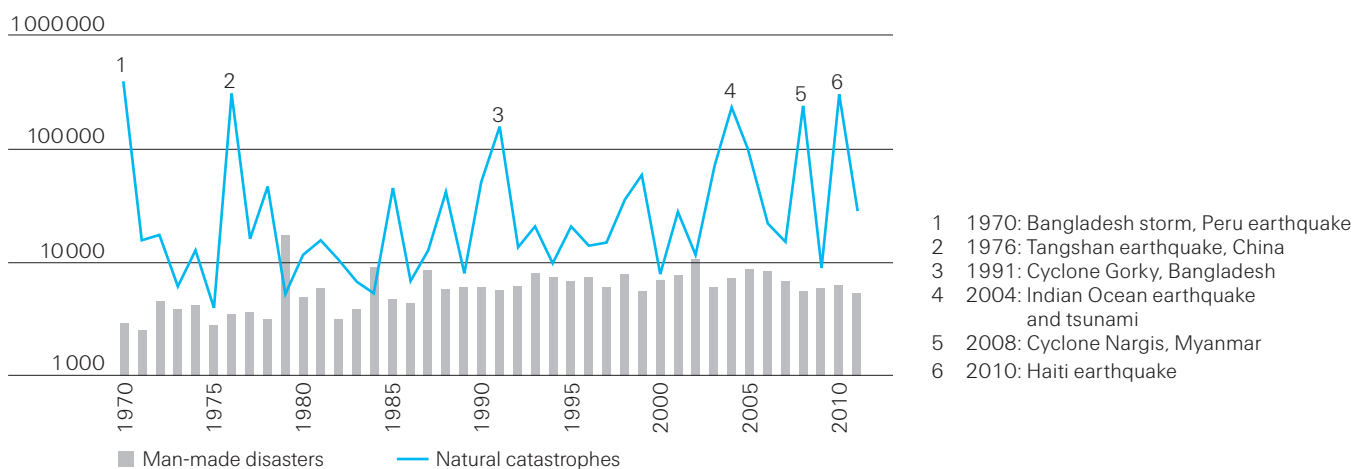
Globally, in 2011, around 29 000 people were victims of natural catastrophes, while approximately 6 000 people were victims of man-made disasters (see Figure 2). After Japan, Tropical Storm Washi in the Philippines and flooding in Thailand and Brazil claimed a further 3 164 lives. The October earthquake in Turkey also accounted for 644 victims. The global tally does not yet include the full consequences of the famine due to severe drought in the Horn of Africa. Although its human and economic impact has yet to be fully assessed, the famine is believed to be the largest human catastrophe of the year.

Approximately 6 000 people were victims of man-made disasters, slightly fewer than in 2010.

The man-made disasters that resulted in the most victims in 2011 were the events in Egypt at the beginning of the year. Included in the figures of this *sigma* are the anti-government demonstrations that took place in Egypt, where approximately 846 lives were lost. Because they are classified as civil war or war-like events², however, this *sigma* does not include the overall human tally of many of the rest of the 2011 events known as "Arab Spring" that led to the loss of many more lives.

Other man-made disasters that resulted in a high number of victims in 2011 include the sinking of an overcrowded ferry off the coast of Tanzania (220 victims), and of boats carrying illegal immigrants or refugees. Maritime and aviation disasters accounted for approximately 2 000 and 500 victims, respectively. Terrorism attacks, including the Norway twin terrorist attacks in July, led to the loss of about 500 more lives.

Figure 2
Number of victims 1970–2011



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

Source: Swiss Re Economic Research & Consulting

² See Term and selection criteria on page 38.

At USD 370bn, primarily due to earthquake events, 2011 reported the highest ever economic losses in history.

Economic losses for man-made disasters in 2011 reached almost USD 8bn.

Total economic losses estimated at USD 370bn

Natural catastrophes and man-made disasters cost society over USD 370bn in 2011. These are the highest catastrophe-related economic losses ever recorded in history. Most of the losses were due to the devastating earthquake and ensuing tsunami that struck northeastern Japan in March. Japan's earthquake was the largest measured – in terms of magnitude – to have ever hit the country and the fourth-strongest ever worldwide. Total direct economic losses incurred by the event are estimated at USD 210bn. The February seism in New Zealand caused an estimated USD 15bn in further damages, adding to global earthquake-related economic losses, which have soared to over USD 230bn, the highest ever recorded in history. The year 2011 saw not only the most damaging earthquake in history, but also, in Thailand, some of the worst flooding in decades. The flood caused massive damage to the country's manufacturing base and severely interrupted international supply chains.

Man-made disasters are estimated to have caused almost USD 8bn in damages. Accidents on drilling platforms, other oil and gas facilities, and to a power station in Cyprus were among the most damaging man-made disasters of 2011.

Table1
2011 economic losses by region
and as a % of GDP

Region	Economic loss	
	in USD m	as a % of GDP
North America	63 460	0.38%
Latin America & Caribbean	5 558	0.10%
Europe	8 712	0.04%
Africa	1 560	0.08%
Asia	260 149	2.09%
Oceania	27 814	1.80%
Seas/Space	3 633	–
World total	370 887	0.31%

Source: Swiss Re Economic Research & Consulting

USD 116bn in insured losses make 2011 the second most expensive year ever

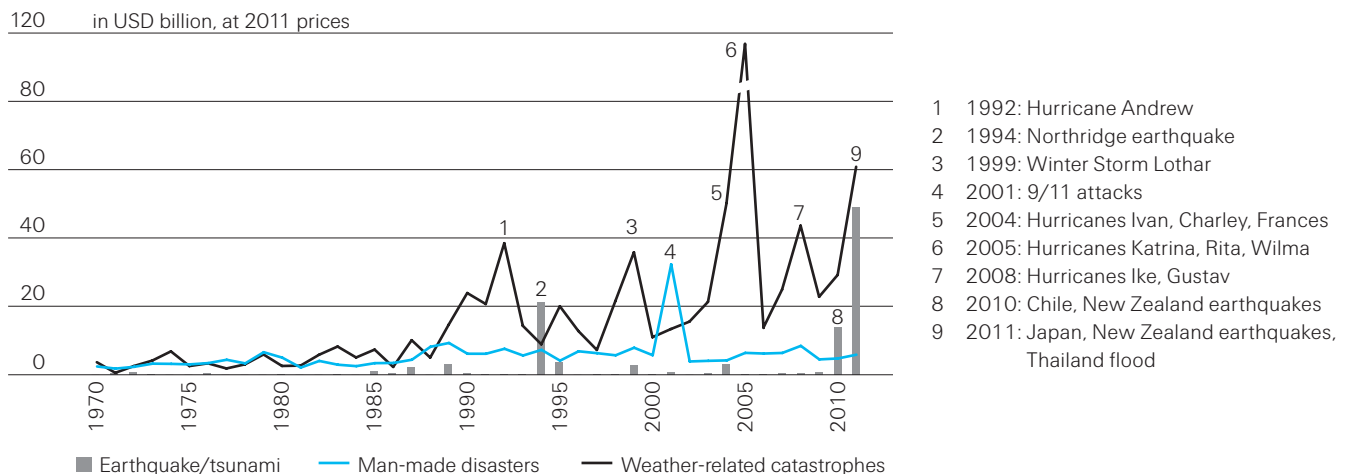
Insured losses from catastrophic events amounted to about USD 116bn, making 2011 the second most expensive year in history for the insurance industry.

Of the USD 370bn in total damages caused by catastrophic events in 2011, almost one-third, or USD 116bn (see Figure 3), was covered by insurance. This makes 2011 the second most expensive year for the insurance industry according to the *sigma* records, second only to 2005, when Hurricanes Katrina, Wilma, and Rita alone caused claims of over USD 100bn. Even so, given the extremely high economic losses to be borne and the low insurance penetration rate in earthquake-prone places like Japan, much of the weight of 2011's economic losses will be shouldered by individuals, private companies, or state institutions.

Natural catastrophes losses amounted to USD 110bn. Primarily earthquake, but also weather-related losses, caused costs to soar in 2011.

At approximately USD 110bn, natural catastrophe losses accounted for most of the insured losses. Earthquake-insured losses, which make up USD 49bn of total natural catastrophe losses, make 2011 the most expensive calendar year in the earthquake category. Weather-related losses were also heavy, due to the massive flooding in Thailand in the second half of the year – the most expensive flooding on *sigma* records¹ – and to record-breaking tornado events in the US. However, moderate hurricane losses kept weather-related losses, and therefore the overall cost of disasters, lower than in 2005. Man-made disasters amounted to approximately USD 6bn of insured losses.

Figure 3
Insured catastrophe losses 1970–2011



Source: Swiss Re Economic Research & Consulting

At least 15 events triggered losses in excess of USD 1bn; the earthquake in Japan was the most expensive at USD 35bn.

At least fifteen disasters triggered insured losses of USD 1bn or more each in 2011 (see Table 5). As in 2010, earthquake events topped the charts again in 2011. With insurance losses of USD 35bn, the Japan earthquake was the most expensive event, followed by the New Zealand earthquake, which generated over USD 12bn in insured losses. These two events alone in 2011 marked the highest ever recorded earthquake losses in history for a single year. The flood in Thailand tied with the earthquake in New Zealand as the 2nd highest loss of the year. In addition, the flood in Thailand prompted the insurance industry's highest ever recorded flood loss.

Insured losses due to man-made disasters amounted to about USD 6bn.

Of the additional man-made insured losses of about USD 6bn in 2011, the biggest were the January fire at an oil sand plant in Alberta, Canada, which houses the largest sand oil reserve in the world, the damage to a floating vessel in the North Sea in February and the July explosion of the Vasilikos Power Station in Cyprus, which caused a massive power shortage on the island. Aviation disaster claims were considerably lower than in 2010, but a series of satellite losses and launch failures cost another USD 0.6bn in claims. Although the total damage from space disasters was higher, many of the projects were government-related and uninsured.

Insured and economic losses were highest in Asia and North America, respectively.

Table 2
Catastrophes in 2011, by region

Regional overview

As a consequence of the historical earthquake in Japan and the unprecedented flood in Thailand, both insured and economic losses were highest in Asia, where they respectively reached an estimated USD 49bn and USD 260bn.

Region	Number	Victims	in %	Insured loss		Total loss	
				in USD m	in %	in USD m	in %
North America	50	768	2.2%	39 756	34.3%	63 460	
Latin America & Caribbean	36	1 880	5.4%	631	0.5%	5 558	
Europe	34	1 158	3.3%	4 340	3.7%	8 712	
Africa	51	2 894	8.3%	323	0.3%	1 560	
Asia	104	26 189	75.4%	49 249	42.5%	260 149	
Oceania	10	233	0.7%	19 106	16.5%	27 814	
Seas/Space	40	1 607	4.6%	2 409	2.1%	3 633	
World total	325	34 729	100.0%	115 814	100.0%	370 887	

Source: Swiss Re Economic Research & Consulting

Asia (losses in USDm) 26 189
Victims 260 149
Total losses 260 149
Insured losses 49 249

Of all the regions, Asia suffered the greatest loss of human life.

Unprecedented in its scale and nature, the flood in Thailand was the second most expensive event in Asia in 2011, and the most expensive flood event on *sigma* records.

Pakistan and China were also hit by deadly and damaging floods.

Tropical Storm Washi was the second deadliest event in the region after the Japan earthquake.

Asia

Asia was the hardest hit region in 2011, in terms of impact on human lives, total economic losses, and insured losses. Within Asia, the Japan earthquake led to the highest number of victims and the highest financial losses. The aggregate total cost of the event is currently estimated at USD 210bn and is likely to increase once damage to nuclear facilities, and the costs of business interruption and population relocation are fully accounted for. Due to the sheer scale of the event, Japan also tallied the highest insured losses despite low insurance penetration, particularly for commercial properties.³ Accordingly, although substantial, insured claims were only a fraction of the total cost of the event.

Asia also suffered significant weather-related losses. In Thailand, intense rainfall triggered the worst flood in fifty years, causing the loss of 813 lives. More than 4 million homes, businesses and industrial facilities were flooded, resulting in massive damage and disruption to daily lives and manufacturing operations. Thailand is an important link in the global manufacturing industry supply chain and one of the world's largest producers of hard drives. Consequently, the flood affected a number of international companies that either had local operations or were highly dependent on Thailand as a manufacturing link for their operations, triggering unprecedented insured claims from business interruption. Currently estimated at USD 12bn in insured losses, the Thailand flood is the most expensive flood event on *sigma* records. Most of the loss will be borne by the international re/insurance markets.

Further major flood events in Pakistan and China in summer and autumn led to the loss of approximately 900 lives and to economic damages of over USD 9bn.

In September 2011, Japan was struck again, this time by Typhoon Roke, which claimed 13 lives and triggered additional claims of USD 1.2bn. Typhoon Muifa, which also hit the Philippines and China, had already added a further USD 850m in economic losses, mainly in China. Late in the year, the deadliest event following the Japanese seism occurred: 1 449 people either lost their lives or went missing and over 400 000 people lost their homes to heavy rains and massive flooding as a result of the severe Tropical Storm Washi that hit the Philippines. The full extent of the storm damage has yet to be assessed.

³ See "Lessons from recent major earthquakes", Swiss Re Economic Research & Consulting, January 2012.

The new wave: integrating tsunami risk in catastrophe modelling

On 11 March 2011, a magnitude 9.0 earthquake struck northeastern Japan, followed by a devastating tsunami. Remarkably, the bulk of economic losses were caused by the effects of the tsunami rather than by ground shaking. The tsunami affected a 2 000 kilometre stretch of the Pacific Coast, and reached more than 5 kilometres inland. It is estimated that almost 535 square kilometres of land were inundated with a wave that reached a height of up to more than 40 metres.

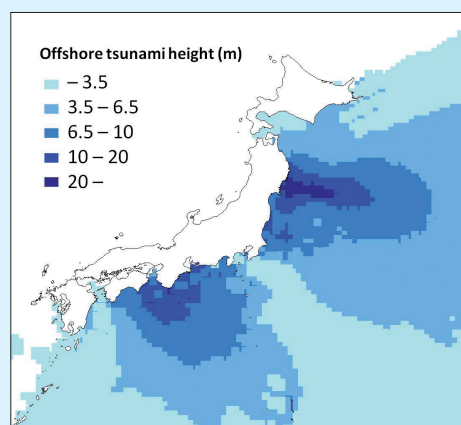
The Japan example serves as a reminder that secondary loss elements, such as tsunamis, can be a crucial loss driver in an earthquake event. Despite the lingering memory of the colossal tsunami damage caused by the Sumatra earthquake in 2004, tsunami risk had so far been a largely underestimated peril in the insurance industry. To measure a natural hazard, the insurance industry usually uses models that simulate huge numbers of probable catastrophe events, such as earthquakes. Even though tsunami models are widely used in scientific and engineering communities, they have until now never been explicitly integrated by the insurance industry in its earthquake models.

In response to this shortcoming in current catastrophe modelling, Swiss Re began refining its model to measure tsunami probability. In 2011, a team of Swiss Re experts was able to simulate tsunami wave propagation in the open ocean and measure the resulting inundation once tsunami waves hit the coast. Offshore tsunamis were calculated using different combinations of pre-computed model runs. Meanwhile, for onshore tsunami inundation, the energy conserved between an offshore tsunami and the frictional energy lost during inundation was taken into account. Using this methodology, the impact of the 11 March event in Japan could be very closely replicated.

One output from Swiss Re's tsunami model is a hazard map showing the offshore tsunami height that can be expected once in one thousand years. Combined with Swiss Re's original earthquake model, tsunami-induced damage is integrated with damages from ground shaking and fire following an earthquake. The resulting output correctly reconfirms that significant tsunami risk exists on the northeastern coast of Japan where the latest disaster occurred. It also warns of significant tsunami risk along the southwestern coast of Japan, linked with gigantic earthquakes along the Tokai, Tonankai, and Nankai troughs.

Swiss Re's tsunami model is expected to contribute significantly to the industry's understanding and assessment of earthquake risks. Swiss Re's natural catastrophe experts and underwriters are currently working to extend the Swiss Re model globally to forecast tsunami risk in Chile, Peru, New Zealand, Indonesia, and other tsunami-prone areas.

Figure 4:
**Japan tsunami hazard map over a
1 000-year period**



Source: Swiss Re Cat Perils

North America (losses in USDm)

Victims	768
Total losses	63 460
Insured losses	39 756

The US suffered a deadly and costly tornado season.

It also had its first hurricane landfall since 2008, causing USD 5.3bn in insured losses.

Sophisticated risk management helped contain flood-related insured property losses.

In terms of insured losses, the Slave Lake wildfires were the second most expensive disaster in Canadian history.

North America

North America was the second most affected region in 2011, both in terms of insured losses (approximately USD 40bn) and economic losses (over USD 63bn). Losses were primarily caused by harsh spring weather and by Hurricane Irene.

For the second consecutive year, the US suffered large non-hurricane losses. Two massive tornado events hit several Southern and Midwestern states in April and May, triggering more than USD 14bn in insured losses and costing more than 500 lives. The two tornadoes events, respectively, are the 10th and 11th most expensive US natural catastrophes on *sigma* records. By comparison, the two most expensive US weather events in 2010 triggered only about USD 5bn in insured claims. In 2011, nine natural disasters in the US triggered insured claims of USD 1bn or more, compared to only three such natural disasters in 2010. The spring tornado outbreaks were also among the deadliest ever recorded.

Hurricane Irene was the first hurricane to make landfall in the US since Hurricane Ike in 2008. As the thirteenth most expensive US natural catastrophe on *sigma* records, Hurricane Irene caused damage in the Caribbean, and then weakened as it moved up along the East Coast, triggering an estimated USD 5.3bn in insured losses, mainly in the US, but also minor ones in Canada. The hurricane season produced 19 named storms, seven of which became hurricanes, and three of which classified as major. Hurricane losses were higher than in 2010, but moderate compared to the last decade.

2011 also saw a massive rise in the levels of the Mississippi and Missouri rivers in spring and summer. The damage from the resulting flooding was contained thanks to a sophisticated water level management system that prevented the flooding of major cities by diverting the water to farmland. However, the diversion brought high agricultural losses. A rare M_w 5.8 earthquake that hit Virginia on 23 August was the most powerful ever recorded in the state. Thankfully, the seism caused only minor damage.

In May, wildfires ravaged parts of the town of Slave Lake, Canada, triggering insured claims of USD 0.7bn. The wildfires led to the second most expensive insured catastrophe loss in Canadian history, after the ice storm that hit Quebec and Ontario in 1998.⁴ Flooding of the Assiniboine River from snowmelt and heavy rains also caused damage to farmland in the Canadian Prairies.

⁴ The 1998 ice storm cost the industry USD 1.7bn (at 2011 prices).

Oceania (losses in USDm)	
Victims	233
Total losses	27 814
Insured losses	19 106

The New Zealand earthquake in February 2011, the country's most expensive disaster, was almost completely covered by the insurance industry thanks to New Zealand's high insurance penetration rate.

Floods in Australia resulted in the country's largest ever insured loss, and a cyclone and a hailstorm also left their mark.

Europe (losses in USDm)	
Victims	1 158
Total losses	8 712
Insured losses	4 340

Turkey experienced its most powerful earthquake since 1999.

Europe's most expensive event was a cloudburst that unleashed torrential rain on Copenhagen.

Oceania

Natural catastrophes and man-made disasters in 2011 caused economic losses of about USD 28bn in Oceania. The cost to insurers was over USD 19bn.

With claims of over USD 12bn, the earthquake that struck Christchurch, New Zealand, in February accounted for most of the 2011 losses in Oceania and claimed 181 human lives. The earthquake, the second to hit the Christchurch area in six months, was the country's most expensive disaster ever. Even though it was technically an aftershock of the September 2010 event, its impact was far more devastating than the earlier event, due to its proximity to the city and to the ground surface. Also, a phenomenon called soil liquefaction⁵ significantly multiplied the property damage caused by the event, making the 2011 earthquake the second most expensive event of the year together with the Thailand flood and the third most expensive earthquake on *sigma* records. Thanks to the high risk awareness and high earthquake penetration in New Zealand, the insurance industry covered most of the USD 15bn in total damages. A series of aftershocks, however, added to the devastation, causing an additional USD 3bn in damage and triggering USD 2bn in insured losses.

At the end of 2010 and in January 2011, northeastern Australia was hit by devastating floods that caused heavy losses. The January floods were Australia's worst natural disaster on *sigma* records, scoring highest in both total damage – Queensland's coal mining industry was heavily impaired – and insured claims of over USD 2bn. In February, Tropical Cyclone Yasi triggered an additional USD 1.3bn in losses. A hailstorm also struck Melbourne on Christmas Day, causing an estimated USD 0.6bn in insured losses.

Europe

Natural catastrophes and man-made disasters in 2011 caused economic losses of about USD 9bn in Europe. The cost to insurers was over USD 4bn.

A magnitude 7.2 earthquake in Van, Turkey, on 23 October caused the loss of 644 lives and damages of USD 1.5bn. The earthquake was the most powerful to have hit Turkey since the 1999 İzmit seism. In May, Spain also experienced an earthquake that led to the loss of 9 lives and caused insured losses of USD 100m.

The most expensive natural disaster in Europe for the insurance industry was, however, a cloudburst that drowned Copenhagen in torrential rain in July. Insured losses from the sudden flooding of several commercial facilities in the greater Copenhagen area and in the city itself are estimated at USD 0.8bn. The cloudburst was the most expensive disaster claim in Denmark since Winter Storm Anatol in 1999, and surprised the industry with the damage it caused in the space of just a couple of hours.

⁵ Soil liquefaction is the transformation of soil from a solid to a liquefied state as a consequence of the change in pressure when ground settles at a different level following ground shaking.

The UK was impacted by hurricane-force winds, and winter storms caused damage in Northern Europe, while low pressure system "Rolf" in the Mediterranean brought tropical storm conditions.

Winter storms caused additional damage to various countries in Northern Europe. Winter Storms Joachim and Dagmar resulted in insured losses of close to USD 0.7bn in Germany, Scandinavia, France, and Switzerland. Windstorm Friedhelm battered the UK with hurricane-force winds, destroying vehicles, damaging offshore facilities, blocking roads, and leading to USD 0.4bn in estimated losses. Hurricane Katia developed over the Cape Verde Islands and made landfall in Scotland, giving rise to USD 0.2bn in damage. Meanwhile, a slow-moving extra-tropical area of low pressure (named "Rolf") caused torrential rains and widespread flooding in southern France and northern Italy, claiming the lives of eleven people and leading to insured losses of USD 0.6bn. Rolf was the first low pressure system over the Mediterranean to be categorised as a tropical storm.

Riots and terrorist attacks in the UK and Norway highlighted new emerging risks.

Summer riots in London and the twin terrorist attacks in the Oslo city centre and at a youth camp claimed 82 victims, most of them teenagers. These events highlight increasing societal risks, and the Norway case also underlines the vulnerability of countries that are traditionally perceived as being exposed to low terrorism risk.

Latin America and the Caribbean
(losses in USDm)

Victims	1 880
Total losses	5 558
Insured losses	631

Latin America and the Caribbean

At the beginning of the year, heavy rainfall caused landslides and flooding in Brazil. These flood events led to approximately half of the 1 880 lives lost in Latin America and the Caribbean due to natural catastrophes in 2011. The economic losses from the Brazil floods are estimated at less than USD 1.0bn. Further flooding in Colombia claimed the lives of over 300 people, and caused over USD 2bn in damage.

Floods and hurricanes were the main natural catastrophes that hit Latin America in 2011.

Aside from flooding, Latin America was also impacted by hurricane-force winds. Hurricane Irene, Tropical Depression 12-E, Tropical Storm Arlene, and Hurricane Jova all caused damage in the Caribbean, Mexico, and Central America. Approximately 150 people perished and economic losses totalled USD 0.6bn. Combined insured losses were low, at USD 0.1bn.

A cold wave in Mexico caused high insured agricultural losses.

In addition, a cold wave hit northern Mexico at the beginning of the year, causing the loss of over 600 000 hectares of corn crops and triggering insured claims of at least USD 0.3bn – though the total financial losses are believed to be much higher. Sinaloa, the affected area, is one of Mexico's principal production areas of white corn, the variety of maize used to make tortillas, Mexico's staple food.

An arson attack gave rise to the most victims.

The man-made disaster with the highest number of victims (52) was an arson attack in a casino in Mexico.

Africa (losses in USDm)	
Victims	2 894
Total losses	1 560
Insured losses	323

Floods in Algeria, South Africa, and Mozambique were the most damaging events in terms of economic losses.

The famine that hit the Horn of Africa is believed to be the biggest human catastrophe of 2011.

Africa

The number of victims due to natural catastrophes and man-made disasters in Africa in 2011 was approximately 2 900.⁶

Anti-government demonstrations at the beginning of the year in Egypt caused the most victims. Bomb explosions in Nigeria, Somalia, and Egypt caused the further loss of over 220 lives.

Most of Africa's financial losses came from the floods in Algeria in October, with an estimated USD 0.8bn in economic losses. Floods in South Africa and Mozambique caused a further USD 0.4bn in damage. Most of the insured losses were due to an explosion at a power station and an aviation accident in Cairo.

The tally for the region does not yet include the full consequences of the worst drought in sixty years in the Horn of Africa. Following consecutive seasons of poor rainfall, the drought caused the loss of cattle and vast expanses of farmland, resulting in a severe food shortage and the displacement of millions of people. A state of famine was declared by the United Nations in six provinces of Somalia, triggering massive international aid operations. In the second half of 2011, improved rainfall led to better pasture conditions and a fuller harvest, reducing the dependency of the affected population on humanitarian assistance. On 3 February 2012, the United Nations was finally able to declare an end to the state of famine. However, a full assessment of the loss of farmland, and especially the loss of lives, has yet to be carried out.

⁶ This *sigma* report does not include the overall humanitarian casualties of the 2011 Arab Spring events.

Submerged hot spots

Thailand is a flood-prone country, but any flooding that occurs is normally contained in the North.

The 2011 monsoon season brought the highest rainfall rates to Thailand in over 50 years, causing major flooding in the central plains that are home to Bangkok and much of Thailand's industry.

What surfaced from the 2011 flood in Thailand?

Thailand is a country prone to flooding. Northern and Central Thailand have a monsoon rainfall regime that is characterized by high total rainfall with dry winters and wet summer months. Yearly precipitation amounts to about 1 200 millimetres, falling mostly from May to October with a peak in August and September. During the peak season, rivers typically carry high water levels, and when flooding happens, it is usually contained in the North of the country. However, in extreme rainfall conditions, flooding can spread down Thailand's central water artery, the Chao Phraya River, into the central plains that are home to the country's capital city, Bangkok. More than 40 percent of the Thai population lives in the downstream area of the Chao Phraya River basin, and the area is also home to most of Thailand's manufacturing industry.

Causes of the flooding

In 2011, the Asian monsoon season had an early start, with record-high rainfall already in March and April. By May, the early onset of heavy rain had saturated soils to the maximum and filled reservoirs to their brims. Rivers in the Chao Phraya basin began rising to high levels. High precipitation rates then continued throughout the entire rainy season. By the end of October, Central and Northern Thailand had respectively received 300 and 500 millimetres more rainfall than normal. The Chao Phraya River and its tributaries swelled until they finally burst, inundating an area of about 30 000 km² and affecting 61 of Thailand's 77 provinces. As Figure 5 shows, the flooded area was roughly equivalent to the size of Switzerland. The 2011 rainfall rates are the highest on record in over 50 years.

Figure 5:
The extent of the Thailand flood (in blue)



Source: Swiss Re Cat Perils, ©GfK GeoMarketing Map Edition World

A strong La Niña may have played a big role in the early onset of the monsoon season and the heavy rainfall.

The flooding led to the loss of lives, population displacement, and damage to Heritage sites and the economy.

Insurance penetration for residential and small commercial properties in Thailand is very low.

The water in Thailand's dams is normally retained for irrigation purposes, so it was not released immediately when the strength of the monsoon rains took the country by surprise.

Many international companies have subsidiaries or manufacturing plants in Thailand's Chao Phraya River Basin.

These industrial estates were not built to withstand the degree of flooding that occurred in 2011.

La Niña may have played a big role in the Thailand flood. El Niño and La Niña are ocean-atmosphere phenomena in the Pacific Region. While El Niño brings drought in South East Asia, La Niña typically brings a period of high precipitation. Around December 2010 and January 2011, a strong La Niña manifested itself and persisted until May 2011, causing an early onset of monsoon rainfall in South East Asia. La Niña also impacted the trajectory of tropical cyclones, bringing tropical depressions to the Thai peninsula and causing further rainfall. On average, only one tropical depression per year is observed in Thailand, but between April and September 2011, no fewer than five remnants of tropical cyclones affected the country.

The human impact and risk mitigation measures

The historic rainfall and consequent flooding in Thailand led to the loss of hundreds of lives, left thousands of people homeless, and impacted the livelihood of many more people. Water inundated and wrecked vast expanses of farmland, damaged World Heritage sites, and forced factories to close for an extended period of time.

Since the floodwater rose slowly, people had time to take some action. Stored items and other moveable goods were moved in time to higher floors, helping to prevent some damage. However, flood insurance penetration for residential homes and small commercial businesses in Thailand is very low, at only about 1%. With overall total damage resulting from the event estimated at USD 30bn, the greatest share of the loss was uninsured.

In the late 1980s and early 1990s, many large dams in Thailand were built in response to chronic drought. The idea was to store the monsoon rainfall in reservoirs for use in the following year until the next monsoon season. Thus, the main priority for water resources management was to efficiently plan and operate the reservoirs to meet irrigation schedules. Since the purpose of the dams was primarily to store water for the dry season, and experienced a general decline in monsoon rainfall, when the 2011 monsoon rains came, the water in the dams was not released. Instead, it was retained for irrigation purposes, exacerbating the unexpected flooding to come. Eventually, storage capacity was exceeded and large amounts of water had to be released in order to ensure dam and population safety.

Flood damage to large commercial properties

In the last decade, many international companies have invested heavily in Thailand, setting up branch offices or building up assembly and manufacturing plants there. After the Japan earthquake in March, several Japanese companies shifted their production to Thailand, increasing their exposure to the Thailand flood. The majority of international operations in Thailand are located in the Chao Phraya River Basin, in industrial estates close to the river.

Although these international industrial estates had structural defences to protect themselves against inundation, they were only designed for protection against average flood conditions. The structures therefore provided inadequate defence against the high water levels in 2011. The estates house car manufacturers, high tech manufacturing, and electronics, which are all especially vulnerable to water damage.

The 2011 Thailand flooding produced the highest insured loss ever for fresh water flooding, at USD 12bn.

Loss expectations, washed away

The size of the insured loss caused by the extensive flooding in Thailand was unprecedented. At USD 12bn, it is the highest insured loss in the history of global fresh water floods (see Table 3).¹

Table 3

The top ten largest insured fresh water flood losses

Date	Country	Insured loss, USD m, at 2011 prices	Insured loss as a % of country's property premiums	Insured loss as a % of country's non-life premiums	Insured loss as % of GDP	Total loss as % of GDP
July–Nov 2011	Thailand	12 000	1 846%	203.5%	3.4%	8.6%
Aug 2002	Germany & Czech Republic	2 886	20%	3.0%	0.1%	0.5%
Jun 2007	United Kingdom	2 697	12%	2.2%	0.1%	0.1%
Aug 2005	Switzerland	2 444	76%	11.7%	0.6%	0.9%
Jan 2011	Australia	2 255	24%	5.9%	0.2%	0.4%
Jul–Aug 1997	Poland & Czech Republic	2 241	213%	42.3%	0.7%	2.3%
Jul 2007	United Kingdom	2 158	9%	1.7%	0.1%	0.1%
Dec 2010	Australia	2 114	27%	5.9%	0.2%	0.4%
Apr 1973	United States	1 873	5%	0.6%	0.03%	0.1%
Jun–Aug 1993	United States	1 600	3%	0.3%	0.02%	0.2%

Notes: 2011 premiums are estimated. Australia's premiums are for 12 months ending in June. Property premiums for Thailand include industrial All-risk premiums. Sources: Swiss Re Economic Research & Consulting, Oxford Economics

One reason for the extraordinary losses is that flood risk was included in all-risk insurance policies.

One reason for the extraordinary losses is that flood insurance has a very high penetration for large commercial properties in Thailand. Flood risk was covered under industrial all-risk insurance policies. However, the premium volume of all-risk insurance in Thailand was only USD 370m in 2011, resulting in a huge loss ratio of over 3 200%.⁷

The Thailand flood is a textbook example of how a natural catastrophe can lead to catastrophic insured losses.

The Thailand flood is a textbook example of how a natural catastrophe event can cause extreme property loss accumulations. All the factors needed to turn a natural event into a catastrophic insured loss event were present. These factors include a large affected area, high intensities, long duration, high concentration of property values, high insurance penetration, high vulnerability of insured goods, and insufficient protection and preparedness. The event was widespread and inundated large areas far beyond main rivers. It lasted from July to November, and many locations were continuously flooded for over two months. Also water depth exceeded three metres in many locations, affecting properties up to the second floor. The average damage degree of affected properties was 50% or more of their insured value, in comparison to an average 15% for other flood-affected regions around the globe.

The insured loss from the Thailand flood is extraordinary, totalling almost 3% of Thailand's GDP.

The Thailand flood loss is extraordinary in many ways. First, it is more than three times the size of any other insured loss of its kind in history. Also, the ratios of the insured loss to country property premiums, non-life premiums, and GDP are larger multiples than for all other recorded flood events up until now. The Thailand flood event cost more than fifteen times the country's property premiums and about twice its total non-life premiums. It is by far the largest insured loss from a flood in terms of percentage of a country's GDP.

⁷ If we include also fire premiums, the loss ratio drops to 1 846% as shown in Table 3.

Swiss Re is identifying flooding hotspots because the Thailand example shows that insured losses for a flood can be just as high as for an earthquake or tropical cyclone.

The insurance industry should watch the growing significance of global supply-chain information to improve risk assessment.

What can the insurance industry learn from the Thailand flooding?

The Thailand event has painfully demonstrated that insured losses from floods can be as high as those from earthquakes or tropical cyclones. Given that floods can happen in almost every country, there may be more hidden flood loss potential than the industry realises. However, hot spots with a large hidden flood loss potential can be proactively determined using detailed flood risk information⁸ and global economic data (see Box on flood loss “hot spots” in emerging markets).

In addition, recent events have highlighted the importance of supply chains when calculating the industry’s risk exposure. Companies’ direct investment in foreign countries is increasing, and with it the exposure to foreign local catastrophe risks. Small and mid-sized countries such as Thailand are growing in importance in the global supply-chain. The flooding has highlighted the insurance industry’s need for a fuller understanding of its exposure to supply chain risk, via more detailed information from clients and aggregation risk management with appropriate limits and premiums.

⁸ In 2011 Swiss Re began developing global river flood hazard zones, based on its patented flood hazard assessment methodology. The detailed flood hazard zones provide consistent global coverage and will be released in spring 2012 in the Swiss Re CatNet[®] information system. The tool will enable underwriters and risk managers to more accurately assess flood risks on a global level.

Flood loss “hot spots” in emerging markets

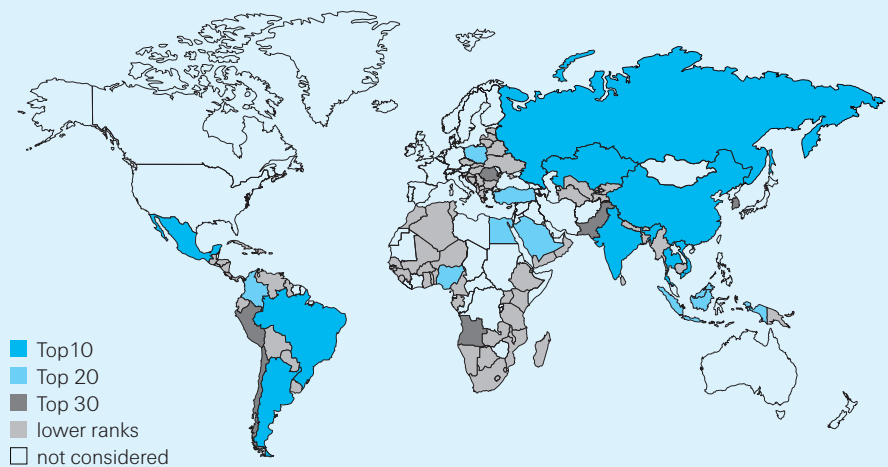
The size of the Thailand flood loss came as a shock to the insurance industry. Although Thailand had been known for being prone to flooding, less known was the large amount of exposure that had built up in Thailand in recent years, most of which originated from foreign companies that had diverted their manufacturing operations there.

Following the Thailand flood event, Swiss Re undertook a global study to identify other emerging markets comparable to Thailand, namely those with high flood risk and recent strong economic growth. The aim was to identify hidden “hot spots” (latent large flood loss potential). In the study, emerging markets were ranked based on a combination of factors, such as real GDP growth, foreign direct investment as a share of GDP, and flood risk indices per country.

The study revealed that other emerging markets in the world present even greater flood exposure than Thailand. China tops the ranking, followed by the remaining BRIC countries⁹, owing to their exceptional economic development of the last few years and the corresponding growth of exposed values combined with flood risk.

Thailand, the country with the highest ever insured flood losses so far, ranks seventh. Vietnam, currently in tenth place, may move up as it is expected to be the destination of Japanese companies relocating their operations from Thailand. Surprisingly, Kazakhstan and Azerbaijan are among the top ten. Both experienced recent high economic growth and increasing foreign investment, particularly in the oil and gas sectors. If economic growth continues, they will confirm their high ranking and large flood loss potential.

Figure 6:
Emerging market “hot spot” rankings



Source: Swiss Re Cat Perils, ©GfK GeoMarketing Map Edition World

⁹ The BRIC countries include Brazil, Russia, India, and China.

Tables for reporting year 2011

Table 4

List of major losses in 2011 according to loss category

	Number	in %	Victims ¹¹	in %	Insured loss ¹⁰ (in USD m)	in %
Natural catastrophes	175	53.8%	29 026	83.6%	110 021	95.0%
Floods	65		5 093		16 262	
Storms	76		3 301		41 152	
Earthquakes	15		20 264		49 194	
Droughts, bush fires, heat waves	9		8		2 432	
Cold, frost	8		360		350	
Hail	2				630	
Man-made disasters	150	46.2%	5 703	16.4%	5 794	5.0%
Major fires, explosions	25	7.7%	390	1.1%	2 463	2.1%
Industry, warehouses	9		30		933	
Oil, gas	8		96		1 490	
Department stores	1				40	
Other buildings	3		163			
Other fires, explosions	4		101			
Aviation disasters	21	6.5%	463	1.3%	710	0.6%
Crashes	11		463		26	
Explosions, fires	1		1			
Damage on ground	2				108	
Space	8				576	
Maritime disasters	39	12.0%	1 986	5.7%	1 833	1.6%
Freighters	2		22		67	
Passenger ships	29		1 873			
Tankers	1				125	
Drilling platforms	6		53		1 641	
Other maritime accidents	1		38			
Rail disasters (incl. cableways)	9	2.8%	272	0.8%		0.0%
Mining accidents	8	2.5%	185	0.5%	377	0.3%
Collapse of buildings/bridges	3	0.9%	103	0.3%		0.0%
Miscellaneous	45	13.8%	2 304	6.6%	411	0.4%
Social unrest	14		1 495		411	
Terrorism	16		492			
Other miscellaneous losses	15		317			
Total	325	100.0%	34 729	100.0%	115 814	100.0%

Source: Swiss Re Economic Research & Consulting

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

¹¹ Dead or missing

Table 5

The 20 most costly insurance losses in 2011

Insured loss¹²				
(in USD m)	Victims¹³	Date (start)	Event	Country
35 000	19 184	11.03.2011	Earthquake (M _w 9.0) triggers tsunami; aftershocks	Japan
12 000	813	27.07.2011	Flood caused by heavy monsoon rains	Thailand
12 000	181	22.02.2011	Earthquake (M _w 6.3), aftershocks	New Zealand
7 300	354	22.04.2011	Severe storms, tornadoes	United States (Alabama, et al)
7 050	155	20.05.2011	Severe storms, tornadoes	United States (Missouri, et al)
5 300	55	22.08.2011	Hurricane Irene, torrential rainfall, extensive flooding	United States, et al
2 255	22	09.01.2011	Floods caused by heavy rains	Australia
2 000	1	13.06.2011	Earthquakes (M _w 5.2 and M _w 6.0)	New Zealand
2 000	9	03.04.2011	Thunderstorms with winds up to 210 km/h, hail, tornadoes	United States
1 510	–	08.04.2011	Thunderstorms with winds up to 275 km/h, tornadoes, hail	United States
1 400	46	14.04.2011	Storms with winds up to 260 km/h, >240 tornadoes	United States
1 364	1	02.02.2011	Tropical Cyclone Yasi, winds up to 240 km/h	Australia
1 300	3	16.06.2011	Storms with winds up to 113 km/h, floods, hail, tornadoes	United States
1 213	13	20.09.2011	Typhoon Roke	Japan
1 018	36	31.01.2011	Groundhog Day Blizzard winter storm, heavy snowfall	United States
ns ¹⁴	–	06.01.2011	Fire at oil sand plant	Canada
ns ¹⁴	–	04.02.2011	FPSO Gryphon Alpha vessel damaged during storm	North Sea, United Kingdom
980	2	10.07.2011	Storms with winds up to 130 km/h, floods, tornadoes, hail	United States
950	–	18.08.2011	Storms with winds up to 148 km/h, tornadoes, hails, floods	United States
830	–	19.04.2011	Thunderstorms, hail, >100 tornadoes	United States

Source: Swiss Re Economic Research & Consulting

Table 6

The 20 worst catastrophes in terms of victims 2011

Insured loss¹⁵				
Victims¹⁶	(in USD m)	Date (start)	Event	Country
19 184	35 000	11.03.2011	Earthquake (M _w 9.0) triggers tsunami; aftershocks	Japan
1 449	–	16.12.2011	Tropical Storm Washi	Philippines
902	50	11.01.2011	Floods, mudslides caused by heavy rains	Brazil
846	ns ¹⁴	25.01.2011	Anti-government demonstrations	Egypt
813	12 000	27.07.2011	Flood caused by heavy monsoon rains	Thailand
644	90	23.10.2011	Earthquake (M _w 7.2); over 400 aftershocks	Turkey
456	–	01.08.2011	Floods caused by heavy rains	Pakistan
354	7 300	22.04.2011	Severe storms, tornadoes	United States
350	–	03.06.2011	Floods causes by heavy monsoonal rains, landslides	China
320	–	13.08.2011	Floods caused by heavy rains	Cambodia, Vietnam
233	–	15.02.2011	Anti-government demonstrations	Libyan Arab Jamahiriya
220	–	10.09.2011	Overcrowded ferry sinks	Indian Ocean, Tanzania
219	–	03.01.2011	Civil commotion	Tunisia
203	–	17.12.2011	Overcrowded boat carrying illegal immigrants capsizes	Indian Ocean, Indonesia
187	–	05.07.2011	Boat carrying illegal immigrants sinks after catching fire	Red Sea, Sudan
181	12 000	22.02.2011	Earthquake (M _w 6.3), aftershock (M _w 5.6)	New Zealand
178	41	01.04.2011	Floods caused by heavy rains	Colombia
155	7 050	20.05.2011	Severe storms, tornadoes	United States (Missouri, et al)
155	–	30.06.2011	Floods caused by heavy monsoon rains, landslides	Nepal
151	–	19.10.2011	Tropical storm 02B	Myanmar (Burma)

Source: Swiss Re Economic Research & Consulting

¹² Property and business interruption, excluding liability and life insurance losses; US natural catastrophe figures: with the permission of Property Claim Services (PCS)/incl. NFIP losses (see page 38, "Terms and selection criteria").

¹³ Dead and missing

¹⁴ ns: not shown

¹⁵ Property and business interruption, excluding liability and life insurance losses

¹⁶ Dead and missing

Table 7

Chronological list of all natural catastrophes 2011

Note: Loss ranges for natural catastrophes in the US in this table are defined by Property Claim Services (PCS).
Canadian natural catastrophe losses are given with the permission of Property Claim Services (PCS Canada)

Floods

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–6.1.	Brazil Sao Paulo, Minas Gerais, Rio de Janeiro	Floods caused by heavy rains	35 dead 13 000 homeless
1.1.–18.1.	Sri Lanka Batticaloa, Polonnaruwa, Monaragala, Nuwara Eliya, Anuradhapura, Badulla, Kegalle, Kandy, Ampara, Trincomalee, Matale, Ratnapura, Vavuniya,	Floods caused by heavy rains; 5 594 houses destroyed, 22 483 houses damaged	43 dead, 4 missing 51 injured 1 060 273 homeless USD 200m total damage
1.1.–31.1.	South Africa, Mozambique	Floods caused by heavy rains; damage to houses, cropland and infrastructure	131 dead 31 000 homeless ZAR 30m (USD 4m) insured loss ZAR 3.55bn (USD 440m) total damage
1.1.–31.1.	Philippines Southern Luzon, Visayas, Mindanao	Floods caused by heavy rains, landslides; 1 116 houses destroyed, 4 613 houses damaged, damage to infrastructures and agriculture	75 dead, 22 missing 13 injured 109 995 homeless PHP 2.06bn (USD 47m) total damage
1.1.–1.2.	Lesotho Botha Bothe, Mokhotlong, Leribe, Mohale's Hoek, Berea, Quthing	Floods caused by heavy rains; 672 houses destroyed, 4 708 livestock killed	26 dead 5 000 homeless
9.1.–17.1.	Australia Queensland, Victoria, New South Wales	Floods caused by heavy rains	22 dead AUD 2.2bn (USD 2.26bn) insured loss AUD 6bn (USD 6.15bn) total damage
11.1.–16.1.	Brazil Rio de Janeiro	Floods, mudslides caused by heavy rains; widespread damage to houses and infrastructure	902 dead USD 50m insured loss <USD 1.0bn total damage
18.1.–20.1.	Indonesia Legon Kulon, Pamanukan, Sukasari, Pusakanegara, Pusaka Jaya	Floods caused by heavy rains	2 000 homeless
27.1.–30.1.	Saudi Arabia Jeddah	Floods caused by heavy rains	10 dead <USD 100m insured loss <USD 300m total loss
29.1.–31.1.	Malaysia Johor	Floods caused by heavy rains; power outages, travel disruption	5 dead 24 000 homeless
31.1.–7.2.	Philippines Visayas, Mindanao	Floods caused by heavy rains, tornado, landslides; 708 houses, bridges destroyed, 1 890 houses damaged	22 dead, 1 missing 164 injured 3 323 homeless PHP 539m (USD 12m) total damage
3.2.–14.2.	Sri Lanka Trincomalee, Matale, Anuradhapura, Polonnaruwa, Badulla, Nuwara Eliya, Kandy, Ampara, Puttalam, Kegalle, Mannar, Monaragala, Kalutara, Batticaloa, Mullaitivu	Floods caused by heavy rains; 4 246 houses destroyed, 22 515 damaged	18 dead, 3 missing 24 injured 100 000 homeless USD 60m total damage
3.2.–17.2.	Afghanistan Herat	Flash floods	25 dead 65 injured
14.2.–11.4.	Bolivia Chuquisaca, Cochabamba, La Paz, Oruro, Beni, Tarija, Potosí, Pando, Santa Cruz	Floods caused by heavy rains, landslides	56 dead 4 821 homeless USD 20m total damage
26.2.	Bolivia La Paz	Landslides caused by heavy rains; 400 houses destroyed	4 000 homeless

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.3.–12.3.	Namibia Caprivi, Kavango, Ohangwena, Omusati, Oshana, Oshikoto, Kunene	Floods caused by heavy rains	108 dead 23 275 homeless NAD 100m (USD 12m) total damage
10.3.–12.4.	Indonesia Tangse (Aceh)	Floods caused by heavy rains	21 dead
12.3.–18.3.	Brazil Santa Catarina, Parana	Floods caused by heavy rains	10 dead 25 000 homeless
17.3.–19.3.	Philippines Mindanao, Visayas	Floods caused by heavy rains, tornadoes, landslides; 111 houses destroyed, 102 houses damaged	16 dead 1 injured 27 165 homeless PHP 2m (USD 0.04m) total damage
17.3.–31.3.	Indonesia Papua	Floods caused by heavy rains, Paniai Lake overflows; 5 000 houses destroyed, damage to agriculture	13 dead 3 000 homeless
23.3.–16.4.	Thailand Surat Thani, Krabi, Nakhon Si Thammarat, Phatthalung, Chumphon, Trang, Phangnga, Satun, Songkhla, Narathiwat	Floods caused by heavy rains; 16 664 houses destroyed, 6 013 roads, 694 temples and schools damaged, damage to agriculture and fish industry	64 dead 63 196 homeless THB 10bn (USD 317m) total damage
1.4.–31.7.	Colombia	Floods caused by heavy rains; 4 510 houses destroyed, 179 786 houses damaged	159 dead, 19 missing 158 injured COP 80bn (USD 41m) insured loss COP 2 000bn (USD 1.03bn) total damage
9.4.–15.4.	Kazakhstan Chingirlausky, Taskalinsky, Zelenovsky, Terektinsky, Uralsk	Floods caused by heavy rains and melting snow; 1 254 houses, 300 kilometres of roads, farmland destroyed; 1 396 houses, dams, bridges, utility lines damaged, 1 314 livestock killed	2 dead 6 013 homeless KZT 10bn (USD 67m) total damage
14.4.–31.5.	Canada Manitoba	Assiniboine River floods; extensive damage to farmland	5 dead CAD 160m (USD 157m) insured loss CAD 815m (USD 800m) total damage
25.4.–15.6.	United States ND, SD, IL, IN, MO, KY, AR, TN, MS, LA	Mississippi Valley floods caused by heavy snowmelt and rains; widespread damage to agriculture, properties	7 dead USD 3bn total damage
25.4.–26.4.	Brazil Rio Grande do Sul	Floods caused by heavy rains, landslides	1 dead USD 200m total damage
1.5.–3.5.	Brazil Pernambuco	Floods caused by heavy rains, landslides	2 dead 13 000 homeless
1.5.–8.5.	Afghanistan Baghlan	Floods caused by heavy rains; 1 940 houses destroyed	37 dead 45 injured
9.5.	China Luojiang (Guangxi Zhuang)	Landslide at a quarry caused by heavy rains	22 dead
15.5.–30.6.	United States Missouri River Basin (MT, ND, SD, NE, IA, MO)	Missouri River Basin floods caused by heavy snowmelt and rains; Missouri and Souris rivers overflow, multiple levees breached, over 84 000 hectares of farmland flooded	5 dead 11 000 homeless USD 2bn total damage
23.5.–30.5.	Russia Krasnodarskiy, Adygeya	Floods caused by heavy rains; 102 houses destroyed, 2 112 houses damaged	9 000 homeless RUB 671m (USD 21m) total damage
1.6.–10.6.	Haiti Port-au-Prince	Floods caused by heavy rains, landslides	34 dead 6 injured
1.6.–16.6.	Philippines Bukidnon, Compostela Valley, Davao del Norte, Davao del Sur, Maguindanao, Lanao del Sur, North Cotabato, Sultan Kudarat, South Cotabato	Floods caused by heavy rains, six rivers overflow; damage to houses, infrastructure, agriculture	12 dead 2 injured 12 875 homeless PHP 429m (USD 10m) total damage
3.6.–17.7.	China Anhui, Zhejiang, Jiangxi, Hubei, Hunan, Sichuan, Chongqing, Guizhou	Floods causes by heavy monsoonal rains, landslides	350 dead 550 000 homeless USD 195m insured loss USD 6.4bn total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
15.6.–16.7.	India Uttar Pradesh, Uttarakhand	Floods caused by heavy monsoonal rains	50 dead USD 20m total damage
21.6.–22.6.	Nigeria Kano	Floods caused by heavy rains; 100 houses destroyed	24 dead 150 injured 100 homeless
28.6.–1.7.	Philippines Davao del Norte, Davao del Sur	Floods caused by heavy rains, landslide; 142 houses destroyed, 268 damaged, 2 450 hectares of farmland flooded	30 dead, 1 missing PHP 944m (USD 22m) total damage
29.6.–31.10.	Lao People's Democratic Republic, Xiengkhuang, Vientiane	Floods caused by heavy monsoon rains; 140 000 houses destroyed, over 60 000 hectares of rice cropland flooded	30 dead 400 000 homeless LAK 1 400bn (USD 175m) total damage
30.6.–22.7.	Nepal	Floods caused by heavy monsoon rains, landslides	113 dead, 42 missing 56 injured
23.7.–28.7.	Brazil Rio Grande do Sul	Floods caused by heavy rains, landslides	3 dead 3 000 homeless
7.7.–8.9.	Bangladesh Cox's Bazar, Satkhira, Jessore	Floods caused by heavy rains; 20 000 houses destroyed	10 dead 250 000 homeless
15.7.–17.7.	Brazil Pernambuco, Paraiba	Floods caused by heavy rains, landslides	15 dead 13 000 homeless
27.7.–20.11.	Thailand	Flood caused by heavy monsoon rains	813 dead USD 12bn insured loss USD 30bn total damage
1.8.–30.9.	Pakistan Sindh, Southern Pakistan	Floods caused by heavy rains; over 500 000 houses destroyed, 2 711 393 hectares of land flooded	456 dead 756 injured USD 2.5bn total damage
4.8.–31.8.	India West Bengal	Floods caused by heavy rains, several rivers burst their banks; damage to houses and cropland	100 dead INR 12.7bn (USD 239m) total damage
5.8.	United States Charlotte (North Carolina)	Flash floods caused by torrential rains	1 dead, 1 missing USD 86m insured loss
8.8.–31.8.	Uganda Bulambuli	Massive landslides caused by incessant heavy rains; damage to houses and cropland	27 dead 33 injured
13.8.–13.10.	Cambodia, Vietnam	Floods caused by heavy rains, Mekong River overflows; over 250 000 houses destroyed, severe damage to transport infrastructure and fisheries	320 dead 19 injured USD 300m total damaged
23.8.–7.9.	Mexico Cuautitlan	Floods caused by heavy rains, Cuautitlan River bursts its banks	74 dead 40 000 homeless
26.8.–29.8.	Nigeria Ibadan	Floods caused by heavy rains; hundreds of livestock perish, damage to houses and contamination of water sources	120 dead
1.9.–22.9.	China Shaanxi, Sichuan	Floods caused by heavy rains, landslides; damage to houses and damage to 1 000 000 hectares of farmland	90 dead, 22 missing 1 000 000 homeless CNY 2.6bn (USD 413m) total damage
1.9.–30.11.	Colombia Sucreña Mojón	Floods caused by heavy rains, landslides; 695 houses destroyed, 79 616 houses damaged	114 dead, 21 missing 104 injured COP 2 500bn (USD 1.29bn) total damage
5.9.–19.9.	India Orissa	Floods caused by heavy rains; over 100 000 houses destroyed	39 dead USD 430m total damage
6.9.–9.9.	Brazil Santa Catarina	Floods caused by heavy rains, several rivers overflow	3 dead 18 000 homeless
23.9.–3.10.	India Orissa, Bihar, Uttar Pradesh	Floods caused by heavy rains; 50 000 houses destroyed, over 200 000 hectares of cropland destroyed	51 dead INR 28bn (USD 527m) total damage
25.9.–4.11.	Vietnam An Giang, Dong Thap, Long An, Can Tho, Vinh Long, Hau Giang, Kein Giang	Floods caused by heavy rains; 359 houses destroyed, 2 076 houses damaged	73 dead

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
30.9.–1.10.	Algeria El Bayadh	Floods caused by heavy rains; hundreds of houses damaged, 5 bridges collapse	13 dead 50 injured EUR 600m (USD 779m) total damage
15.10.–26.10.	Ireland Dublin	Floods caused by heavy rains; damage to private and commercial buildings	2 dead EUR 127m (USD 165m) insured loss EUR 250m (USD 325m) total damage
25.10.–26.10.	Italy Liguria, Toscana	Floods caused by heavy rains; damage to houses and infrastructure	10 dead EUR 11m (USD 14m) insured loss EUR 420 (USD 545m) total damage
4.11.–7.11.	France, Italy Var (France), Genoa (Italy)	Extratropical low pressure system "Rolf" causes heavy rains and widespread flooding; damage to houses and infrastructure	11 dead, 1 missing EUR 500m (USD 649m) insured loss EUR 1.2bn (USD 1.56bn) total damage
5.11.	Colombia Manizales	Massive mudslide due to heavy rains	48 dead
5.12.	Tanzania Kilimanjaro, Mbeya	Floods caused by heavy rains, landslides	9 dead 6 776 homeless
5.12.–16.5.	Colombia Tolima, Bogota	Floods caused by heavy rains, landslides; damage to houses and cropland	21 dead
6.12.–8.12.	Venezuela Miranda, Zulia, Merida, Tachira, Caracas	Floods caused by heavy rains; 1 096 houses destroyed, damage to transport and infrastructure	8 dead 2 000 homeless USD 16m total damage
20.12.–23.12.	Tanzania Dar es Salaam	Floods caused by heavy rains; damage to houses and infrastructure	20 dead 200 injured 10 000 homeless

Storms

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
31.1.–3.2.	United States CT, IL, IN, MA, NY, OH, PA, RI, TX	Groundhog Day Blizzard winter storm, heavy snowfall, freezing rain; damage to private, industrial and commercial buildings, damage to power plants, 20 000 flights cancelled	36 dead USD 1–3bn insured loss USD 2bn total damage
2.2.–6.2.	United States AZ, CO, NM, OK, TX	Winter storm, freezing and icy conditions; damage to property and agriculture, travel disruption	3 dead 5 injured USD 300–600m insured loss USD 600m total damage
2.2.–7.2.	Australia Queensland (Cassowary Coast Shire, Innisfail, Silkwood, Mission Beach, Cardwell, Tully, Townsville, Ingham, Cairns)	Tropical Cyclone Yasi, winds up to 240 km/h	1 dead 7 300 homeless AUD 1.33bn (USD 1.36bn) insured loss AUD 2bn (USD 2.05bn) total damage
4.2.–6.2.	Australia Victoria (Melbourne)	Storms, heavy rains, floods	4 injured AUD 415m (USD 425m) insured loss
14.2.–16.2.	Madagascar, Mozambique Maroantsetra, Mananara North, Mandritsaras	Tropical Cyclone Bingiza, 12 683 houses, 222 public buildings damaged	14 dead, 8 missing 64 injured 12 994 homeless
24.2.–25.2.	United States MD, PA, TN, VA	Thunderstorm with winds up to 97 km/h, hail, floods, tornadoes	USD 100–300m insured loss
27.2.–28.2.	United States IL, IN, MO, OH, TN	Winter storm, flooding, hail, tornadoes	1 dead USD 100–300m insured loss
1.3.	Italy Trieste	Winter storm with winds up to 170 km/h	90 injured
5.3.–7.3.	Canada Quebec, Ontario	Winter weather, heavy rainfall	CAD 50m (USD 49m) insured loss
8.3.–11.3.	United States CT, LA, MD, NJ, NY, PA, VA	Storm, flooding, hail, tornadoes, wind	1 dead 2 injured USD 100–300m insured loss

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
26.3.–28.3.	United States AL, GA	Winter storm, hail, tornadoes	USD 100–300m insured loss
29.3.–31.3.	United States FL, LA	Storms with winds up to 145 km/h, flooding, hail, tornadoes	USD 100–300m insured loss
3.4.–5.4.	United States GA, IA, IL, KS, KY, MO, NC, SC, TN, WI	Thunderstorms with winds up to 210 km/h, hail, multiple tornadoes	9 dead USD 1–3bn insured loss USD 3.5bn total damage
4.4.–5.4.	Bangladesh Jamalpur, Thakurgaon, Sherpur, Mymensingh, Gaibandha, Joypurhat, Bogra	Storms, tornadoes, flooding; damage to houses and cropland, and power outages	13 dead 100 injured
8.4.–11.4.	United States AL, IA, KS, NC, OK, SC, TN, TX, WI	Thunderstorms with winds up to 275 km/h, multiple tornadoes, heavy rains, large hailstones; damage to properties and public infrastructure	36 injured USD 1–3bn insured loss USD 2.25bn total damage
14.4.–16.4.	United States AL, AR, GA, MS, NC, OK, PA, SC, TX, VA	Storms with winds up to 260 km/h, >240 tornadoes, hail, floods	46 dead 43 injured USD 1–3bn insured loss >USD 2bn total damage
17.4.–18.4.	China Guangzhou, Foshan, Dongguan, Zhaqing (Guangdong)	Hailstorms, winds up to 164 km/h, heavy rains; over 45 houses destroyed, over 1 000 hectares of farmland damaged	18 dead 150 injured CNY 96m (USD 15m) total damage
19.4.–21.4.	United States AR, IL, IN, KY, MO, OH, TN, TX	Thunderstorms, hail, >100 tornadoes	2 dead USD 600m–1bn insured loss USD 1.2bn total damage
22.4.	Philippines Compostela	Landslide due to heavy rains; mine flooded	14 dead, 8 missing 14 injured 560 homeless
22.4.–28.4.	United States AL, AR, GA, IL, KY, LA, MS, MO, OH, OK, TN, TX, VA	Major weather outbreak, storms with winds up to 340 km/h, >350 tornadoes	354 dead 2 200 injured USD 6–10bn insured loss USD 11bn total damage
25.4.–5.5.	Rwanda Kigali	Heavy storms caused widespread flooding	14 dead 3 588 homeless
27.4.–28.4.	Canada Ontario, Quebec	Storms with winds up to 100 km/h; property damage and power cuts	1 dead 6 injured CAD 210m (USD 206m) insured loss
8.5.–9.5.	Philippines Luzon, Visayas	Tropical Storm Aere with winds up to 83 km/h, heavy rains, landslides, floods; 63 houses destroyed, 9 357 houses damaged; damage to infrastructure and farmland	35 dead, 2 missing 11 injured 141 910 homeless PHP 1.37bn (USD 31m) total damage
10.5.–13.5.	United States MN, NC, SC	Strong winds, hail, tornadoes	USD 100–300m insured loss
20.5.–22.5.	India Uttar Pradesh, Shahjahanpur, Lakhimpur-Kheri, Budaun, Ambedka, Bareilly	Thunderstorm with winds up to 70 km/h, heavy rains	42 dead 50 injured
20.5.–27.5.	United States AR, GA, IL, IN, IA, KS, KY, MI, MN, MO, NE, NY, NC, OH, OK, PA, TN, TX, VA, WI	Major tornado outbreak, storms with winds up to 405 km/h, widespread damage in Joplin and other areas	155 dead 1 150 injured USD 6–10bn insured loss USD 9bn total damage
25.5.–29.5.	Philippines, Japan Philippines (Luzon), Japan (Okinawan islands, Kagoshima, Naze)	Typhoon Songda with winds up to 240 km/h, landslide, floods; damage to houses, 9 fishing boats capsized	4 dead 58 injured 1 151 homeless PHP 130m (USD 3m) total damage
29.5.–1.6.	United States IL, MA, MI, MN, ND	Storms with winds up to 260 km/h, tornadoes, hail, floods	3 dead 200 injured USD 300–600m insured loss
1.6.–2.6.	United States KS	Storm with winds up to 113 km/h, floods, hail, tornadoes	USD 25–100m insured loss USD 80m total damage
4.6.–11.6.	China, Philippines Guandong	Tropical Storm Sarika; damage to houses and farmland	26 dead, 6 missing USD 255m total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
8.6.–11.6.	United States IL, IA, KS, WI	Storms with winds up to 97 km/h, tornadoes, hail, floods	USD 100–300m insured loss USD 300m total damage
14.6.–15.6.	United States OK	Thunderstorm with winds up to 113 km/h, hail, tornadoes	USD 100-300m insured loss
16.6.–22.6.	United States GA, IL, IN, KS, MI, MO, NE, NC, OH, OK, SC, TN, TX, WI	Storms with winds up to 113 km/h, floods, hail, tornadoes	3 dead USD 1–3bn insured loss USD 1.4bn total damage
19.6.–24.6.	Vietnam, Philippines, China	Tropical Storm Haima	24 dead, 1 missing USD 50m total damage
27.6.–28.6.	China, Philippines, South Korea Liaoning, Zhejiang, Shangon (China)	Tropical Storm Meari with winds up to 135 km/h	17 dead, 12 missing 4 injured USD 44m total damage
28.6.	Uganda Kiryandongo	Lightning strikes a school amid heavy storm	23 dead 47 injured
30.6.	Mexico Cabo Rojo	Tropical Storm Arlene, heavy rains, floods, landslides	22 dead USD 70m total damage
1.7.–4.7.	United States IL, MN, WI	Strong winds, hail, flooding, tornadoes	2 dead USD 600m–1bn insured loss
2.7.–3.7.	Denmark Copenhagen	Cloudburst, floods	DKK 4.7bn (USD 821m) insured loss DKK 6bn (USD 1.05bn) total damage
10.7.–14.7.	United States CO, IL, IA, MI, MN, OH, WY	Storms with winds up to 130 km/h, floods, tornadoes, hail	2 dead USD 600m–1bn insured loss USD 1.1bn total damage
18.7.–19.7.	Canada Alberta, Manitoba, Saskatchewan	Thunderstorms, heavy winds, hail	CAD 185m (USD 182m) insured loss
22.7.–24.7.	United States IL	Storm with winds up to 140 km/h, hail, floods; damage to houses, roads, disruption to air travel	USD 100–300m insured loss USD 200m total damage
26.7.–28.7.	South Korea Seoul	Cloudburst, flooding	59 dead KRW 60bn (USD 52m) insured loss
27.7.–31.7.	Philippines, China, Vietnam	Typhoon Nock-Ten with winds up to 95 km/h	75 dead, 9 missing 53 injured 14 814 homeless USD 121m total damage
29.7.–1.8.	United States MN, NY, ND, OH, WI	Storm with winds up to 160 km/h, hail, heavy rains; damage to residential, commercial buildings, farmland and infrastructure, power cuts	USD 100-300m insured loss USD 300m total damage
1.8.–9.8.	China, North Korea, South Korea, Philippines, Japan	Typhoon Muifa with winds up to 260 km/h, flooding; damage to houses, ports and fishing vessels	22 dead, 3 missing 42 injured 1 000 000 homeless >USD 25m insured loss USD 850m total damage
3.8.	Sudan El Geneina (West Darfur)	Two buildings collapse due to heavy rainstorms	20 dead 30 injured
18.8.	Belgium Hasselt	Storms with gusty winds, hail; damage to buildings, stage at outdoor music festival collapses	5 dead 71 injured EUR 76m (USD 99m) total damage
18.8.–19.8.	United States IA, KS, MO, NE, SD	Storms with winds up to 148 km/h, tornadoes, hails, floods	USD 600m-1bn insured loss USD 1.2bn total damage
21.8.	Canada Goderich (Ontario)	Storm, F3 tornado; damage to salt mine and processing plant	1 dead 37 injured CAD 135m (USD 133m) insured loss
22.8.–28.8.	United States, Canada, Bahamas, Dominican Republic CT, DE, DC, ME, MD, MA, NH, NJ, NY, NC, PA, RI, VT, VA	Hurricane Irene, torrential rainfall, extensive flooding; over 7 million homes and businesses lose power during the storm	55 dead USD 5.3bn insured loss USD 8bn total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
26.8.–31.8.	Philippines, China, Taiwan	Typhoon Nanmadol with winds up to 230 km/h; damage to houses, transportation and farmland	35 dead, 8 missing 37 injured USD 250m total damage
1.9.–3.9.	United States MI, WI	Storms with winds up to 113 km/h, hail, floods	USD 25–100m insured loss
2.9.–3.9.	Japan Shikoku Island	Tropical Storm Talas with winds up to 90 km/h	68 dead JPY 36.2bn (USD 470m) insured loss JPY 66bn (USD 858m) total damage
3.9.–8.9.	United States AL, DC, GA, LA, MD, MS NY, PA, TN, VA	Tropical Storm Lee with winds up to 75 km/h	21 dead USD 600m–1bn insured loss USD 1bn total damage
12.9.–13.9.	United Kingdom Britain, Scotland, Wales, Ireland	Hurricane Katia with winds up to 113 km/h; damage to buildings	1 dead GBP 100m (USD 155m) insured loss
20.9.–22.9.	Japan Shizuoka	Typhoon Roke with winds up to 215 km/h; damage to houses and infrastructure	13 dead 308 injured JPY 93.3bn (USD 1.21bn) insured loss JPY 140bn (USD 1.82bn) total damage
26.9.–4.10.	Philippines, China, Vietnam	Typhoon Nesat with winds up to 150 km/h; over 10 000 houses destroyed, damage to transport facilities and farmland	94 dead, 20 missing 91 injured 254 412 homeless <USD 50m insured loss >USD 360m total damage
30.9.–6.10.	Philippines, China, Vietnam	Typhoon Nalgae with winds up to 195 km/h	18 dead, 7 missing 12 injured 143 702 homeless PHP 115m (USD 3m) total damage
2.10.	South Africa Ficksburg, Duduza	Severe weather, tornadoes; 1 000 houses damaged	1 dead 285 injured
11.10.–13.10.	Mexico Jalisco, Colima, Nayarit	Hurricane Jova with winds up to 160 km/h, heavy rains and flooding; damage to residential and commercial properties	5 dead MXN 700m (USD 50m) insured loss
11.10.–21.10.	Nicaragua, El Salvador, Honduras, Mexico, Costa Rica, Guatemala	Tropical Depression 12-E; heavy rains, floods	115 dead USD 445m total damage
19.10.–21.10.	Myanmar (Burma) Magway, Mandalay, Sagaing	Tropical Storm 02B, heavy rainfall and flooding; 2 500 houses destroyed	151 dead 35 734 homeless
28.10.–31.10.	United States CT, MA, NH, NJ, NY, PA	Winter storm with winds up to 85 km/h, heavy snowfall	29 dead USD 600m–1bn insured loss
2.11.–3.11.	Oman Salalah	Tropical Storm Keila with winds up to 119 km/h	14 dead 200 injured
9.11.	Argentina Puerto Madryn Chubut	Landslide damages electrical equipment of hydroelectric plant; production capacity reduced	USD 50m insured loss
24.11.–25.11.	Norway, Faroe Islands Nordland, Nord-Trøndelag	Winter storm Berit; damage to properties and temporary closure of three oil drilling platforms	NOK 285m (USD 48m) insured loss
24.11.–27.11.	Sri Lanka	Thunderstorms, flooding, landslides; over 7 000 houses damaged	22 dead 41 injured
27.11.	Canada Calgary	Storm with winds up to 149 km/h; damage to private and commercial buildings, minor travel disruption	CAD 200m (USD 196m) insured loss
30.11.–2.12.	United States CA, NM, UT	Strong winds, thunderstorms; power outages and travel disruption	7 dead USD 100–300m insured loss USD 225m total damage
8.12.–10.12.	United Kingdom, North Sea Glasgow, Campbeltown, Falkirk, Stirling, Dalry, Ardrossan, Aberdeen (Scotland)	Windstorm Friedhelm with winds up to 266 km/h; damage to vehicles and widespread road blockages, heavy damage to FPSO (floating production storage and offloading) in North Sea	USD 420m insured loss
15.12.–17.12.	France, Germany, Switzerland	Winter Storm Joachim with winds in excess of 170 km/h; power outages and travel disruption, cargo vessel runs aground in Brittany, train derails in Switzerland	EUR 300m (USD 389m) insured loss

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
16.12.–18.12.	Philippines Northern Mindanao, Mimaropa, Bicol	Tropical Storm Washi; 13 337 houses destroyed, damage to livestock, farmland, and fisheries	1 268 dead, 181 missing 6 071 injured 431 235 homeless PHP 1.71bn (USD 40m) total damage
25.12.–27.12.	Norway, Finland, Sweden, Estonia, Bavaria, Saxony, Saxony-Anhalt	Windstorm Dagmar with winds up to 223 km/h; damage to buildings and forestry	USD 365m insured loss USD 555m total damage
29.12.–30.12.	India Cuddalore (Tamil Nadu)	Tropical Cyclone Thane with winds up to 125 km/h; 200 000 houses damaged	47 dead
31.12.	South Africa KwaZulu-Natal	Severe weather, gusty winds, flooding; over 700 houses destroyed	5 dead 50 injured ZAR 79m (USD 10m) total damage

Earthquakes

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.2.	China Dehong (Yunnan)	Earthquake (M _w 4.8); 1 house destroyed, 670 houses damaged	64 500 homeless
22.2.	New Zealand Christchurch	Earthquake (M _w 6.3), aftershocks	181 dead 1 500 injured USD 12bn insured loss USD 15bn total damage
10.3.	China Yingjiang (Yunnan)	Earthquake (M _w 5.4), aftershocks; 3 618 houses destroyed; 11 356 houses, 1 hotel, and 1 supermarket damaged	26 dead 250 injured CNY 1.84bn (USD 292m) total damage
11.3.	Japan North East	Earthquake (M _w 9.0) triggers tsunami, aftershocks, 200 landslides; 128 538 buildings destroyed; 790 719 buildings, 3 559 roads, 77 bridges, 45 dikes, and 29 railways damaged; damage to nuclear facilities, Fukushima nuclear plant decommissioned	15 845 dead, 3 339 missing 5 893 injured 400 000 homeless USD 35bn insured loss USD 210bn total damage
24.3.	Myanmar (Burma) Chiang Rai, Shan, Tachileik, Tarlay	Earthquake (M _w 6.8), aftershocks; 318 houses destroyed, 702 houses, schools, 1 hospital, 31 religious buildings, road infrastructure, and water facilities damaged	74 dead 125 injured 3 152 homeless MMK 24m (USD 4m) total damage
11.5.	Spain Lorca, Murcia	Earthquakes (M _w 4.5 and 5.1)	9 dead 293 injured USD 100m insured loss USD 150m total damage
19.5.	Turkey Simav Kutahya	Earthquake (M _w 5.8), aftershocks	3 dead 121 injured 10 000 homeless TRY 8m (USD 4m) insured loss TRY 460m (USD 244m) total damage
13.6.	New Zealand Christchurch	Earthquakes (M _w 5.2 and M _w 6.0); damage to property	1 dead 46 injured USD 2bn insured loss USD 3bn total damage
11.7.–15.7.	Indonesia Sulawesi Island	Mount Lokon erupts	6 000 homeless
20.7.	Uzbekistan, Kyrgyzstan Ferghana valley	Earthquake (M _w 6.1), aftershocks; damage to houses and roads	14 dead 90 injured USD 10m total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
18.9.	India, Nepal, China Gangtok (Sikkim)	Earthquake (M_W 6.9), aftershocks; over 100 000 houses damaged	At least 88 dead 154 injured 30 000 homeless USD 20m total damage
23.10.	Turkey Van, Ercis	Earthquake (M_W 7.2), over 400 aftershocks; 2 900 destroyed, 66 350 houses damaged	644 dead 2 500 injured 22 000 homeless USD 90m insured loss USD 1.5bn total damage
28.10.	Peru Ica	Earthquake (M_W 6.9); 134 houses destroyed	103 injured
1.11.	China Xinjiang Uygur	Earthquake (M_W 5.4); 63 600 houses damaged	3 800 homeless CNY 358m (USD 57m) total damage
9.11.	Turkey Van	Earthquake (M_W 5.6), aftershocks; 25 houses destroyed	40 dead 30 injured

Droughts, bush fires, heat waves

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–30.5.	China Hebei, Shanxi, Jiangsu, Anhui, Shandong, Henan, Shaanxi, Gansu	Prolonged drought, severe water shortages; 7 million hectares of farmland damaged	CNY 14.9bn (USD 2.37bn) total damage
1.1.–30.6.	United States Texas	Prolonged drought conditions	Over USD 5bn total damage < USD 1bn insured loss
1.1.–31.12.	Somalia, Ethiopia, Kenya	Prolonged and severe drought; poor harvest and loss of livestock trigger population displacement, state of famine declared for six regions in Somalia	Human and economic impact under assessment
1.1.–1.8.	Afghanistan Balkh, Samangan, Takhar, Saripul, Herat, Badghis, Faryab, Jowzjan, Baghlan, Kunduz, Badakshan, Bamiyan, Daikundi, Ghor	Drought caused by limited snowfall and rainfall; damage to farmland, food shortage	USD 142m total damage
9.4.–30.4.	United States Texas	Wildfires triggered by prolonged drought conditions; 250 buildings, 650 000 hectares of farmland destroyed	2 dead 5 injured USD 183m total damage
14.5.–17.5.	Canada Slave Lake, Alberta	Wildfires triggered by prolonged dry conditions and strong winds; 400 houses destroyed	7 000 homeless CAD 700m (USD 687m) insured loss
29.5.–23.6.	United States AZ, NM, TX, FL	Wildfires triggered by drought conditions and strong winds; 231 000 hectares of farmland destroyed	2 dead USD 200m total damage
4.9.–9.9.	United States TX	Wildfires triggered by high temperatures and strong winds; over 180 wildfires outbreaks, over 1 600 houses destroyed	4 dead USD 300–600m insured loss USD 1bn total damage
23.11.–24.11.	Australia Margaret River	Margaret River bushfires; 40 houses damaged	AUD 53m (USD 54m) insured loss

Cold, frost

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–18.1.	India Allahabad, Pratapgarh, Jaunpur, Barabanki (Uttar Pradesh), Solan, Sundernagar, Bhuntar, Shimla (Himachal Pradesh), Leh, Qazigund (Jammu&Kashmir), Bihar	Cold wave with –23° Celsius temperatures	80 dead
1.1.–19.1.	Nepal Kapilvastu, Parbat, Bhojpur, Khotang, Dhank-uta, Sankhuwasabha. Terai	Heavy snow, cold temperatures; farmland destroyed, travel disruption	42 dead NPR 10m total damage
1.1.–24.1.	China Guizhou, Sichuan, Yunnan, Anhui, Hunan, Hubei, Guangxi Zhuang	Snow storms, icy rains, prolonged cold wave; water shortage, power cuts, major transport disruption	2 dead 472 injured 233 000 homeless CNY 1.77bn (USD 281m) total damage
2.1.–28.1.	Poland Warsaw, Bialystok	Extreme cold weather with -20° Celsius temperatures; travel disruption due to excessive frost	30 dead
7.1.–20.2.	Bangladesh Barguna, Gaibandha, Isbwa, Lalmonirhat, Rajshahi	Cold wave with temperatures of 4.5° Celsius; damage to agriculture	50 dead
23.1.–10.2.	Mexico Sinaloa	Cold temperatures, over 600 000 hectares of cropland lost	3 dead USD 350m insured loss USD 1bn total damage
10.2.–14.2.	Afghanistan Daykundi	Heavy snowfall, avalanches	21 dead 5 injured
16.12.–31.12.	India Uttar Pradesh, Punjab, Haryana	Cold wave with temperatures below 0° Celcius, heavy snow; damage to cropland and travel disruption	132 dead

Hail

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
8.8.	Paraguay Itapúa	Hailstorm; damage to houses and farmland	2 000 homeless
25.12.	Australia Melbourne	Hailstorm; damage to property	AUD 615m (USD 630m) insured loss

Table 8

Chronological list of all man-made disasters 2011**Major fires, explosions**

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
5.1.	Netherlands Moerdijk	Chemical plant destroyed during fire	EUR 71m (USD 93m) total damage
6.1.	Canada Alberta	Fire at oil sand plant	5 injured
8.1.	United States Louisiana	Fire at petrochemical plant	
7.2.–8.2.	Philippines Barangay Central (Quezon City)	Fire in shanty town spreads to residential compound; 600 houses destroyed	11 injured 20000 homeless PHP 20m total damage
8.2.	United States Mont Belvieu (Texas)	Explosion at gas plant	1 dead
9.2.	Italy Caldiero (Verona)	Fire at food plant	2 injured
10.2.	South Africa Mpumalanga	Explosion and fire at power station during turbine test	
14.2.–15.2.	Philippines Sinagtala Bahay Toro, Quezon City	Fire in shanty town	1 dead 10000 homeless PHP 10m total damage
25.2.	Germany Dinslaken	Fire in tube factory	
12.4.	Canada Alberta	Fire in fertilizer plant	
14.4.	Mexico Jalisco	Fire in department store	USD 107m total damage
20.4.	Philippines Makati City, Manila	Fire in shanty town	8 000 homeless
12.6.	South Africa Springs	Fire in care centre	22 dead 27 injured
11.7.	Cyprus Zygi	Explosion at Vasilikos Power Station, ignited by fire of nearby naval base; nearby buildings destroyed or damaged, massive power cuts	13 dead 62 injured
21.8.	Germany Schwerte	Fire at iron and steel plant	
25.8.	Mexico Monterrey	Arson attack at casino, fire erupts	52 dead
12.9.	Kenya Nairobi	Leaky pipeline explosion ignites fire in shanty town	76 dead 116 injured
28.9.	Singapore Bukom	Explosion in oil refinery	
6.10.	Canada Saskatchewan	Explosion in refinery releases diesel and hydrogen gas	10 injured
25.10.	Libyan Arab Jamahiriya Sirte	Sparks from nearby generator ignite explosion at fuel tank	100 dead 50 injured
15.11.	Russia Stavropol	Explosion in petrochemical plant	9 injured
9.12.	India Calcutta	Fire in hospital	89 dead
17.12.	China Shanghai	Explosion in manufacturing plant	61 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
23.12.	Colombia Dosquebradas	Gas pipeline explosion; 22 houses destroyed	19 dead 100 injured
29.12.	Myanmar (Burma) Rangoon	Fire at medical warehouse due to faulty electrical wiring; nearby warehouses damaged	17 dead 80 injured

Aviation disasters

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
9.1.	Iran Orumiyeh	Iran Air Boeing 727 crashes in emergency landing	77 dead, 1 missing 26 injured
4.3.	Space, United States	Glory Satellite vehicle launch failure	USD 424m total damage
4.4.	Congo, Democratic Republic of (DRC) Kinshasa-N'Djili Airport	Canadair CL-600-2B19 Jet CRJ-100ER crashes in rainy weather	32 dead
3.5.	Space, Luxembourg	Antennas on New Dawn Satellite fail to deploy in orbit	USD 250m total damage
7.5.	Indonesia Kaimana Gulf, 800m off Kaimana Airport	Merpati Nusantara Airlines Xian MA60 crashes into the sea	25 dead
18.5.	Argentina Prahuaníyeyu	Sol Airlines Saab 340A crashes while on approach	22 dead
21.5.	Space, Canada	Deployment failure of solar array on Telstar 14R satellite	USD 251m total damage
21.6.	Russia Petrozavodsk	RusAir Tupolev 134A-3 crashes on highway while on approach	47 dead 9 injured
8.7.	Congo, Democratic Republic of (DRC) Kisangani	Hewa Bora Airways Boeing 727-030 (WL) crashes on landing	77 dead
26.7.	Morocco Guelmim	Royal Moroccan Air Force C-130 Hercules crashes on landing in bad weather	80 dead
29.7.	Egypt Cairo	Egypt Air Boeing 777-266ER catches fire shortly before take-off	
30.7.	Guyana Georgetown	Caribbean Airlines Boeing 737-8BK (WL) overruns the runway after landing	
17.8.	Space, Kazakhstan	Loss of Express AM-4 satellite shortly after launching	
18.8.	Space, China	Shi Jian 11-04 launch vehicle failure	USD 150m total damage
24.8.	Space	Progress M-012M ISS supply mission launch vehicle failure	USD 150m total damage
2.9.	Chile Isla Robinsón Crusoe, Juan Fernández archipelago	Chilean Air Force CASA C-212 Aviocar crashes on landing	21 dead
7.9.	Russia Yaroslavl	Yakovlev RA-42434 aircraft crashes while taking off	44 dead
16.9.	United States Reno, Nevada	P-51 Mustang aircraft crashes at air show	9 dead 70 injured
13.10.	Papua New Guinea Madang	De Havilland Canada DHC-8-102 crashes on approach	28 dead
9.11.	Space	Phobos Grunt Mars probe fails to reach designated orbit	RUB 5bn (USD 156m) total damage
23.12.–23.11.	Space	Meridian 5 Russian military satellite launch vehicle failure	USD 150m total damage

Maritime disasters

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
2.1.	Indian Ocean, Red Sea, Gulf of Aden, Yemen Strait of Bab-el-Mandeb	Boat carrying illegal immigrants capsizes	28 dead
3.1.	Indian Ocean, Gulf of Aden, Yemen Lahij province	Boat carrying illegal immigrants capsizes	40 dead
16.1.	Mediterranean Sea, Greece Corfu	Boat carrying illegal immigrants sinks in bad weather	22 dead 11 injured
28.1.	Indian Ocean, Indonesia Merak (Java)	Fire on overcrowded ferry ignited by a vehicle explosion	27 dead 200 injured
4.2.	North Sea, United Kingdom Aberdeen	FPSO Gryphon Alpha vessel damaged during storm; damage to riser and subsea systems	2 injured
10.2.	Norwegian Sea, Norway	Gas leakage at exploration rig	
20.2.	Indian Ocean, Gulf of Aden, Yemen Shabwa	Boat carrying refugees capsizes	57 dead 1 injured
2.3.	Zambia Lake Mweru (Luapula)	Fishing boat capsizes in stormy weather	38 dead
15.3.	Mediterranean Sea, Italy Lampedusa	Boat carrying illegal immigrants capsizes	35 dead
16.3.	Pacific Ocean Tristan Da Cunha	Grounding of bulk carrier	
22.3.	Indian Ocean, Gulf of Aden, Yemen Shabwa	Boat carrying illegal immigrants capsizes	49 dead
23.3.	Gulf of Mexico, United States Walker Ridge	Loss of deepwater riser connecting floating production, storage, and offloading (FPSO) vessel to well	
31.3.	Mediterranean Sea, Tunisia Kerkennah Islands	Boat carrying illegal immigrants capsizes	27 dead
2.4.	Venezuela Mariscal Sucre	Drilling vessel struck by a tugboat	
6.4.	Mediterranean Sea, Italy Lampedusa	Boat carrying illegal immigrants capsizes in bad weather	150 dead
12.4.	Gulf of Mexico, Mexico Bay of Campeche	Semi-submersible accommodation oil platform Jupiter sinks	
14.4.	Indian Ocean, Arabian Sea, Gulf of Aden, Yemen	Overcrowded fishing boat carrying illegal immigrants sinks	21 dead, 14 missing
24.4.	Congo, Democratic Republic of (DRC) Sud-Kivu (Minova)	Boat capsizes on Lake Kivu in rough weather	30 dead
29.4.	Egypt Beni Suef	Ferry carrying bus capsizes on Nile River	22 dead
2.5.	Congo, Democratic Republic of (DRC) Kasai-Occidental	Overloaded boat capsizes on Kasai River	at least 100 dead
6.5.	Mediterranean Sea, Spain Almeria	Boat carrying illegal immigrants capsizes	22 dead
8.5.	Togo Lake Togo	Passenger boats capsize in stormy weather on Lake Togo	36 dead
31.5.	Mediterranean Sea, Tunisia Kerkennah Islands	Boat carrying illegal immigrants capsizes	123 dead
6.6.	Philippine Sea, Indonesia South Kalimantan (Borneo Island)	Overcrowded passengers ship sinks in strong winds	28 dead
5.7.	Indian Ocean, Red Sea, Sudan Sawaken	Boat carrying illegal immigrants sinks after catching fire	187 dead

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
11.7.	Russia Tatarstan	Overcrowded cruise ship sinks on Volga River	130 dead 2 injured
29.7.	Mediterranean Sea, Egypt Alexandria	Boat carrying illegal immigrants sinks	30 dead
1.8.	Mediterranean Sea, Italy Lampedusa	25 immigrants are asphyxiated from crowding on boat fleeing Libya	25 dead
9.8.	Indian Ocean, Comoros Ngazidja Island (Comoros)	Overcrowded passenger boat capsizes	54 dead, 67 missing
16.8.	Nepal Siraha	Overcrowded boat capsizes in rain-swollen Kamal River	3 dead, 20 missing
10.9.	Indian Ocean, Tanzania Pemba, Zanzibar	Overcrowded ferry sinks	192 dead, 28 missing
22.9.	Indian Ocean, Indonesia Nusa Penida	Passenger boat capsizes in rough waters	25 dead
5.10.–14.10.	South Pacific Ocean, New Zealand Tauranga	Grounding of container vessel MV Rena triggers oil spill	
21.10.	South Pacific Ocean, Hong Kong Cheung Chau	Ferry crashes into a mooring pillar	76 injured
26.11.	Mediterranean Sea, Italy Brindisi	Boat carrying illegal immigrants capsizes	3 dead, 30 missing
17.12.	Indian Ocean, Indonesia Prigi, East Java	Overcrowded boat carrying illegal immigrants capsizes	16 dead, 187 missing
19.12.	Russia Sakhalin Island, Sea of Okhotsk	Drilling platform capsizes in rough weather	16 dead, 37 missing
25.12.	Caribbean Sea, Cuba Punta de Maisi	Overcrowded boat carrying immigrants capsizes	45 dead
25.12.–25.11.	North Pacific Ocean, Philippine Sea, Philippines Luzon Island	Ship carrying nickel sinks due to liquefaction of the cargo	22 missing

Rail disasters including cableways

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
16.2.	Argentina San Miguel (Buenos Aires province)	Two trains collide at level crossing	4 dead 70 injured
8.4.	South Africa Pretoria	Collision between two trains	1 dead 200 injured
19.5.	South Africa Johannesburg	Collision between two trains	857 injured
7.7.	India Kanshiramnagar (Uttar Pradesh)	Train hits bus at railway crossing	35 dead 39 injured
10.7.	India Fatehpur (Uttar Pradesh)	Kalka Mail passenger train derails	68 dead 100 injured INR 100m (USD 2m) total damage
23.7.	China Wenzhou (Zhejiang)	High-speed train crashes into a stalled train	140 dead 191 injured
28.8.	Brazil Rio de Janeiro	City tram derails	5 dead 57 injured
13.9.	India Chennai	Two trains collide	10 dead 52 injured
13.9.	Argentina Buenos Aires	Train collides with bus at level-crossing and hits a second train	9 dead 212 injured

Mining accidents

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
5.1.	Australia Oakbridge	Fire at coal mine	USD 445m total damage
27.1.	Colombia Sardinata	Explosion at coal mine due to methane gas build-up	21 dead 6 injured
20.3.	Pakistan Quetta	Gas explosions at coal mine	43 dead
10.4.	Australia Laverton	Gold mine wall partially collapses following blast	
11.7.–17.11.	China Shandong	Miners trapped in iron mine due to flood	21 dead
29.7.	Ukraine Luhansk	Explosion at coal mine	28 dead 2 injured
29.10.	China Hengshan (Hunan)	Gas explosion at coal mine	29 dead
10.11.	China Qujing (Yunnan)	Explosion at illegal coal mine	20 dead, 23 missing

Collapse of building/bridges

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
22.10.	India Rangeet Khola River (Darjeeling)	Overcrowded bridge collapses during public gathering	32 dead 132 injured
29.10.	India Kameng River (Arunachal Pradesh)	Suspension footbridge collapses while people are crossing it	30 dead
26.11.	Indonesia Kalimantan (Borneo)	720 metre-long suspension bridge over Mahakam river collapses	11 dead, 30 missing 39 injured

Miscellaneous

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.	Egypt Alexandria	Bomb explodes in a church	21 dead
3.1.–16.1.	Tunisia Thala, Kasserine, Regueb	Civil commotion	219 dead 700 injured
14.1.	India Pullumedu (Kerala)	Stampede at Sabarimala Temple	100 dead
24.1.	Russia Moscow	Bomb explosion at Domodedovo International Airport	35 dead 180 injured
25.1.–12.2.	Egypt Cairo, Suez, Alexandria	Anti-government demonstrations	846 dead 6 400 injured
26.1.	India Kalapet	Poisonous chlorine leak at chemical plant	300 injured
10.2.	Pakistan Mardan	Suicide bombing at army recruitment centre	20 dead 20 injured
15.2.–21.2.	Libyan Arab Jamahiriya Benghazi	Anti-government demonstrations	233 dead
16.2.	Tanzania Dar es Salaam	Explosion at military ammunition depot; 188 houses damaged	27 dead 500 injured 1 000 homeless

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
21.2.	Mali Bamako	Stampede at Modibo Keita Stadium after religious ceremony	36 dead
28.2.	Kenya Mukuru Fuata Nyayo	Fire in shanty town	1 dead 8 969 homeless
28.2.	Brazil Minas Gerais, Bandeira do Sul	Power cable falls into Carnival float	17 dead 55 injured
18.3.	Yemen Sanaa	Anti-government demonstrations	41 dead
11.4.	Belarus Minsk	Explosions at Oktyabrskaya subway station	11 dead 126 injured
14.4.–15.4.	Uganda Kampala	Anti-government demonstrations	3 dead 67 injured
28.4.–29.4.	Uganda Kampala	Anti-government demonstrations	7 dead 327 injured
18.5.	Madagascar Tsiroanomandidy	Stampede at concert	21 dead
25.5.	Egypt Disuk	Poisonous chlorine leak from a cistern in shop	850 injured
11.6.–14.6.	Sudan Lakes	Clashes between clans over cattle	71 dead
13.6.–15.6.	Pakistan Karachi	Clashes between opposition political parties	20 dead
15.6.	Canada Vancouver	Riots following 2011 Vancouver Stanley Cup final	150 injured CAD 5m (USD 5m) total damage
26.6.	Nigeria Maiduguri	Bomb explosion at beer garden	25 dead
28.6.–29.6.	Egypt Cairo	Anti-government demonstrations	1 000 injured
3.7.	Italy Chiomonte	Demonstrations against high-speed rail	200 injured
10.7.	India Rangiya (Assam)	Bomb explosion causes train to derail; 200 metres of rail track destroyed	100 injured
13.7.	India Mumbai	Triple bomb explosions in Mumbai	31 dead 137 injured
18.7.	China Hotan (Xinjiang)	Clashes between ethnic factions	20 dead
22.7.	Norway Oslo, Utoya	Twin terror attacks in Oslo city centre and at youth camp	77 dead 96 injured
6.8.–9.8.	United Kingdom London, Birmingham, Enfield, Manchester	Riots following shooting of man by police; looting and damage to private and commercial properties due to fires	5 dead 111 injured
19.8.	Pakistan Ghundi (Khyber region)	Bomb explosions in a mosque	40 dead 85 injured
26.8.	Nigeria Abuja	Suicide bomb explosion at United Nations compound	25 dead 80 injured
7.9.	India Delhi	Bomb explosion at Delhi High Court	13 dead 76 injured
15.9.	Pakistan Lower Dir	Bomb explosion at funeral	20 dead
22.9.	Russia Makhachkala (Dagestan)	Triple bomb explosions in city centre	6 dead 60 injured
4.10.	Somalia Mogadishu	Suicide bomb explosion near government compound	70 dead 50 injured
15.10.	Mexico Tamaulipas	Clashes between rival gangs in a penitentiary	20 dead 12 injured
29.10.	Nigeria Zamfara	Lead poisoning from illegal gold mine	2 000 injured
1.11.	China Guizhou	Explosives explode while parked at petrol station	9 dead 219 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
4.11.	Nigeria Damaturu	Series of bomb explosions and gun attacks	63 dead
8.11.	India Haridwar	Stampede at religious festival	20 dead 50 injured
13.12.	Belgium Liège	Gunman opens fire in Christmas market in city centre	6 dead 125 injured
16.12.–20.12.	Egypt Cairo	Mass protests against Government during elections	14 dead 300 injured
17.12.	Kazakhstan Zhanaozen, Shetpe	Violent clashes between police and oil workers following dismissal; 41 buildings damaged	16 dead 108 injured KZT 1.9bn (USD 13m) total damage
20.12.–31.12.	India Rajasthan	Hospital patients die for lack of care following doctors' strike	60 dead
25.12.	Nigeria Abuja	Bomb explosion in a catholic church during Christmas mass	35 dead 52 injured

Tables showing the major losses 1970–2011

Table 9

The 40 most costly insurance losses (1970–2011)

Insured loss¹⁷

(in USD m,

indexed to 2011)

	Victims ¹⁸	Date (start)	Event	Country
74 686	1 836	25.08.2005	Hurricane Katrina; floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
35 000	19 184	11.03.2011	Earthquake (M _w 9.0) triggers tsunami; aftershocks	Japan
25 641	43	23.08.1992	Hurricane Andrew; floods	US, Bahamas
23 848	2 982	11.09.2001	9/11 attacks	US
21 239	61	17.01.1994	Northridge earthquake (M 6.6)	US
21 141	136	06.09.2008	Hurricane Ike; floods, offshore damage	US, Caribbean: Gulf of Mexico, et al
15 350	124	02.09.2004	Hurricane Ivan; damage to oil rigs	US, Caribbean; Barbados, et al
14 468	35	19.10.2005	Hurricane Wilma; floods	US, Mexico, Jamaica, Haiti, et al
12 000	813	27.07.2011	Flood caused by heavy monsoon rains	Thailand
12 000	181	22.02.2011	Earthquake (M _w 6.3), aftershock (M _w 5.6)	New Zealand
11 625	34	20.09.2005	Hurricane Rita; floods, damage to oil rigs	US, Gulf of Mexico, Cuba
9 583	24	11.08.2004	Hurricane Charley; floods	US, Cuba, Jamaica, et al
9 322	51	27.09.1991	Typhoon Mireille/No 19	Japan
8 292	71	15.09.1989	Hurricane Hugo	US, Puerto Rico, et al
8 248	562	27.02.2010	Earthquake (M _w 8.8) triggers tsunami	Chile
8 036	95	25.01.1990	Winter Storm Daria	France, UK, Belgium,, et al
7 830	110	25.12.1999	Winter Storm Lothar	Switzerland, UK, France, et al
7 300	354	22.04.2011	Severe storms, tornadoes	United States (Alabama, et al)
7 050	155	20.05.2011	Severe storms, tornadoes	United States (Missouri, et al)
6 609	54	18.01.2007	Winter Storm Kyrill; floods	Germany, UK, Netherlands,, et al
6 135	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands, et al
6 127	38	26.08.2004	Hurricane Frances	US, Bahamas
5 491	64	25.02.1990	Winter Storm Vivian	Europe
5 454	26	22.09.1999	Typhoon Bart/No 18	Japan
5 300	55	22.08.2011	Hurricane Irene, extensive flooding	United States, et al
5 155	–	04.09.2010	Earthquake (M _w 7.0), over 300 aftershocks	New Zealand
4 870	600	20.09.1998	Hurricane Georges; floods	US, Caribbean
4 577	41	05.06.2001	Tropical Storm Allison; floods	US
4 527	3 034	13.09.2004	Hurricane Jeanne; floods, landslides	US, Caribbean: Haiti, et al
4 268	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
3 918	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 810	70	10.09.1999	Hurricane Floyd; floods	US, Bahamas, Columbia
3 697	59	01.10.1995	Hurricane Opal; floods	US, Mexico, Gulf of Mexico
3 648	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
3 418	25	24.01.2009	Winter Storm Klaus, wind up to 170 km/h	France, Spain
3 240	45	27.12.1999	Winter Storm Martin	Spain, France, Switzerland
3 055	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 886	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria, et al
2 840	64	27.02.2010	Winter Storm Xynthia, winds up to 160 km/h	France, Germany, Belgium, et al
ns ¹⁹	167	06.07.1988	Explosion on platform Piper Alpha	UK

¹⁷ 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 38 "Terms and selection criteria")

¹⁸ Dead and missing

¹⁹ ns: not shown

Table 10

The 40 worst catastrophes in terms of victims (1970–2011)

Victims ²¹	Insured loss ²⁰ (in USD m, indexed to 2011)	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	103	12.01.2010	Earthquake (M _w 7.0)	Haiti
220 000	2 381	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 floods	Myanmar (Burma), Bay of Bengal
138 000	3	29.04.1991	Tropical Cyclone Gorky	Bangladesh
87 449	383	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	198	21.06.1990	Earthquake (M 7.7); landslides	Iran
35 000	1 542	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	296	04.02.1976	Earthquake (M 7.5)	Guatemala
19 737	127	26.01.2001	Earthquake (M _w 7.6) in Gujarat	India, Pakistan, Nepal, et al
19 184	35 000	11.03.2011	Earthquake (M _w 9.0) triggers tsunami	Japan
19 118	1 350	17.08.1999	Earthquake (M _L 7) in Izmit	Turkey
15 000	–	11.08.1979	Macchu Dam bursts in Morvi	India
15 000	–	01.09.1978	Floods following monsoon rains in the north	India, Bangladesh
15 000	135	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	297	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	673	19.09.1985	Earthquake (M 8.1)	Mexico
9 475	–	30.09.1993	Earthquake (M 6.4) in Maharashtra	India
9 000	690	22.10.1998	Hurricane Mitch in Central America	Honduras, Nicaragua, et al
6 425	3 648	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
5 749	45	27.05.2006	Earthquake (M _L 6.3); Bantul almost 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
5 000	–	30.06.1976	Earthquake in West Irian	Indonesia
5 000	1 326	05.03.1987	Earthquake; oil pipeline damaged	Ecuador

²⁰ Property and business interruption, excluding liability and life insurance losses²¹ Dead and missing

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, tsunamis, and other natural catastrophes.

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

Man-made disasters

This study categorises major events associated with human activities as “man-made” or “technical” disasters. 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 7 and 8 (pages 19–35), 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. Insured losses are gross of any reinsurance, be it provided by commercial or government schemes. 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 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.

Thresholds for insured losses and casualties in 2011

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.

For the 2011 reporting year, the lower loss thresholds were set as follows:

Insured losses:	
Maritime disasters	USD 18.0m
Aviation	USD 35.9m
Other losses	USD 44.6m
or Total losses:	USD 89.2m
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 (2011) 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 2011 prices:	USD 1 365.6m

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 2011 prices of USD 1 398m, 2% more than with the standard *sigma* method. The reason for the difference is that the value of the GBP rose by 4% against the USD in the period 2000–2011, ie more than the difference in inflation between the US (30.6%) and the UK (28.5%) over the same period.

Figure 7
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	1.494	1 045.7	1 045.7
Level of consumer price index 2000	93.1			172.2
Level of consumer price index 2011	119.6			224.9
Inflation factor	1.285			1.306
Adjusted for inflation to 2011	899.8	1.554	1 398.4	1 365.6
Comparison			102%	100%

Source: Swiss Re Economic Research & Consulting

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

Information on individual events is not available.

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

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 9 and 10 on pages 36-37).

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 2011 according to loss category. *sigma* does not provide further information on individual insured losses or about updates made to published data.

Sources

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

Table 11
Exchange rates used when converting total damage and/or insured losses

Country	Currency	Exchange rate, end 2011
Australia	AUD	0.9754
Brazil	BRL	1.8653
Canada	CAD	1.0183
China	CNY	6.294
Colombia	COP	1938.5
Denmark	DKK	5.7254
Europe	EUR	0.7703
United Kingdom	GBP	0.6435
India	INR	53.105
Japan	JPY	76.94
South Korea	KRW	1152
Kazakhstan	KZT	148.485
Laos	LAK	8002.5
Myanmar	MMK	6.51
Mexico	MXN	13.9554
Namibia	NAD	8.076
Norway	NOK	5.9680
Nepal	NPR	85.39
Philippines	PHP	43.855
Russia	RUB	32.123
Thailand	THB	31.55
Turkey	TRY	1.8887
US	USD	1
South Africa	ZAR	8.0734

Source: Swiss Re, *sigma* catastrophe database

²² 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.

²³ The losses for 2011 were converted to USD using these exchange rates. No losses in any other currencies were reported.

Recent *sigma* publications

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

Telephone +41 43 285 2551
Fax +41 43 282 0075
sigma@swissre.com