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Natural catastrophes and man-made disasters in 2012:
A year of extreme weather events in the US

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Executive summary

Large-scale weather events in 2012 led to the third highest insured losses since 1970

Catastrophes claimed over 14 000 lives in 2012. Insured losses were over USD 77 billion.

Natural catastrophes and man-made disasters claimed approximately 14 000 lives and resulted in economic losses of about USD 186 billion in 2012. The cost to insurers was over USD 77 billion, making 2012 the third-highest year since 1970, when *sigma* began collecting natural catastrophe data.

318 disasters were recorded in 2012.

In 2012, 318 catastrophic events occurred, of which 168 where natural catastrophes and 150 man-made disasters.

Typhoon Bopha in the Philippines was the event with the highest loss of lives.

Of the approximately 14 000 people who died in catastrophic events in 2012, Typhoon Bopha in the Philippines accounted for above 1 900. Flooding in Pakistan and an earthquake in Iran, as well as a cold snap in Europe added to the overall human toll.

Catastrophes cost society about USD 186 billion in 2012. Extreme weather in the US and an earthquake in Italy caused most of the damage.

In terms of economic losses, natural catastrophes and man-made disasters cost society USD 186 billion in 2012, versus USD 403 billion in 2011, the year with the highest economic losses on record. Overall, North America was the hardest-hit region, with economic losses of USD 118 billion. The US suffered one of the most severe droughts in recent decades, affecting the most productive agricultural region of the US. In addition, at the end of the North Atlantic hurricane season, Hurricane Sandy lashed the north-eastern coast of the US and left New York City without electricity for days. A series of earthquake shocks caused extensive damage to the manufacturing centre of Northern Italy, leading to the country's worst natural catastrophe in terms of economic impact since *sigma* records began.

Natural catastrophes cost insurers over USD 71 billion, while man-made disasters accounted for USD 6 billion.

Natural catastrophes cost over USD 71 billion in 2012, while man-made disasters triggered additional claims of about USD 6 billion. By way of comparison, overall insured losses totalled USD 126 billion in 2011. Most of the losses in 2012 arose from Hurricane Sandy, the summer drought and several thunderstorms in the US. Insured losses were highest in North America, where they reached almost USD 65 billion. While insured catastrophe losses declined significantly in 2012 from the record levels in 2011, they were still above the average of recent years.

There is a USD 109 billion gap between insured and non-insured economic losses.

Severe weather events again affected many parts of the world. Although insurance cannot bring back lost lives, many people and businesses can rely on insurance cover to provide financial relief, as was the case for the US. However, in large parts of the world that are exposed to severe weather events, people and businesses could increase risk-preparedness by eliminating underinsurance.

This edition of *sigma* features a special chapter on Sandy, investigating the factors behind the devastations it caused.

This *sigma* features a special chapter on Hurricane Sandy which investigates the factors that caused the devastation and the insured losses that followed. A combination of large affected areas, a high concentration of property values and high insurance penetration all contributed to the large insured loss resulting from the storm.

Based on current exposure and insurance penetration, Hurricane Sandy was the second most expensive hurricane to hit the north-eastern coast of the US.

A simulation of insured losses from historical storms shows that a loss like the one triggered by Sandy should be expected about every 5 years when looking at the entire US, but is likely to be less frequent in the north-eastern part of the US, where Sandy was the second most expensive Hurricane since 1900. Only the 1938 Long Island Express storm would have been more expensive if it had happened today.

Rising sea levels will make losses like the one caused by Hurricane Sandy even more likely in the future.

Assuming a 10-inch rise in sea levels by 2050, Swiss Re's proprietary storm-surge model shows that the frequency of losses like Sandy are likely to increase in the future.

Overview of catastrophes in 2012

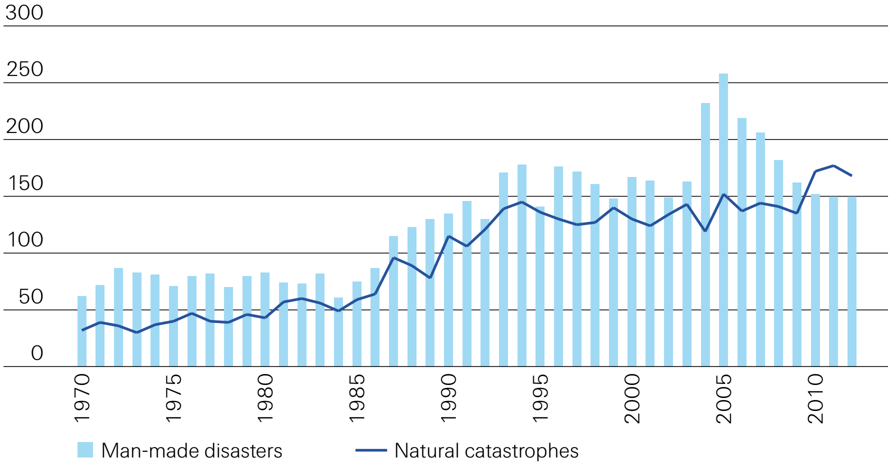
Over 300 catastrophic events occurred in 2012

The *sigma* event selection criteria, 2012		
		Threshold in USD
Insured losses (millions):		
	Maritime disasters	18.3
	Aviation	36.7
	Other losses	45.5
or Total economic losses (millions):		91.1
or Casualties:	Lost or missing lives	20
	Injured	50
	Homeless	2000

The number of catastrophic events declined in 2012 compared with the previous year. Out of the 318 catastrophic events that occurred in 2012, 168 were natural catastrophes, while the remaining 150 events were man-made disasters, unchanged from 2011 (see Figure 1). In 2012, the number of natural catastrophes was lower than in 2011.

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 2012 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 1970-2012



Source: Swiss Re Economic Research & Consulting

Approximately 14 000 people around the world were victims of catastrophes

Typhoon Bopha in the Philippines accounted for 1 901 of the approximately 14 000 lives lost globally due to natural catastrophes and man-made disasters in 2012.

In 2012, approximately 14 000 people lost their lives due to natural catastrophes and man-made disasters, making this one of the ten least-deadly years on *sigma* records. By comparison, more than 70 000 people lost their lives in catastrophes each year on average since 1990. Compared to 2011, when the tsunami in Japan alone claimed over 19 000 lives, the number of victims fell by almost 60%. The deadliest event in 2012 was Typhoon Bopha, which killed more than 1 900 people after making landfall in the Philippines.

Natural catastrophes claimed 9 000 lives.

Approximately 9 000 people were killed or went missing due to natural catastrophes, over 8 000 of which were claimed by weather-related events – (see Figure 2). After Typhoon Bopha, a cold snap that affected much of the European continent at the beginning of the year claimed the lives of over 800 people. Flooding in Pakistan led to a further 455 deaths, and an earthquake in Iran accounted for 304 victims. .

Man-made disasters claimed approximately 5 000 victims in 2012.

Approximately 5 000 people were victims of man-made disasters, down from 5 643 in 2011.

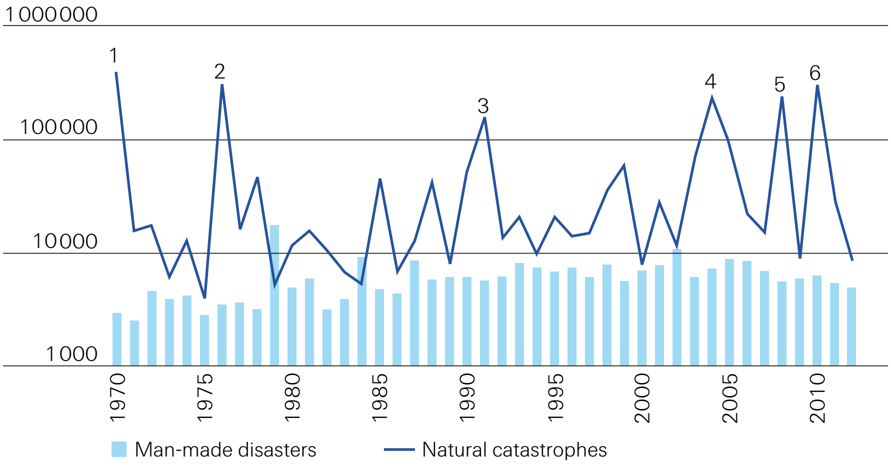
A fire in a prison in Honduras was the deadliest man-made disaster.

The man-made disasters that resulted in the most victims in 2012 was a prison fire in Honduras, where 361 people died, making it the world's deadliest prison fire in a century.

Maritime and aviation disasters accounted for over 1 700 and 400 victims.

Other man-made disasters that resulted in a high number of victims in 2012 include the explosion at an arms depot in the Republic of Congo (286 victims) and a fire in a garment factory in Pakistan (240 victims). Maritime and aviation disasters that meet *sigma* criteria accounted for over 1 700 and 400 victims, respectively. Terrorism attacks around the world led to the loss of almost 800 more lives, up from 500 in 2011.

Figure 2
Number of victims 1970–2012



1 1970: Bangladesh storm, Peru earthquake
2 1976: Tangshan earthquake, China
3 1991: Cyclone Gorky, Bangladesh
4 2004: Indian Ocean earthquake and tsunami
5 2008: Cyclone Nargis, Myanmar
6 2010: Haiti earthquake

Note: The scale is logarithmic – the number of victims increases tenfold per band
Source: Swiss Re Economic Research & Consulting

Total economic losses estimated at about USD 186 billion

Estimated total economic losses were about USD 186 billion, primarily due to weather-related events.

Natural catastrophes and man-made disasters cost society about USD 186 billion in 2012. Most of the losses were due to Hurricane Sandy, which devastated the north-eastern coast of the US. The storm also affected the Caribbean and Canada, making it the largest North Atlantic hurricane on record in terms of wind span. The impact of the winds and ensuing flooding from the storm surge caused about USD 70 billion in economic losses. Last year, Italy suffered the most damaging earthquake in its history in terms of total economic losses. The earthquake caused significant property damage and disrupted local manufacturing activity, estimated to be over USD 16 billion.

Economic losses from man-made disasters in 2012 were roughly USD 8 billion.

Man-made disasters are estimated to have caused roughly USD 8 billion in damages. The cruise liner Costa Concordia running aground off the Tuscan coast in Italy and damaging fires and explosions on drilling platforms and in other oil and gas facilities were among the costliest man-made disasters of 2012.

Table 1
2012 economic losses by region

Region	USD bn	% of GDP
North America	119	0.68%
Latin America & Caribbean	4	0.08%
Europe	27	0.13%
Africa	1	0.08%
Asia	30	0.13%
Oceania/Australia	1	0.07%
Seas/Space	3	–
Total	**186**	**0.13%**

Source: Swiss Re Economic Research & Consulting

Insured losses of USD 77 billion make 2012 the third most expensive year ever

Insured losses from catastrophic events were more than USD 77 billion, making 2012 the third-highest loss year for insurers.

Of the USD 186 billion in total damage caused by catastrophic events in 2012, more than USD 77 billion (see Figure 3), were covered by insurance. According to the *sigma* records, this makes 2012 the third-most expensive year for the insurance industry, after 2011, the year in which record earthquakes and floods contributed to losses of over USD 126 billion, and 2005, when Hurricanes Katrina, Wilma, and Rita alone caused claims of over USD 100 billion. Most of the losses in 2012 resulted from weather-related events in the US, such as Hurricane Sandy, the drought in the Corn Belt.[1]

Natural catastrophe losses amounted to USD 71 billion, caused mainly by weather-related events.

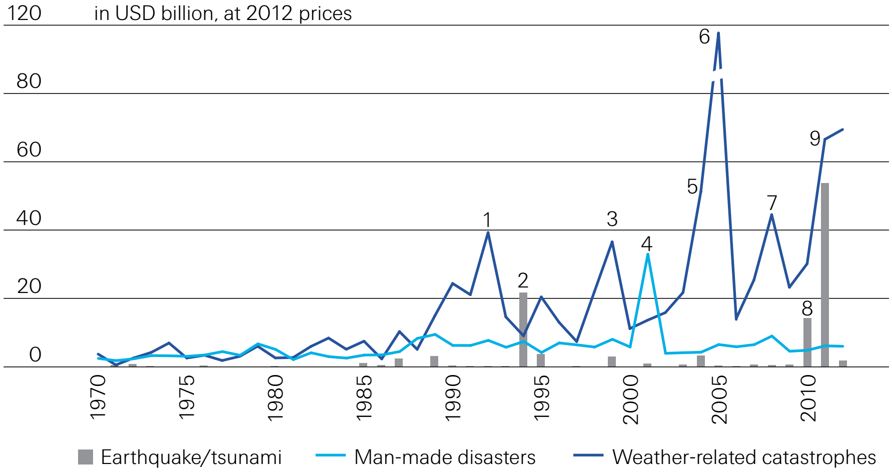
Of the USD 71 billion insured losses from natural catastrophes, USD 69 billion were due to weather-related events, while roughly USD 2 billion were triggered by earthquakes.

[1] Illinois, Indiana, Iowa, Michigan, east Nebraska, east Kansas, south Minnesota and parts of Missouri.

Average insured losses

A comparison of current and past losses becomes more meaningful if the effects of inflation are eliminated. In real terms, the USD 71 billion in natural catastrophe losses are higher than the previous 10-year average loss of USD 48 billion at 2012 prices. However, losses could also be compared to nominal GDP and direct premiums written (DPW). On this basis, the 2012 natural catastrophe loss at 4.3% of DPW and 0.10% of GDP where close to recent historical averages of 3.2% and 0.08% respectively.

Figure 3
Insured catastrophe losses 1970–2012



1 1992: Hurricane Andrew
2 1994: Northridge earthquake
3 1999: Winter Storm Lothar
4 2001: 9/11 attacks
5 2004: Hurricanes Ivan, Charley, Frances
6 2005: Hurricanes Katrina, Rita, Wilma
7 2008: Hurricanes Ike, Gustav
8 2010: Chile, New Zealand earthquakes
9 2011: Japan, New Zealand earthquakes, Thailand flood

Source: Swiss Re Economic Research & Consulting

At least nine events triggered losses of USD 1 billion or more; Hurricane Sandy was the most expensive at USD 35 billion.

Nine disasters triggered insured losses of USD 1 billion or more in 2012 (see Table 4, page 19). For the first time since 2008, a hurricane – Sandy – was the costliest event with insured losses of USD 35 billion. This figure includes USD 20 to 25 billion of private insurance industry loss and flood claims covered by the National Flood Insurance Program (NFIP).[2] The second largest insured loss was the drought in the US, which caused an estimated insured loss of USD 11 billion including the pay-outs from the Federal scheme.[3] Among the other events were tornado outbreaks and a violent line of storms in the Great Plains, Texas and Southeast/Ohio Valley. The largest loss outside the US was triggered by the deadly earthquake shocks in Italy in May.

Insured losses due to man-made disasters amounted to roughly USD 6 billion.

Of the man-made insured losses of roughly USD 6 billion in 2012, the biggest were the cruise liner Costa Concordia running aground in January, fires at offshore drilling platforms in Nigeria and in the North Sea, the explosion at a large oil refinery in Venezuela and explosions at various chemical plants.

[2] The National Flood Insurance Program (NFIP) is a federal scheme that enables property owners to purchase flood insurance at subsidised rates and is designed to provide an alternative to disaster relief after an event. The sigma definition of insured loss also includes flood damages covered by such schemes.
[3] Multi-Peril Crop Insurance (MPCI) in the US is administered through the Risk Management Agency of the US Dept. of Agriculture. Crop insurance is sold through a limited number of lincensed private insurance companies. The federal government subsidises part of the insurance premium. The FCIC (Federal Crop Insurance Corporation) acts as reinsurer and absorbs a major part of the losses when claims exceed the total amount of insurance premiums. The *sigma* definition of insured loss also includes pay-outs from such schemes.

Regional overview

Insured and economic losses were highest in North America.

As a consequence of the extreme weather in the US, both the insured and the economic losses were highest in North America (84% of the insured losses), while Europe came a distant second with only 7%.

Table 2
Catastrophes in 2012, by region

Region	Number	Victims	in %	Insured loss in USD bn	in %	Total loss in USD bn
North America	43	560	4.0%	64.6	83.6%	118.5
Latin America & Caribbean	30	1 167	8.4%	0.9	1.2%	4.2
Europe	33	1 480	10.7%	5.5	7.1%	26.8
Africa	53	2 300	16.5%	0.2	0.3%	1.5
Asia	115	7 177	51.5%	3.4	4.4%	30.5
Oceania/Australia	7	97	0.7%	0.3	0.4%	1.1
Seas/Space	37	1 148	8.2%	2.4	3.1%	3.1
Total	**318**	**13 929**	**100.0%**	**77.2**	**100.0%**	**185.7**

Source: Swiss Re Economic Research & Consulting

North America

North America		
	Victims	560
	Total losses (USD)	118.5bn
	Insured losses (USD)	64.6bn

North America was the most affected region in 2012, in terms of both insured losses (roughly USD 65 billion) and economic losses (over USD 118 billion). Losses were primarily caused by Hurricane Sandy and the severe drought in the Corn Belt.

The tornado season got off to an early and deadly start ...

An early-season tornado outbreak hit the Ohio Valley and south-eastern regions of the US on 2–3 March 2012. According to the US Storm Prediction Centre, 75 tornadoes were reported over the two-day period, making it one of the largest March tornado outbreaks on record (since 1950) and causing the highest tornado-related number of victims (42) for one single outbreak. Insured claims totalled about USD 2.5 billion. Later on, more severe weather in the Midwest and Ohio Valley (on 28 and 29 April) again spawned tornadoes and large hail storms, causing a similar amount of insured claims. At the end of June, a fast-moving, violent line of storms known as derecho[4] developed in Iowa and travelled through the Ohio Valley into the Mid-Atlantic within ten hours, causing insured damage across the various states of about USD 2 billion and also 28 fatalities. The storm highlighted severe failures in the emergency communication infrastructure of the affected states.[5]

... but overall tornado activity in 2012 was below average.

In terms of the number of both recorded tornadoes and victims, the 2012 tornado season ranked 25th since 1950 and was below the average for the past 30 years. Nevertheless, tornadoes and related storms led to insured losses of around USD 14 billion, the second highest on *sigma* records, although significantly lower than historic losses recorded in 2011, when the top two tornado outbreaks triggered a combined USD 15 billion in insured claims. Loss potential from tornadoes and related thunderstorms has consistently shown an upward trend in recent decades. One reason is the advancing urbanisation, which has exposed more insured assets.

[4] According to the NOAA, a derecho is defined as a "widespread, long-lived wind storm that is associated with a band of rapidly moving showers or thunderstorms", and are usually accompanied by straight-line winds.
[5] Public Safety and Homeland Security Bureau Federal Communications Commission, *'Impact of the June Derecho on Communications Networks and Services'*, January 2013.

The 2012 North Atlantic hurricane season was the third-most active on record.

The 2012 North Atlantic hurricane season produced 19 named storms, ten of which developed into hurricanes, and one that was classified as major. While this was the third-most active season on record, no major hurricane (of Category 3 and above) has made landfall in the US, for the seventh year in a row – the longest stretch since the 1860s.

Hurricane Sandy had the largest wind span of any Atlantic hurricane on record.

Even so, the 2012 hurricane season proved very costly. Just when the season was about to end, Hurricane Sandy lashed out on the North East coast of the United States with wind, storm surge and rainfall/snow precipitation, after bringing devastation to the Caribbean. Estimates for the total damage were about USD 70 billion, with USD 35 billion in insured claims, including USD 20 to 25 billion of private insurance industry loss and flood claims covered by the NFIP,[6] making it the second-most expensive storm after Hurricane Katrina in 2005. Several factors contributed to the high toll, despite its relatively weak winds. First, Hurricane Sandy was the largest Atlantic hurricane on record in terms of wind span. Second, the combination of a moon tide and interference with concurrent weather patterns amplified the impact. Third, the record storm surge caused widespread flooding and damage to a densely populated and highly insured area in the East Coast of the US (including New Jersey and New York City). Finally, it also led to the worst power outage caused by a natural catastrophe in the history of the US, in terms of the number of people affected.

Extreme heat led to a historic drought that brought record agriculture losses …

2012 was the warmest year on record in the US since 1895, leading to one of the worst droughts in recent decades. The 2012 drought began with the warmest March on record and extended through the warmest and driest June/July period in the US Corn Belt since 1936. Drought conditions affected more than half of the country for most of 2012, resulting in widespread harvest failure for corn, sorghum and soybean crops across the central agriculture states. Crop failure resulted in record drought-related agriculture losses of USD 11 billion including the pay-outs from the Federal scheme,[7] the largest since *sigma* records began. An estimate of the excess mortality related to heat stress has yet to be completed but, according to current estimates, summer heat wave also directly caused 123 deaths.

… and wildfire losses.

In June, the Waldo Canyon Fire engulfed parts of Colorado Springs, prompting the evacuation of over 32 000 people, including the US Air Force Academy. The fire destroyed over 300 houses, becoming the most damaging fire in Colorado. Insured losses were estimated at about USD 0.5 billion. Several other wildfires occurred throughout the United States, fuelled by record heat and extremely dry weather conditions. The Whitewater-Baldy fires were the largest ever recorded in New Mexico. National Interactive Fire Center (NIFC) data show that more than 9.1 million acres had burned by 30 November, the third-highest since 1960, while the average fire size was the highest on record. Even so, none of the fires had a significant insurance impact.

The most costly event in Canada was a hailstorm in Alberta.

On 12 August, a powerful hailstorm affected parts of the region around Calgary, Alberta in Canada. The storm brought heavy rain and flooding, triggering insured claims of USD 0.5 billion. Additional thunderstorms led to more than USD 1 billion in insured losses for 2012.

[6] The National Flood Insurance Program (NFIP) is a federal scheme that enables property owners to purchase flood insurance at subsidised rates and is designed to provide an alternative to disaster relief after an event. The *sigma* definition of insured loss also includes flood damage covered by such schemes.

[7] Multi-Peril Crop Insurance (MPCI) in the US is administered through the Risk Management Agency of the US Dept. of Agriculture. Crop insurance is sold through a limited number of lincensed private insurance companies. The federal government subsidises part of the insurance premium. The FCIC (Federal Crop Insurance Corporation) acts as reinsurer and absorbs a major part of the losses when claims exceed the total amount of insurance premiums. The *sigma* definition of insured loss also includes pay-outs from such schemes.

The US Corn Belt drought

Following a prolonged dry spell, drought conditions started during July 2012 in Illinois, Indiana and Kentucky and then spread to Nebraska, South Dakota, Kansas and Oklahoma. Eventually the entire Corn Belt region of the US was affected, causing severe damage to crops. At the beginning of 2013, dry weather conditions still lingered in some states.

Drought is not unusual in the US, but the 2012 drought stands out for three main reasons

Drought is not an unusual phenomenon in the US. Previous examples include the dust bowl years between 1933 and 1940, or the periods from 1950 to 1957 and from 1985 to 1988. Paleo-climatic research indicates that longer period of drought have occurred in the past 500 years. Still, the 2012 drought is seen as exceptional for the following reasons:

- Record high temperatures dominated across the Central Plains to Midwest agriculture belt, increasing evapotranspiration during the May–July growing season July 2012 was ranked as the warmest on record.
- It affected a large agricultural area. The Corn Belt is the most productive agricultural area in the US and historically less vulnerable to drought.
- Additionally, a rather wet and warm spring had caused crops to grow fast and early. When dry conditions set in, the lack of rainfall hit the crops in the most critical growth phase, thus agravating the damage.

Harvest failure resulted in record agriculture losses in 2012

The harvest failure resulted in record agriculture losses. The overall insurance claims in US agriculture amounted to USD 16 billion in 2012. Of these, an estimated USD 11 billion relate to the drought in the Corn Belt states, including the pay-outs from the Federal scheme.[8] This was the most expensive drought faced by private and public insurance systems.

High insurance penetration lifted insured agriculture losses in 2012.

A key driver behind the record loss observed in 2012 was the increased insurance penetration in agriculture in recent years. Penetration increased due to the extension of coverage, which went from providing protection against losses triggered by extreme weather to covering losses due to commodity price volatility. The increase in acreage, which was also stimulated by the generous MPCI public-private insurance scheme that encouraged farming on less suitable land, was another reason for the increase in insurance take-up.

The 2012 penetration rate in 1988 and 1930 would have caused higher losses than in 2012.

Applying current insurance penetration rates throughout, the 2002 drought would have been comparable to the 2012 event in terms of market loss ratios. Similarly, the insured losses in agriculture in the years of 1988 and 1930 would have been higher, had the insurance penetration in agriculture been the same.

High crop values have increased the loss in 2012.

The value of crops has also increased – another factor which contributed to the high losses. The strong increase in crop demand, partly due to the rise of the alternative use of crop as fuel, has driven prices up.

[8] Multi-Peril Crop Insurance (MPCI) in the US is administered through the Risk Management Agency of the US Dept. of Agriculture. Crop insurance is sold through a limited number of licensed private insurance companies. The federal government subsidises part of the insurance premium. The FCIC (Federal Crop Insurance Corporation) acts as reinsurer and absorbs a major part of the losses when claims exceed the total amount of insurance premiums. The *sigma* definition of insured loss also includes pay-outs from such schemes.

Europe

Europe	Victims	1480
	Total losses (USD)	26.8bn
	Insured losses (USD)	5.5bn

Natural catastrophes and man-made disasters in 2012 caused total damages of approximately USD 27 billion in Europe. The cost to insurers was over USD 5 billion. Most of the losses were caused by the earthquake in Italy.

A severe cold spell at the start of the year claimed hundreds of lives throughout Europe.

After a seasonally mild December 2011, cold polar air from northern Russia brought a sudden cooling to almost the entire Eurasian continent at the beginning of 2012. From late January into much of February, record low temperatures and heavy snow disrupted large parts of Europe, claiming hundreds of lives and causing utilities and transportation systems to break down. Thick ice closed vast stretches of the Danube and trapped hundreds of boats along the Kerch Strait linking the Sea of Azov to the Black Sea. Snowstorms were also recorded in Rome and as far south as Tripoli. Eastern Europe was particularly hard hit, suffering insured agricultural losses of at least USD 0.3 billion due to frost.

Europe's biggest event in terms of property damage was the earthquake in Northern Italy.

On 7 May, a magnitude 5.9 earthquake hit the northern Italian region of Emilia Romagna, followed by a powerful aftershock of magnitude 5.8 on 29 May with an epicentre 15km north-west of the previous shock. The two shocks combined claimed 26 lives and significantly damaged numerous local industrial facilities as well as many historical buildings. Damage to public infrastructure was moderate. The total cost of the two events combined is currently estimated at over USD 16 billion with insured claims of USD 1.6 billion, making it the biggest insured loss on record for the country.

The earthquake hit an area of moderate seismic risk, with anti-seismic building codes not universally enforced.

Most of the Italian peninsula is exposed to moderate-to-high seismic risk and, as a result, it has a long history of devastating earthquakes. Only three years earlier, in 2009, a magnitude 6.3 earthquake destroyed large parts of the medieval city of L'Aquila, Abruzzo, claiming 308 lives. With an estimated 95000 victims, the 1908 Messina earthquake is the deadliest documented European earthquake. The 2012 earthquake struck in a region of moderate seismic risk, which was classified as seismic in Italian hazard maps only in 2003. Hence, anti-seismic construction codes have only been mandatory in the region since then. This amplified the impact of the ground motion, particularly among the industrial facilities. Most of the damage concerned a particular type of prefabricated reinforced concrete structure which is quite common with industrial buildings in Italy and is known to have performed poorly in previous earthquakes.

Earthquake insurance in Italy

Earthquake insurance penetration is low for residential property…

Natural catastrophe insurance coverage is low in Italy, especially for residential property.[9] According to the Italian Association of Insurance Companies (ANIA),[10] an estimated 44% of residential properties have a fire insurance policy, but only 0.4% of those policies have any earthquake cover. This is due to a lack of both demand and supply resulting from over-reliance on post-disaster government intervention for both contingency funds and full reconstruction of the residential property.

… but relatively high for commercial property.

In contrast to residential insurance, commercial property insurance penetration is high. An estimated 40% of commercial and industrial policies are estimated to include earthquake coverage. However, 14% of companies with fewer than 250 employees do not have any form of property insurance.

[9] Swiss Re, *'The Italian insurance market: opportunities in the land of the Renaissance'*, August 2012.
[10] ANIA, *'L'indagine ANIA sulla domanda di assicurazione delle piccole imprese. Caratteristiche e risultati'*, February 2010.

Insured losses were mainly commercial.

Insured losses originated mainly from industrial facilities, given the low earthquake insurance penetration among residential properties. The affected area is renowned for its *Parmesan* and "*Grana Padano*" cheeses and boasts some 60 000 firms, the great majority of which are small and medium-sized enterprises. Since such firms are less likely to purchase insurance, this may explain why the insured loss was not higher, despite the relatively high earthquake insurance penetration for commercial properties.

Record-breaking rainfall led to hefty insured losses from flood damage in the UK.

Heavy flooding caused losses of over USD 1.7 billion in the UK. This made 2012 the worst year in terms of flood damage since 2007, when two heavy floods in rapid succession caused a combined insured loss of approximately USD 5 billion (at 2012 prices). The impact of the record breaking rainfall of 2012 was lessened by the preceding two years of drought, which had dried out the soil, and by favourable timing of the rainfall, with intermittent dry periods.

Costa Concordia was the biggest man-made disaster in Europe.

The biggest man-made disaster of the region was the cruise liner Costa Concordia running aground just off the island of Giglio, about 16 kilometres off Italy's Tuscan coast. Thirty passengers were confirmed dead and another two are still officially listed as missing since the incident, which occurred on 13 January 2012. The ship has been lying on its starboard side ever since. An unprecedented salvage operation to re-float it – a process known technically as parbuckling - is scheduled to be completed in September 2013. The Costa Concordia will then be towed to Sicily, where it will take two years to break it into scrap, ending the life of Italy's biggest cruise ship with the biggest salvage operation in nautical history. The salvage operations are greatly complicated by the delicate protected ecosystem of the Tuscan Archipelago National Park, Europe's largest marine park.

Asia

Asia	Victims	7 177
	Total losses (USD)	30.5bn
	Insured losses (USD)	3.4bn

As in 2011, Asia was the hardest-hit region in 2012 in terms of the impact on human lives, with over 7 000 victims. The aggregate total cost of disastrous events was estimated at more than USD 30 billion, while insured losses were above USD 3 billion. In comparison, in 2011 the region suffered total losses in excess of USD 282 billion and insured losses of USD 53 billion, for the great majority caused by the historic earthquake in Japan and the record flood losses in Thailand.

The most deadly event in Aisa was Typhoon Bopha.

Towards the end of the year, Typhoon Bopha lashed the eastern coast of Mindanao Island in the Philippines. Over 1 900 people either lost their lives or went missing. The massive storm caused extensive damage to lifelines, property, infrastructure and agriculture, leading to a total estimated cost of USD 0.9 billion (preliminary). Earthquake events in Iran led to the loss of a further 306 lives.

Deadly and damaging floods engulfed regions of China and Pakistan.

China and Pakistan again endured deadly and damaging floods throughout the summer, leading to a loss of over 900 lives, widespread destruction of private dwellings and damage to cropland and transport infrastructure, with a total economic loss of USD 14 billion.

A storm triggered property damage in Japan, while Typhoon Bolaven caused agriculture losses in South Korea.

A powerful storm caused devastation and transport disruption in Japan and insured losses of over USD 0.8 billion. Typhoon Bolaven caused extensive damage to cropland in South Korea, leading to agriculture claims alone in excess of USD 0.2 billion, out of overall insured losses of USD 0.4 billion.

An unprecedented electrical blackout in India affected millions of people.

In northern India, weak monsoon rains forced farmers to pump water to their fields causing three of India's interconnected power grids to collapse for several hours on one day in summer. As a result northern India suffered the largest electrical blackout in history, affecting an area encompassing about 670 million people.

Fires in garment factories in Pakistan and Bangladesh were among the most deadly man-made disasters in the region.

In September 2012, a fire broke out in a garment factory in Pakistan, leading to the loss of 243 lives. At least 102 people were confirmed dead in another clothing factory, in Dhaka, Bangladesh, making it the deadliest factory fire in the nation's history. Bangladesh is home to over 4 500 garment factories servicing global retailers, and is the world's biggest exporter of clothing after China. Explosions and fires at one of the world's largest petrochemical industrial estates in eastern Thailand killed 12 people and injured more than 100 others. The blasts forced the evacuation of more than 1 000 people living near the Map Ta Phut industrial estate. A series of terrorist attacks continued to plague Pakistan, claiming at least 200 lives.

Oceania

Oceania	Victims	97
	Total losses (USD)	1.1bn
	Insured losses (USD)	0.3bn

Natural catastrophes and man-made disasters in 2012 caused total damages of over USD 1 billion in Oceania. The cost to insurers was roughly USD 0.3 billion.

Floods again affected Australia at the beginning of the year.

After the unprecedented disasters of 2011, the region benefited from a more benign year in 2012. Australia was affected by flood events in Queensland and New South Wales at the beginning of 2012 that cost insurers approximately USD 0.3 billion.

Latin America and the Caribbean

Latin America and the Caribbean		
	Victims	1 167
	Total losses (USD)	4.2bn
	Insured losses (USD)	0.9bn

Natural catastrophes and man-made disasters in 2012 caused a total damage of more than USD 4 billion in Latin America and the Caribbean. The cost to insurers was over USD 0.9 billion. Heavy rainfall again caused flooding in Brazil, as well as Colombia, Peru and Ecuador. These flood events led to more than 100 deaths. The economic losses are estimated at USD 0.2 billion.

Drought destroyed crops and let to power cuts in Brazil.

Persistent dry weather conditions affected north-eastern Brazil, leading to the most severe drought in half a century. This caused water shortages, loss of crops and livestock, as well as frequent power outages. October saw Brazil's worst power cut in a decade.

Floods and hurricanes were the main natural catastrophes to hit Latin America in 2012.

Apart from floods and drought, Latin America was also impacted by hurricane-force winds. Both Hurricane Sandy and Hurricane Isaac caused damage in the Caribbean. Hurricanes Carlotta and Ernesto made landfall in Mexico. Approximately 19 people perished and economic losses totalled USD 0.8 billion. Combined insured losses were moderate, at USD 0.1 billion. In June in Peru, cold weather claimed an estimated 252 lives, mainly children and affected many more with respiratory problems.

A prison fire in Honduras claimed the most victims.

A fire started by an inmate at an overcrowded prison in Comayagua, Honduras, killed 361 people, many of them trapped in their cells, making it the world's deadliest prison fire in a century. In August, an explosion at a refinery in Venezuela, the second-largest refining complex in the world, caused the death of 48 people, making it one of the global oil industry's most deadly accidents in recent years.

Africa

Africa	Victims	2 300
	Total losses (USD)	1.5bn
	Insured losses (USD)	0.2bn

Natural catastrophes and man-made disasters in Africa claimed more than 2 000 lives in 2012 and caused a total damage of about USD 1.5 billion, with insured losses of less than USD 0.2 billion.

Floods in West and Central Africa were among the most damaging events in the region.

Above-average rainfall was recorded in West and Central Africa, resulting in floods affecting three million people. In Nigeria, the River Niger burst its banks, causing the worst floods in the past four decades. The flooding also temporarily affected crude production in the Niger Delta region of Nigeria, home to the continent's largest oil industry, and neighbouring Niger, Chad and Senegal, with a total loss of at least 266 lives.

A hailstorm in South Africa was the most expensive natural catastrophe in terms of insured losses.

A hailstorm in South Africa in October caused insured losses in excess of USD 100 million. A fire at an offshore drilling platform in Nigeria added to the insured tally in the region.

An explosion at an arms depot in the Republic of Congo was among the most deadly man-made disasters.

An explosion at an arms depot caused by an electrical short circuit in Brazzaville, Republic of Congo and the resulting fires which spread to the city led to the death of 286 people. A series of clashes between opposing ethnic and religious factions plagued the Nigerian Middle Belt, causing the loss of approximately 500 lives.

Hurricane Sandy

Sandy – an exceptional storm?

2012 will be remembered as the year of Hurricane Sandy.

Even beyond the natural catastrophe insurance community, the year 2012 will be widely remembered as the year of Hurricane Sandy. Etched into the memory of most people are the pictures of a 'blacked out' downtown Manhattan following power outages in the wake of the catastrophe. Media coverage in the US and abroad was extensive both as Hurricane Sandy approached the US mainland and in the aftermath of its landfall in southern New Jersey.

Sandy developed in the Caribbean Sea and made landfall close to Atlantic City on the evening of 29 October.

Hurricane Sandy developed on 22 October in the Caribbean Sea south of Jamaica. It strengthened quickly in a favourable environment of warm sea water and low wind shear. Moving north, it made landfall in Jamaica on 24th and hit Cuba the next day as a Saffir-Simpson category 2 storm. Strong winds and heavy seas were experienced close to the storm track. Rainfall inflicted additional damage in more distant places like Haiti and the Dominican Republic. Hurricane Sandy continued north, along the eastern fringe of the Bahamas to a location some 450 km to the east of Cape Hatteras around midnight on 28 October. At this point in time, tropical storm force winds extended more than 800 km from Sandy's centre, and were already affecting huge swathes of the US coast from Massachusetts down to North Carolina. Hurricane Sandy then curved north-westwards, accelerating towards the New Jersey shore. It made landfall close to Atlantic City on the evening of 29 October, impacting the north-eastern US with the combined effects of wind, storm surge and rainfall/snow precipitation.

Sandy caused USD 70 billion of damage, 35 billion of which was insured.

Total economic damage due to Sandy is estimated to be approximately USD 70 billion. Of this the insurance industry is covering USD 35 billion,[11] including USD 20 to 25 billion of private insurance industry loss and flood claims covered by NFIP, thus contributing significantly to post-disaster relief. On the residential side, insured losses were roughly equally split between wind and flood damage. On the commercial side, it is estimated that roughly 65 – 70% of insured losses were caused by flood.

Table 3
Ranking of historical US hurricanes according to simulated losses using current exposure data

Rank	Hurricane year and name	
1	1926	Great Miami
2	2005	Katrina*
3	1992	Andrew
4	1900	Galveston
5	1928	Lake Okeechobee
6	1947	Fort Lauderdale
7	1938	Long Island Express
8	1945	Homestead, FL
9	1965	Betsy
10	1915	Galveston
11	1921	Tampa Bay
12	1960	Donna
13	1944	Pinar del Rio
14	2012	Sandy

* The estimated Hurricane Katrina loss is based on levee failure and subsequent flooding of New Orleans as it happened in 2005, i.e. it does not consider levee improvements carried out since.

Despite the wide-spread destruction Sandy caused, it ranks only as number 14 compared to simulated US hurricane losses since 1900.

In a simulation exercise using Swiss Re's proprietary tropical cyclone model, the meteorological characteristics of historic storms were applied to current insured onshore property and business interruption assets. Comparing the resulting 'as if' losses with an equivalent loss estimate for Sandy reveals that Hurricane Sandy ranks only as number 14 of all US hurricane losses since 1900 (see Table 3).

[11] The National Flood Insurance Program (NFIP) is a federal scheme that enables property owners to purchase flood insurance at subsidised rates and is designed to provide an alternative to disaster relief after an event. The *sigma* definition of insured losses also includes flood damage covered by such schemes.

The industry should expect a hurricane loss like Sandy every 5 to 10 years.

Looking at the past 113 years of hurricane experience in the US, a loss like Sandy is expected to be reached or exceeded about once every eight years. However, scientific research indicates increased hurricane activity levels in the North Atlantic due to rising sea surface temperatures. Allowing for such effects, Swiss Re's tropical cyclone model suggests a US-wide return period[12] of below five years for the insured Hurricane Sandy loss.

For the north-eastern part of the US alone, Sandy was the second most expensive Hurricane since 1900.

Nonetheless, focusing solely on past events in the north-eastern part of the US, Sandy ranks second only to the 1938 Long Island Express storm. One of the reasons for the scale of the losses relates to the sheer size of the storm, which essentially affected the whole north-eastern seaboard of the US. In addition, Sandy was accompanied by an unprecedented storm surge in some parts of the US costline.

Record wind field

Hurricane Sandy was the largest Atlantic Hurricane on record in terms of wind fields…

Hurricane Sandy had the largest reach of tropical storm-force winds ever recorded, spanning almost 1000 miles of coastline when it made landfall in New Jersey. It smashed numerous existing low-pressure records across locations in Maryland, New Jersey and Pennsylvania. But rather than concentrating its wind energy tightly around the central core, Hurricane Sandy instead developed a large wind field that spread out over wide swathes of the US Northeast coast.

… but relatively weak in terms of wind speed.

Consequently, the wind speeds recorded during Sandy were much lower than those measured during historic hurricanes in the US Northeast. Hurricane Sandy reached maximum peak gusts of slightly above 90 mph along the New Jersey coast and on Long Island, NY. By way of comparison, during the passage of Hurricanes Carol (1954) and Donna (1960), peak gusts of 130 mph were recorded, while the 1938 Long Island Hurricane peak gusts are believed to have exceeded 120 mph along wide sections of the coast. The same picture of relatively weak wind speed was also observed at inland locations, for example at Philadelphia Airport, where Hurricane Sandy's gusts reached only 68 mph versus a record of 94 mph set by Hurricane Hazel (1954).

Wind damage accounted for less than half of the insured losses – but could have been a lot worse.

Based on information currently available, it is estimated that less than 50% of the total insured Hurricane Sandy loss, taking into account the NFIP losses, can be associated with wind damage. However, the relatively low wind speeds recorded should also serve as a reminder that wind damage inflicted by Hurricane Sandy was much lower than its potential in the Northeast. Indeed, a Long Island Express type of event could result in wind damage making up 80% or more of overall losses.

Massive storm surge

Hurricane Sandy produced a remarkable storm surge, affecting the entire north-eastern coastline of the US.

Hurricane Sandy produced a remarkable storm surge, which added significantly to overall insured losses. However, different areas along the north-eastern coastline were affected to different degrees. The surge death the hurricane generated was historically large in the densely populated area of Manhattan and regions to the south. By contrast, measured water levels rose more modestly in areas such as Long Island Sound a few dozen kilometres to the northeast of Manhattan, and by much less than during the hurricanes in 1938 or 1954.

[12] Return period is defined as the estimated likelihood of an event recurring.

The financial impact of rising sea levels on insurers

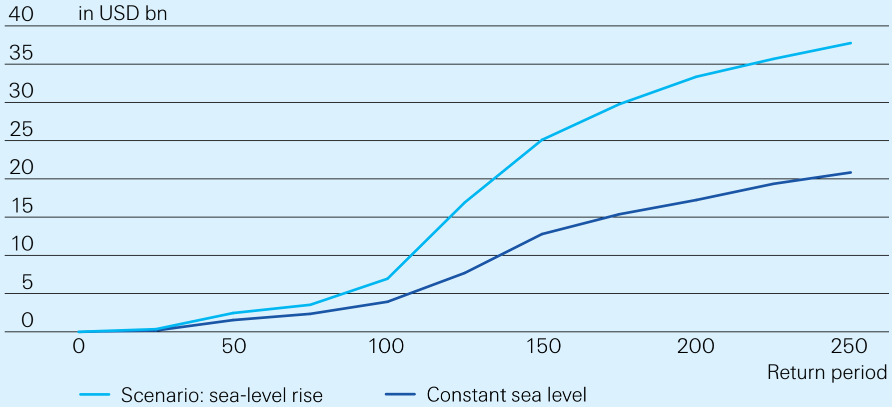
Further increases in sea levels are highly likely.

Estimating prospective changes in sea levels involves significant uncertainties, not least because future events (eg large volcanic eruptions) could alter current trends. However, a continuation of the steady rise observed in the past century is considered most likely.

Swiss Re simulated the financial impact ofrising sea levels using its proprietary storm surge model.

Using Swiss Re proprietary storm-surge model, it is possible to assess the financial impact of rising sea levels on the insurance industry. Assuming the sea level rises by 10 inches (0.25 meters) by 2050, the model suggests that the probability of extreme flood losses occurring will almost double.[13]

Figure 4
Insured losses reached or exceeded for a given return period in a scenario with sea levels rising by 10 inches and current sea levels.



Source: Swiss Re

The likelihood of extreme storm surge losses increases tremendously with rising sea levels.

Put another way, losses from an event currently reached or exceeded only once in every 250 years would be incurred about every 140 years. Similarly, loss currently levels exceeded only once every 200 years would occur once every 125 years, while those once every 100 years would arise to once every 75 years.

The frequency of events is not the only driver behind insurance losses.

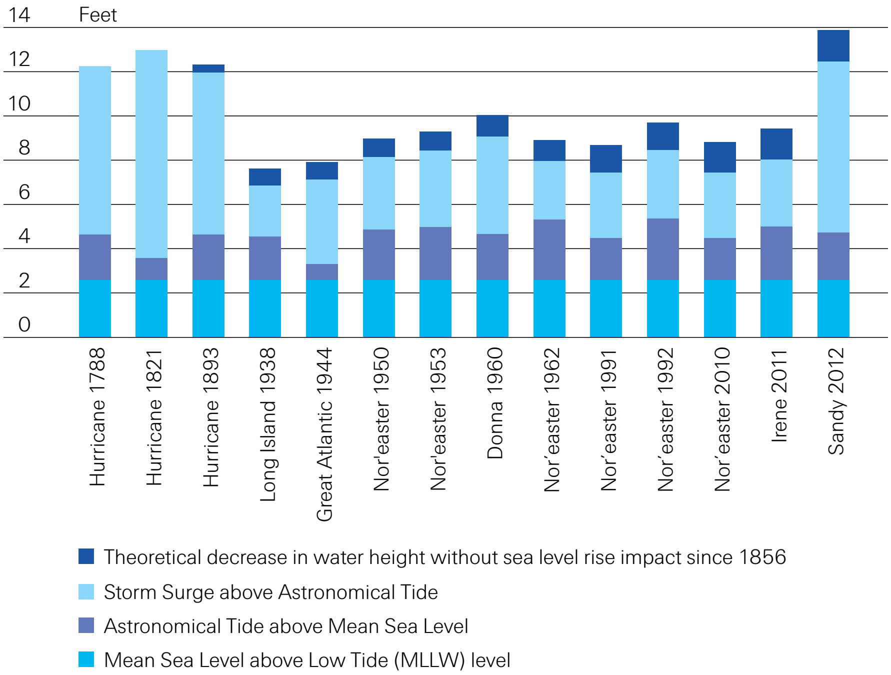
It should be noted however, that the change in occurrence frequency of insured losses does not necessarily correspond with changes in the underlying frequency of events, as insurance deductibles and limits influence estimated loss levels. Additionally, physical protection measures, such as levees, can significantly alter losses.

Even without increased hurricane activity, rising sea levels alone are likely to have a significant impact on future storm surge losses.

So even without considering how climate change may affect future hurricane frequency or severity, the impact of sea-level rise alone is likely to be significant for both those seeking and those providing insurance protection. It is encouraging that decision makers, eg in New York City, are pro-actively investigating the implications of rising sea levels and considering available options for mitigating the potential impact of such a change.

[13] This lies within the range provided by a recent study conducted for the State of New York Horton, R. et al. (2011): Climate risks. In *"Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaption: Technical Report"*, Rosenzweig, C. et al. (Eds). New York State Energy Research and Development Authority, pp. 15–48.

Figure 5
Elements that contributed to the total water height at The Battery, NY, gauge-measuring station during historic storm events



Source: NOAA/NOS, Scileppi & Donnelly, 2007[14]

The storm surge in New York City was unprecedented.

Within Manhattan, some areas were especially hard hit by Hurricane Sandy. Water levels at the Battery Park rose by almost four feet (13.9 feet[15]) exceeding the previous record set by Hurrican Donna in 1960 (10.02 feet) . In fact, the impact of Hurricane Sandy on water levels may well have been greater than in past episodes that predate official records, for example, the 1821 Norfolk and Long Island Hurricane and the strong hurricanes affecting New York in 1788 and 1893.[16]

To the south of Manhattan, the storm surge caused the highest water levels ever recorded in Sandy Hook (13.3 feet)[17] and at the Delaware River gauge, Philadelphia (10.6 feet). At a variety of other locations, like Atlantic City on the New Jersey coast, record tide levels were only barely missed.

Key drivers behind the surge were the timing of Sandy's landfall, its uncommon north-westward direction and the size of tropical storm force winds.

The key drivers behind the storm surge were:
- The timing of the landfall. Peak storm-surge heights coincided at many locations with the daily peaks in the tide levels. Additionally, Sandy's landfall occurred during a full moon, which increased the astronomical high-tide levels.
- The uncommon north-westward direction of the storm's path prior to landfall, leading to winds that blew the water masses directly towards the New York/New Jersey coast.
- The tremendous size of tropical storm force winds in the days before landfall, thus enlarging the volume of water being pushed towards the coast.

[14] Data back to 1938 based on NOAA/NOS (http://tidesandcurrents.noaa.gov/est/est_station.shtml?stnid=8518750), total water heights before 1938 based on estimates by Scileppi & Donnelly, 2007: *Sedimentary evidence of hurricane strikes in western Long Island, New York. Geochemistry, Geophysics, Geosystems, Volume 8, Issue 6*.
[15] All water level figures given in respect to low tide levels (Mean Lower Low Water - MLLW)
[16] This is the result of investigaions of sedimentary records along the US coast to find traces of past hurricane events.
[17] Measured before failure of gauge.

Lessons learnt for the insurance industry

Storm surge not adequately assessed due to poor data quality

Hurricane risk assessment has historically been strongly geared towards wind exposure.

Historically, hurricane risk assessment has been strongly focused on wind exposure. Wind damage in the US is covered under standard fire insurance policies and as a result exposure information for wind insurance is typically of high quality in the US.

Flood insurance in the US

In the US, flood damage for residential property is covered via the NFIP.

Storm surge damage in the US can be insured via the National Flood Insurance Program (NFIP). In order to gain access to such insurance at a given location, certain criteria need to be met. The cover granted by the NFIP is limited: broadly speaking, average mortgage-backed residential properties in storm surge-exposed areas are covered, while high-value properties and, in particular, commercial and industrial risks need to seek insurance beyond NFIP in the private insurance market.

Storm surge models have already improved tremendously over the last decade, but underlying exposure data remains weak.

However, information on storm-surge exposure and insurance conditions is less developed than for wind exposure. This is currently considered a substantial source of uncertainty in the assessment of storm-surgerisk.

Quantifying the influence of location-specific flood protection measures is another hurdle.

Additionally, quantifying the influence of location specific flood protection measures, both physically as well as operationally, will remain a challenge. Primary insurers, the reinsurance industry and natural catastrophe model vendors will need to strive for better data and further improve models to better assess storm surge risk.

Storm surges like the one generated by Sandy will be more frequent in the future

Rising sea levels make losses due to storm surges like the one caused by Sandy more likely in the future.

The frequency of storm surges like the one caused by Hurricane Sandy is likely to increase even without any rise in hurricane activity. The reason for this is the continued trend of rising sea surface levels around the world unities as well as cities along low lying rivers influenced by tidal waters. Along the New York coastline, the observed sea-level rise amounts to an average of 3mm per year over the last century. The globally observed retreat of glaciers and sea ice as well as thermal expansion of warmer ocean waters provide a convincing physical explanation for this observed trend. In the New York area, a region-specific subsidence of the earth's crust adds to the overall sea-level rise.

Power outages can contribute significantly to insurance losses

The storm surge led to prolonge power outages in New York City.

While generally the overhead transmission infrastructure is a big concern during hurricanes, this time the situation was exacerbated by the widespread storm surge flooding of the underground power infrastructure in New York City. This included the flooding and subsequent explosion of vital components of a power plant.

In the absence of effective mitigation measures, losses due to power outages will become more important in the future.

In the absence of effective mitigation measures against rising sea levels, the likelihood of prolonged power outages in the aftermath of such floods will also increase. Hence, the insurance industry needs to improve its understanding of the risks and potential costs linked to prolonged power breakdowns.

The insurance impact of power failure is difficult to assess.

The insurance impact of power failure is extremely difficult to assess, and this is believed to be a major reason why it took a long time for the industry to come up with insurance loss estimates after Hurricane Sandy. In many cases, commercial insurance policies include coverage of power failure losses if an insured peril damages power utility infrastructure (eg a transformer) within 500 or 1000 feet of the premises.

Large corporationstend to have additional off-premises power (OPP) interruption cover.

Beyond this rather restrictive cover, large corporations tend to have so-called off-premises power (OPP) interruption cover (also known as service interruption cover). OPP coverage goes beyond lack of electricity and includes loss of gas, water, sewage and the like, although it generally excludes the interruption of Internet connections.[18]

OPP coverage takes effect if the loss of power is triggered by an insured peril at the power utility and causes a property loss for the policy holder.

OPP coverage is triggered only if an insured peril causes a physical loss to the property of the power utility, and the resulting loss of power causes physical damage (eg due to jamming of machinery) or business interruption loss (eg due to inability to operate). Usually, a waiting period of 24–48 hours applies, after which the OPP insurance becomes active. The cover is also subject to deductibles and sub-limits.

Spoilage of perishable goods is a further aspect to consider.

A further aspect to consider is spoilage of perishable goods, for instance foodstuffs turning bad because cooling systems remain without electricity. Insurance for such damage is independent of OPP cover and is automatically included in most commercial insurance polices, provided that it is caused by damage at the power utility due to an insured peril. Limited cover of this type may also apply under residential homeowner policies depending on the specific policy wordings.

Knock-on effects on business operations further add to insured losses.

Knock-on effects of power failure, eg through contingent business interruption insurance, loss of productivity as a result of general infrastructure problems (transportation) and damage deterioration issues (water, mould) may further add to the overall impact of power failure on insured losses.

Deductibles play an important role

Policy wordings should be designed to minimise the ambiguity around expected payments for all involved parties.

The question of applying or waiving hurricane deductibles was widely discussed in the media, in the insurance industry and among the general public. The controversy was heightened by the classification of Hurricane Sandy as a 'post-tropical cyclone' just before landfall. This again highlighted the need for precise policy wordings that minimise ambiguity and allow all parties to form reliable expectations about coverage, deductibles and the resulting future cash flows from an insurance contract.

Deductibles in property insurance policies are often differentiated by the peril causing the insured loss.

Different deductibles apply in almost all property insurance policies in the US, depending on the peril causing an insured loss. Deductibles for hurricanes tend to be higher than those for other perils.

Higher deductibles allow insurers to focus on those most in need after an event.

The intention behind specific hurricane deductibles is to make the claims-handling process in the wake of a disaster as efficient as possible to help those in need. In the days after Hurricane Sandy, many insurers were faced with claims numbers that were a magnitude higher than the normal flow of claims. Possibilities to ramp up claims-handling staff at short notice are usually limited. The generally overwhelming proportion of small claims diverts insurers' scarce resources away from large claims that can potentially threaten the viability of household and businesses. To help mitigate these undesirable effects, insurers introduce deductibles that limit the claims number for events that can affect a large number of policy holders at the same time.

Higher deductibles and lower administrative costs make insurance cover more affordable in catastrophe-prone regions.

Another benefit of higher deductibles is that they lower the price of insurance coverage in catastrophe-prone regions. Of course, insurers can also offer options for lower deductible amounts if this is desired by the customer. However, the high administrative costs relative to the small claim amounts makes such covers more expensive. Hence, lower deductible levels potentially lead to higher insurance premiums.

[18] Note that this is not general power failure insurance, because 'black-outs' could be caused by events other than those covered under that policy.

Tables for reporting year 2012

Table 4
The 20 most costly insurance losses in 2012

Insured loss[19] (in USD m)	**Victims**[20]	**Date** (start)	**Event**	**Country**
35 000[21]	237	24.10.2012	Hurricane Sandy	US, et al
11 000[22]	123	15.07.2012	Drought in the Corn Belt	US
2 500	42	02.03.2012	Severe storms, tornadoes	US
2 500	1	28.04.2012	Thunderstorms, large hail, tornadoes	US
2 000	28	28.06.2012	Derecho storm with winds up to 146 km/h, tornadoes, hail	US
1 700	–	25.05.2012	Thunderstorms, hail, tornadoes	US
1 622	26	May 2012	Earthquakes (M_W 5.9 and M_W 5.7), aftershocks	Italy
1 600[23]	40	26.08.2012	Hurricane Isaac	US, et al
1 000	–	06.06.2012	Thunderstorms, large hail, tornadoes	US
950	–	11.06.2012	Thunderstorms, large hail, tornadoes	US
910	6	13.04.2012	Thunderstorms, >100 tornadoes, hail, flooding (Wichita)	US
841	4	03.04.2012	Storms with winds up to 150 km/h	Japan
813	1	June 2012	Floods caused by heavy rains (two events)	UK
813	4	23.11.2012	Floods caused by heavy rains	UK
775	–	02.04.2012	Thunderstorms, tornadoes, hail, heavy rains	US
532	–	12.08.2012	Hailstorm	Canada
515	32	13.01.2012	Cruise liner Costa Concordia capsizes after hitting rocks	Italy
450	2	24.06.2012	Waldo Canyon Fire; 346 houses destroyed	US
443	5	04.01.2012	Windstorm Andrea	Germany, et al
npa[24]	2	31.03.2012	Explosion at chemical plant	Germany

Source: Swiss Re Economic Research & Consulting

Table 5
The 20 worst catastrophes in terms of victims 2012

Victims[20]	**Insured loss**[19] (in USD m)	**Date** (start)	**Event**	**Country**
1 901	–	04.12.2012	Typhoon Bopha	Philippines
824	250	21.01.2012	Cold wave, severe frost	Europe
455	–	03.09.2012	Floods caused by heavy monsoon rains	Pakistan
361	–	15.02.2012	Fire in a prison started by an inmate	Honduras
317	–	07.12.2012	Cold wave	Eastern Europe
306	–	11.08.2012	Earthquakes (M_W 6.2 and M_W 6.0)	Iran
286	–	04.03.2012	Explosion at arms depot caused by a short circuit	Congo, Republic of
252	–	01.06.2012	Cold wave	Peru
246	–	02.02.2012	Overcrowded ferry capsizes	Papua New Guinea
244	10	22.07.2012	Floods caused by heavy rains	Nigeria, et al
240	–	12.09.2012	Fire at garment factory	Pakistan
237	35 000[17]	24.10.2012	Hurricane Sandy	US, et al
205	–	30.04.2012	Ferry capsizes on Brahmaputra River	India
185	–	20.01.2012	Armed attacks on police buildings	Nigeria
172	30	07.07.2012	Flash floods; 7 200 houses destroyed	Russia
169	–	18.07.2012	Floods caused by heavy rains	North Korea
153	npa[24]	03.06.2012	Dana Air McDonnell Douglas MD-83 crashes	Nigeria
149	140	21.07.2012	Floods caused by heavy torrential rains	China
144	–	18.07.2012	Ferry capsizes in rough weather	Tanzania
135	–	07.04.2012	Avalanche from Himalaya glacier hits military base	Pakistan

Source: Swiss Re Economic Research & Consulting

[19] 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 48, "Terms and selection criteria").
[20] Dead and missing.
[21] Swiss Re estimate includes USD 20 to 25 billion of private insurance industry loss and flood claims covered by the National Flood Insurance Program (NFIP).
[22] Swiss Re estimate includes losses from Multi Peril Crop Insurance Federal scheme
[23] Swiss Re estimate includes flood claims covered by the National Flood Insurance Program (NFIP).
[24] Not publicly available

Table 6
List of major losses in 2012 according to loss category

	Number	in %	Victims[25]	in %	Insured loss[26] (in USD m)	in %
Natural catastrophes	**168**	**52.8%**	**8948**	**64.2%**	**71278**	**92.3%**
Floods	63		2979		2712	
Storms	61		3129		54065	
Earthquakes	15		717		1787	
Droughts, bush fires, heat waves	8		139		11524	
Cold, frost	13		1806		250	
Hail	5				900	
Other natural catastrophes	3		178			
Man-made disasters	**150**	**47.2%**	**4981**	**35.8%**	**5960**	**7.7%**
Major fires, explosions	**40**	**12.7%**	**1367**	**9.8%**	**2933**	**3.8%**
Industry, warehouses	19		497		1137	
Oil, gas	12		94		1696	
Department stores						
Other buildings	5		454			
Other fires, explosions	4		322		100	
Aviation disasters	**11**	**3.5%**	**449**	**3.2%**	**557**	**0.7%**
Crashes	8		449		142	
Explosions, fires						
Damage on ground						
Space	3				415	
Maritime disasters	**43**	**13.5%**	**1701**	**12.2%**	**2208**	**2.9%**
Freighters	4		14		224	
Passenger ships	26		1679		719	
Tankers	3		6		130	
Drilling platforms	6		2		929	
Other maritime accidents	4				206	
Rail disasters (incl. cableways)	**5**	**1.6%**	**141**	**1.0%**		**0.0%**
Mining accidents	**2**	**0.6%**	**66**	**0.5%**		**0.0%**
Collapse of buildings/bridges						
Miscellaneous	**49**	**15.4%**	**1257**	**9.0%**	**262**	**0.3%**
Social unrest	15		152		116	
Terrorism	25		785			
Other miscellaneous losses	9		320		147	
Total	**318**	**100.0%**	**13929**	**100.0%**	**77238**	**100.0%**

Source: Swiss Re Economic Research & Consulting

[25] Dead or missing
[26] Property and business interruption, excluding liability and life insurance losses

Table 7
Chronological list of all natural catastrophes 2012

Floods

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–11.1.	Brazil Minas Gerais, Rio de Janeiro	Floods caused by heavy rains	33 dead 14 000 homeless
1.1.–15.3.	Ecuador Loja, Manabí, Los Rios, El Oro, Azuay, Guayas, Cañar	Floods caused by heavy rains	29 dead 70 injured 2 548 homeless
5.1.	Philippines Pantukan, Compostela Valley Province	Landslide	42 dead, 42 missing 16 injured
22.1.–6.2.	Fiji	Floods caused by heavy rains, landslides	10 dead 3 000 homeless FJD 30m (USD 17 m) total damage
24.1.	Papua New Guinea Tari (Southern Highlands Province)	Landslide caused by heavy rains	25 dead, 35 missing
24.1.–15.2.	Australia Queensland (Roma, St George, Mitchell, Charleville)	Floods caused by heavy rains	1 dead AUD 131m (USD 136m) insured loss <AUD 350m (<USD 363m) total damage
3.2.–14.2.	Algeria Skikda, Boumerdes	Floods caused by heavy rains	49 dead
24.2.–16.3.	Australia New South Wales (Riverina)	Floods caused by heavy rains	2 dead AUD 132m (USD 137m) insured loss <AUD 360m (<USD 363m) total damage
15.3.–15.4.	Paraguay Paraguayan Chaco	Floods caused by heavy rains; damage to dairy manufacturing facilities	2 000 homeless USD 4m total damage
15.3.–14.5.	Colombia Casanra, Amazonas	Floods caused by heavy rains	48 dead, 8 000 homeless COP 110bn (USD 62m) total damage
8.4.–26.4.	Haiti	Floods caused by heavy rains, landslides	9 dead, 11 150 homeless
10.4.–12.4.	Rwanda Musanze, Nyabihu, Rubavu	Floods caused by heavy rains	5 dead 3 315 homeless
20.4.–26.4.	Colombia Soacha	Floods caused by heavy rains	17 dead, 2 000 homeless COP 70bn (USD 40m) total damage
22.4.–8.5.	Kenya Nairobi	Floods caused by heavy rains	42 dead USD 1m insured loss USD 100m total damage
1.5.–20.5.	Brazil Amazonas	Floods caused by heavy rains; over 70 000 houses flooded	BRL 350m (USD 171m) total damage
5.5.	Nepal Kharapani (Kaski)	Landslide triggers flash floods, Seti River bank bursts; 20 houses and one temple destroyed	31 dead, 41 missing 5 injured INR 43m (USD 1m) total damage
10.5.–22.5.	China Hunan, Gansu	Floods caused by heavy rains	132 dead USD 2.5bn total damage
12.5.–13.5.	Georgia Tbilisi, Dusheti, Akhmeta, Gurjaani, Lagodekhi, Mtskheta	Flash floods; 1 400 houses severely damaged	5 dead 2 000 homeless GEL 5m (USD 3m) total damage
12.5.–16.5.	Afghanistan Takha	Floods caused by heavy rains	20 dead
18.5.	Afghanistan Saywad, Suzma Qala	Floods caused by heavy rains	74 dead 2 043 injured
21.5.–22.5.	France Nancy	Floods caused by heavy torrential rains	1 dead EUR 40m (USD 53m) insured loss
24.5.–27.5.	Indonesia North Maluku	Floods caused by heavy rains, landslides	20 dead 100 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
9.6.–11.6.	United States FL, AL, MS, LA	Flooding	2 dead USD 174m total damage
10.6.–11.6. and 23.6.–24.6.	United Kingdom	Floods caused by heavy rains	1 dead GBP 500m (USD 813m) insured loss GBP 1bn (USD 1.6bn) total damage
12.6.–13.6.	Philippines Mindanao	Floods caused by heavy rains	14 dead, 15 missing 2 injured 30 927 homeless PHP 50m (USD 1m) total damage
15.6.–5.9.	Burkina Faso	Floods caused by heavy rains	18 dead 21 000 homeless
22.6.–2.7.	China Mongolia, Zhejiang, Fujian, Jiangxi, Hubei, Hunan, Guangdong, Guangxi, Chongqing, Sichuan, Guizhou	Floods caused by heavy rains	91 dead USD 125m insured loss <CNY 7.6bn (<USD 1.2bn) total damage
22.6.–19.7.	India Assam	Floods caused by heavy monsoonal rains	120 dead
23.6.–25.6.	Afghanistan	Floods caused by heavy rains	35 dead
24.6.	Uganda Bududa	Landslides caused by heavy rains buries a village	18 dead, 64 injured 3 368 homeless
26.6.–12.7.	Bangladesh	Floods caused by heavy monsoonal rains; severe damage to roads and water infrastructures	131 dead
7.7.–8.7.	Russia Krymsk (Krasnodar Krai)	Flash floods	172 dead, 3 910 injured 5 500 homeless USD 30m insured loss <USD 600m total damage
9.7.–25.7.	China Hubei	Floods caused by heavy rains	58 dead USD 30m insured loss USD 600m total damage
12.7.–13.7.	Japan Kumamoto, Oita, Fukuoka	Floods caused by heavy rains, landslides	30 dead JPY 124bn (USD 1.4bn) total damage
18.7.–29.7.	North Korea	Floods caused by heavy rains and remnants of Tropical Storm Khanun; damages to houses, public infrastructure and two coal mines	169 dead 144 injured 62 889 homeless
21.7.–24.7.	China Bejing	Floods caused by heavy torrential rains, landslides; heavy damage to houses, cropland and public infrastructure	149 dead USD 140m insured loss USD 8bn total damage
22.7.–31.10.	Nigeria, Niger, Benin, Mali	Floods caused by heavy rains, River Niger burst its banks; outbreak of epidemic diseases	244 dead, 18 282 injured 2 119 292 homeless USD 400m total damage
1.8.–12.8.	Sudan Kassala, White Nile, Sinnar, Gadaref and Khartoum	Floods caused by heavy rains; 11 633 houses destroyed, 12 823 houses damaged	35 dead 35 injured
5.8.–17.8.	Philippines Luzon	Floods caused by heavy monsoon rains (South-west Monsoon Hagabat)	109 dead, 4 missing, 14 injured 215 184 homeless PHP 3.06 bn (USD 74 m) total damage
6.8.–24.9.	Chad N'Djamena, Tandjilé, Sila, Moy-en Chari, Mayo Kebbi Est, Mayo Kebbi Ouest, Logone Oriental, Ouaddai	Floods caused by heavy rains, Chari River burst its banks	20 dead 2 000 homeless USD 20m total damage
7.8.–26.8.	Myanmar (Burma) Karen, Irrawaddy	Floods caused by heavy rains; Salween and Moei Rivers burst their banks	6 000 homeless
14.8.–20.8.	China Shaanxi	Floods caused by heavy rains	15 dead USD 370m total damage
18.8.–26.8.	Senegal, Gambia Dakar	Floods caused by heavy rains; over 7 700 drinking-water sources contaminated	23 dead, 9 357 homeless USD 10m total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
23.8.–29.8.	Pakistan Khyber Pakhtunkhwa	Floods caused by heavy rains	26 dead
25.8.–31.8.	Cameroon North	Floods caused by heavy rains	15 dead 31 980 homeless
28.8.–30.8.	China Liaoning, Hebei	Floods caused by heavy rains	15 dead USD 360m total damage
1.9.–20.9.	Papua New Guinea Southern Highlands	Floods caused by heavy rains	5 dead 2 000 homeless
2.9.–9.9.	Vietnam Yen Bai	Floods caused by heavy rains; 3 500 houses destroyed	34 dead 40 injured USD 2m insured loss USD 30m total damage
3.9.–27.9.	Pakistan	Floods caused by heavy monsoonal rains	455 dead, 3 000 injured 300 000 homeless USD 2.5bn total damage
9.9.–19.9.	China Sichuan	Floods caused by heavy rains	21 dead USD 500m total damage
16.9.–18.9.	India Uttarakhand	Floods caused by heavy rains	45 dead INR 1.08bn (USD 20m) total damage
19.9.–23.9.	India Assam	Floods caused by heavy monsoonal rains	21 dead
24.9.–25.9.	United Kingdom York	Floods caused by heavy torrential rains due to remnants of Hurricane Nadine	2 dead GBP 50m (USD 81m) insured loss
27.9.–28.9.	Somalia Belet Wey	Flash floods; Shabelle River burst its banks	25 dead 20 000 homeless
27.9.–29.9.	Spain Andalusia, Valencia, Murcia	Floods caused by heavy rains	10 dead, 35 injured EUR 197m (USD 260m) insured loss EUR 300m (USD 395m) total damage
1.11.–8.11.	Indonesia North Sumatra, Sulawesi	Floods caused by heavy rains	10 dead, 20 missing
5.11.–6.11.	Slovenia, Croatia	Floods along Drava and Sava Rivers	EUR 20m (USD 26m) insured loss EUR 209m (USD 276m) total damage
12.11.–13.11.	Italy Tuscany, Umbria	Flash floods caused by heavy torrential rains	5 dead, 700 homeless <EUR 100m (<USD 132m) total damage
17.11.–18.11.	Congo, Republic of Pointe-Noire	Floods caused by heavy rains	5 dead 2 025 homeless
23.11.–29.11.	United Kingdom	Floods caused by heavy rains	4 dead GBP 500m (USD 813m) insured loss GBP 1bn (USD 1.63bn) total damage
8.12.–9.12.	Congo, Republic of Brazzaville	Floods caused by heavy rains, River Mfilou burst its banks; 1 000 houses eihter destroyed or damaged	14 dead 11 missing
17.12.	Sri Lanka	Floods caused by heavy rains; 6 678 houses destroyed	43 dead, 7 missing 19 injured, 6 678 homeless

Storms

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
3.1.–4.1.	United Kingdom, Germany, Denmark, Netherlands	Windstorm Ulli; power cuts, travel disruption	2 dead EUR 180m (USD 237m) insured loss
4.1.–5.1.	Germany, United Kingdom, Belgium, France, Switzerland, Netherlands	Windstorm Andrea	5 dead, 1 injured EUR 336m (USD 443m) insured loss EUR 540m (USD 712m) total damage
15.1.	Mozambique Maputo, Gaza, Inhambane	Tropical Storm Dando, flooding	45 dead, 42 injured 450 homeless
18.1.–23.1.	United States Pacific Northwest	Winter storm, heavy snowfall, blizzards	3 dead, 1 injured USD 100m total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
20.1.–22.1.	Mozambique, Malawi, Madagascar	Tropical Cyclone Funso, floods; 4 478 houses destroyed	21 dead, 76 340 homeless USD 13m insured loss USD 100m total damage
22.1.–23.1.	United States AL	Thunderstorms with winds up to 240 km/h, tornadoes, hail; damage to houses and businesses, power cuts	2 dead, 100 injured USD 100–300m insured loss USD 175m total damage
25.1.	Indonesia Java	Tropical Cyclone Iggy, floods, landslides, storm surge	17 dead, 60 injured IDR 8.9bn (USD 1m) total damage
14.2.	Madagascar Brickaville, Vatomandry	Tropical Cyclone Giovanna	35 dead, 284 injured 34 000 homeless USD 100m total damage
26.2.–27.2.	Madagascar, Mozambique	Tropical Storm Irina; over 1 400 houses destroyed	80 dead, 15 injured 20 000 homeless
28.2.–29.2.	United States MO, IL, KS, KY	Thunderstorms, heavy snow, tornadoes	13 dead USD 300–600m insured loss USD 500m total damage
2.3.–3.3.	United States TN, KY, IN, AL, GA, OH	Severe storms, tornadoes	42 dead USD 1–3bn insured loss USD 5bn total damage
14.3.–15.3.	United States MO, MI, IL	Strong winds, hail, tornadoes	USD 100–300m insured loss USD 275m total damage
18.3.–25.3.	United States TX, VA, NC, IN	Thunderstorms, hail, tornadoes	USD 100–300m insured loss USD 325m total damage
27.3.	Philippines Western Visayas	Thunderstorms, heavy rains, flooding	11 dead 4 835 homeless PHP 90m (USD 2m) total damage
29.3.	United States TX	Thunderstorms, floods, hail, tornadoes	USD 100–300m insured loss USD 400m total damage
29.3.–30.3.	Fiji	Tropical Depression 17F, heavy rains, floods	5 dead 2 000 homeless >USD 40m total damage
2.4.–4.4.	United States TX	Thunderstorms, tornadoes, hail, heavy rains	USD 600m–1bn insured loss USD 1.55bn total damage
3.4.–4.4.	Japan Niigata, Miyagi	Storm with wind up to 150 km/h, travel disruption	4 dead, 56 injured JPY 72.6bn (USD 841m) insured loss
5.4.	China Guizhou, Guangdong	Severe thunderstorms; over 20 000 houses damaged	CNY 750m (USD 120m) total damage
5.4.	Argentina Buenos Aires	Heavy storm, tornadoes; 30 000 houses damaged	18 dead, 20 injured 2 000 homeless
5.4.–6.4.	Bangladesh West Bengal	Nor'wester storm, heavy rains	25 dead 42 injured
13.4.–15.4.	United States KS, IA, NE, OK	Thunderstorms, >100 tornadoes, hail, flooding (Wichita)	6 dead, 30 injured USD 600 m–1 bn insured loss USD 1.8 bn total damage
20.4.–28.4.	Comoros Grand Comore, Mohéli, Anjouan	Floods caused by heavy rains	4 dead 9 000 homeless
28.4.–29.4.	United States MO, IL, KY, TX, IN	Thunderstorms, large hail, tornadoes, heavy rains	1 dead, 100 injured USD 1–3 bn insured loss USD 4.5 bn total damage
2.5.–6.5.	United States SD, MN	Thunderstorms, tornadoes, hail, heavy rains	1 dead USD 100–300m insured loss USD 275m total damage
25.5.–30.5.	United States OK, KS, MN, TX, PA, NY	Thunderstorms, hail, tornadoes	USD 1–3bn insured loss USD 3.4bn total damage
26.5.–29.5.	Canada Thunder Bay, Montreal	Storms, flash floods	CAD 245m (USD 246m) insured loss CAD 300m (USD 301m) total damage
6.6.–7.6.	United States CO, WY	Thunderstorms, large hail, tornadoes	2 injured USD 1–3bn insured loss USD 1.4bn total damage

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
11.6.–13.6.	United States TX, NM	Thunderstorms, large hail, tornadoes	3 injured USD 600m–1bn insured loss USD 1.9bn total damage
15.6.	Mexico Oaxaca	Hurricane Carlotta	7 dead USD 84m insured loss USD 555m total damage
17.6.–18.6.	United States MN	Storms, tornadoes, hail, flooding	USD 25–100m insured loss USD 115m total damage
19.6.–20.6.	United States Duluth, MN	Thunderstorms, heavy rains, floods, mudslides	1 injured USD 25–100m insured loss USD 185m total damage
23.6.–27.6.	United States FL	Tropical Storm Debby, flooding; shutdown of offshore oil drilling platform in the Gulf of Mexico	9 dead, 1 injured USD 100–300m insured loss USD 210m total damage
28.6.–2.7.	United States OH, VA, MD, WV, DC, IL, IN, KY, NJ, NC, OH, SC	Derecho storm with winds up to 146 km/h, tornadoes, hail	28 dead USD 1–3bn insured loss USD 4bn total damage
2.7.–4.7.	United States OH, MN, PA, MI, WI	Thunderstorms, hail, flash floods	USD 300–600m insured loss USD 700m total damage
11.7.–12.7.	Canada Edmonton (Alberta)	Thunderstorms, flash floods; damage to private and public properties	CAD 100m (USD 100m) insured loss CAD 150m (USD 151m) total damage
19.7.	Georgia Kakheti, Samtskhe-Javakheti, Mtskheta-Mtianeti	Storms, heavy rains, hail	18 injured 6000 homeless GEL 150m (USD 91m) total damage
20.7.–24.7.	China, Vietnam, Philippines, Hong Kong	Typhoon Vicente	19 dead, 2000 homeless >USD 19m insured loss USD 300m total damage
22.7.–23.7.	Canada Ontario	Storms, heavy rains, flash floods	CAD 85m (USD 85m) insured loss CAD 120m (USD 121m) total damage
26.7.–27.7.	United States PA, NY	Thunderstorms, tornadoes, hail	2 dead USD 100–300m insured loss USD 200m total damage
29.7.–3.8.	Philippines, China, Taiwan	Typhoon Saola	94 dead, 3 missing >USD 1.8m insured loss USD 161m total damage
2.8.–8.6.	China Shangdon	Typhoon Damrey, floods	14 dead CNY 660m (USD 106m) insured loss <USD 600m total damage
3.8.–10.8.	Mexico	Hurricane Ernesto	12 dead MXN 200m (USD 15m) insured loss MXN 3.9bn (USD 300m) total damage
8.8.–9.8.	China, Philippines	Typhoon Haikui	16 dead USD 183m insured loss USD 1.5bn total damage
9.8.–10.8.	United States IN, IL	Thunderstorms, hail, flash floods	USD 100–300m insured loss USD 200m total damage
15.8.–18.8.	Vietnam, Philippines, China	Typhoon Kai-tak	29 dead USD 275m total damage
23.8.–30.8.	Taiwan, Philippines, South Korea	Typhoon Tembin	18 dead, 3 missing >USD 1.4m insured loss USD 8m total damage
25.8.–30.8.	North Korea, South Korea	Typhoon Bolaven, damage to agriculture and fisheries	84 dead, 600 injured 300000 homeless >USD 350m insured loss USD 1bn total damage
26.8.–29.8.	United States, Haiti, Dominican Republic, Venezuela, Puerto Rico	Hurricane Isaac	40 dead USD 1.6bn insured loss USD 2.6bn total damage
31.8.–2.9.	Algeria Tebessa	Thunderstorms, torrential rains, flooding	20 dead 56 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
7.9.–8.9.	United States MO, PA, VA, AR, OK, MD, NY	Thunderstorms, hail, flash floods	5 dead USD 100–300m insured loss USD 210m total damage
17.9.	South Korea, Japan	Typhoon Sanba	2 dead USD 100m insured loss USD 300m total damage
18.9.	Paraguay Punta del Este	Heavy storm, hails; winds up to 180 km/h	5 dead, 100 injured USD 2m total damage
11.10.	Bangladesh Hatiya, Bhola, Sandwip	Tropical storm, heavy rains, flooding; damage to houses and fishing facilities	36 dead, 72 missing 183 injured
24.10.–29.10.	Philippines, Vietnam, China	Typhoon Son-tinh	38 dead USD 225m total damage
24.10.–31.10.	United States, Haiti, Cuba, Dominican Republic, Puerto Rico, Bahamas, Canada, Jamaica	Hurricane Sandy, massive storm surge	216 dead, 21 missing USD 35bn insured loss USD 70bn total damage
29.10.–31.10.	India, Sri Lanka	Tropical Storm Nilam	40 dead 4 627 homeless INR 3.1bn (USD 56m) total damage
4.12.–5.12.	Philippines	Typhoon Bopha	1 067 dead, 834 missing 2 666 injured 306 000 homeless PHP 37bn (USD 902m) total damage
13.12.–18.12.	Samoa, Fiji, Tonga	Cyclone Evan	14 dead USD 300 m total damage
25.12.	United States AL, LA, MS, TX	Winter storm, tornadoes, heavy snowfall	17 dead USD 50m insured loss USD 100m total damage
26.12.	Philippines	Tropical Depression Quinta	20 dead, 4 missing 3 injured PHP 225m (USD 5m) total damage

Earthquakes

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
19.1.	Iran Neyshabur	Earthquake (M_W 5.5)	110 injured
30.1.	Peru Ica	Earthquake (M_W 6.3)	119 injured
6.2.	Philippines Negros, Cebu	Earthquake (M_W 6.8), aftershocks; 6 352 houses destroyed	51 dead, 62 missing 112 injured 112 injured 23 490 homeless USD 9m total damage
9.3.	China Xinjiang	Earthquake (M_W 5.8); damage to private dwellings	36 641 injured CNY 524m (USD 84m) total damage
20.3.	Mexico Guerrero, Oaxaca	Earthquake (M_W 7.4), aftershocks; over 800 houses destroyed	2 dead 11 injured USD 160m insured loss <USD 600m total damage
18.5.	Azerbaijan Zagatala	Earthquake (M_W 5.6), aftershocks; 1 993 houses destroyed	6 949 homeless
20.5. and 29.5.	Italy Emilia Romagna	Earthquake (M_W 5.9 and M_W 5.7), aftershocks; damage to private dwellings, historical buildings, factories and warehouses	26 dead, 400 injured 13 295 homeless EUR 1.2bn (USD 1.6bn) insured loss EUR 12.6bn (USD 16.6bn) total damage
11.6.	Afghanistan Sayi Hazara	Earthquake (M_W 5.7), massive landslide	73 dead 13 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
24.6.	China Sichuan	Earthquake (M_W 5.5); 6 768 houses damaged	4 dead, 394 injured 28 000 homeless
30.6.	China Xinjiang	Earthquake (M_W 6.3)	52 injured USD 68m total damage
11.8.	Iran Varzeghan	Earthquakes (M_W 6.2 and M_W 6.0)	306 dead IRR 7 360bn (USD 599m) total damage
7.9.	China Yunnan, Guizhou	Earthquake (M_W 5.7), aftershocks; 7 138 houses destroyed	81 dead, 821 injured USD 45m insured loss USD 1bn total damage
7.11.	Guatemala San Marcos	Earthquake (M_W 7.2); 30 870 houses damaged	50 dead, 24 missing 186 injured 5 251 homeless USD 210m total damage
11.11.	Myanmar (Burma) Shwebo	Earthquake (M_W 6.8); 1 bridge, 1 gold mine collapsed, over 100 houses damaged.	26 dead, 12 missing 231 injured

Droughts, bush fires, heat waves

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
1.1.–6.1.	Chile Bio-Bio, Torres del Paine National Park	Wildfires	7 dead USD 15m insured loss USD 200m total damage
15.4.–31.7.	Ukraine Amur	Drought	UAH 13.6bn (USD 1.69bn) total damage
20.4.	Russia	Wildfires	2 dead 346 injured
1.5.–31.12.	Brazil Northeast	Drought	>BRL 120m (USD 59m) insured loss BRL 3bn (USD 1.46bn) total damage
1.6.–25.9.	Ecuador	Wildfires; over 33 046 hectares of forest destroyed	5 dead 70 injured
1.6.–10.10.	Italy	Drought	EUR 900m (USD 1.19bn) total damage
24.6.–28.6.	United States CO	Waldo Canyon Fire; 346 houses destroyed, 75 km2 burned down	2 dead USD 300–600m insured loss USD 600m total damage
15.7.–15.9.	United States	Drought in the Corn Belt	123 dead USD 11bn insured loss USD 15bn total damage

Cold, frost

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
16.1.–25.1.	Afghanistan	Cold wave, winter weather, heavy snowfall	45 dead, 65 injured
18.1.	Afghanistan Arghanj Khaw	Avalanche	29 dead 40 injured
21.1.–20.2.	Ukraine, Russia, Romania, Italy, Poland, et al.	Cold wave, severe frost	824 dead USD 250m insured loss USD 700m total damage
1.2.–2.2.	Japan Akita, Niigata, Nagano	Heavy snowfall, winter weather	134 dead JPY 13.7bn (USD 158m) total damage
7.2.–9.2.	China Tibet, Qinghai, Yushu, Huangnan, Golog	Winter weather, heavy snowfall	650 injured
4.3.	Afghanistan Shekay	Avalanche	37 dead
12.3.	Afghanistan Nuristan	Avalanche	45 dead

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
28.4.–29.4.	Canada	Overnight frost damages fruit crops	CAD 100m (USD 100m) total damage
1.6.–30.6.	Peru Arequipa	Cold wave	252 dead 15 000 injured
7.12.–31.12.	Russia, Ukraine, Poland, Serbia, Czech Republic	Cold wave	317 dead
18.12.–22.12.	Kyrgyzstan Bishkek	Cold wave, heavy snowfall, freezing rains; power and gas outages	16 dead 50 injured
18.12.–31.12.	Kazakhstan	Cold wave, heavy snowfall	5 000 injured
22.12.–31.12.	India Uttar Pradesh	Cold wave	107 dead

Hail

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
20.4.	United States Rio Grande Valley (TX)	Hailstorm	USD 25–100m insured loss USD 90m total damage
26.7.	Canada Alberta	Hailstorm	CAD 70m (USD 70m) insured loss CAD 100m (USD 100m) total damage
12.8.	Canada Calgary	Hailstorm	CAD 530m (USD 532m) insured loss >CAD 620m (>USD 623m) total damage
21.9.–22.9.	United States IN	Hailstorm with winds up to 97 km/h	USD 100–300m insured loss USD 150m total damage
20.10.–21.10.	South Africa Johannesburg	Hail storm, flooding	ZAR 1bn (USD 118m) insured loss ZAR 1.7bn (USD 200m) total damage

Table 8
Chronological list of all man-made disasters 2012

Major fires, explosions

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
18.1.	Chile Codegua	Ammonia leak at fruit packing company	1 dead 120 injured
21.1.	Germany Cologne	Explosion at petrochemical plant	1 injured
26.1.	Brazil	Building collapses	39 dead
28.1.	Peru Lima	Fire at unlicensed and overcrowded drug rehabilita- tion centre	20 dead 5 injured
4.2.	Venezuela Monagas state	Explosion and leak at oil pipeline	
6.2.	Pakistan Lahore	Gas explosion at medical factory	29 dead 13 injured
15.2.	Honduras Comayagua	Fire in a prison started by an inmate	361 dead 596 injured
24.2.	Turkey Kozan	Failure at hydro plant under construction	10 dead
26.2.	United Kingdom Essex	Fire at power station	
28.2.	China Shijiazhuang (Hebei)	Explosion at steel plant	25 dead 5 injured
4.3.	Congo, Republic of Brazzaville	Explosion at arms depot caused by a short circuit	286 dead 1000 injured
15.3.	South Korea Poryong	Fire at power plant	
17.3.	Qatar Doha	Fire at gas power station	
31.3.	Germany Marl	Explosion at chemical plant	2 dead
7.4.	Nigeria Benue	Church collapses during Easter vigil service	22 dead 31 injured
22.4.	Japan Iwakuni	Explosion at adhesive plant; 484 nearby buildings damaged	1 dead, 21 injured
5.5.	Thailand Map Ta Phut	Fire at large petrochemical plant	12 dead 129 injured
15.5.	United States El Dorado (Arkansas)	Explosion and fire at gas plant	
15.5.	Nepal Siraha	Accidental fire spreads to neighbourhood; 3000 houses destroyed	1 dead, 2067 homeless NPR 1 bn (USD 11 m) total damage
28.5.	United States Sartell (MN)	Explosion at paper mill	1 dead, 4 injured
4.7.	Thailand Bangkok	Explosion and fire at oil refinery	
31.7.	Kuwait Kuwait City	Fire at petrochemical plant	
2.8.	United States Tulsa	Fire and explosion at oil refinery	
7.8.	Turkey Istanbul	Fire at chemical plant	
25.8.	Venezuela Amuay	Explosion at large oil refinery; damage to nearby houses and businesses	48 dead
4.9.	India Sivakasi	Fire at fireworks factory	38 dead 33 injured
5.9.	Turkey Afyonkarahisar	Explosion at military ammunition depot	25 dead 4 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
11.9.	Pakistan Lahore	Fire at illegal shoe factory	21 dead 14 injured
12.9.	Pakistan Karachi	Fire at garment factory	240 dead
18.9.	Mexico Reynosa (Tamaulipas)	Explosion and fire at gas plant	32 dead, 43 injured
27.9.	South Korea Gumi	Gas leak at chemical plant	5 dead, 3 178 injured USD 30m total damage
29.9.	Japan Himeji City	Fire and two explosions at chemical plant	1 dead, 36 injured
19.10.	Oman Muscat	Fire at fibre optics plant	
23.10.	Taiwan Tainan	Fire at hospital	12 dead 60 injured
25.10.–26.10.	Brazil Bahia	Massive power outage causes damage to petrochemical plant	
1.11.	Saudi Arabia Riyadh	Fuel truck crashes into flyover and triggers explosion; nearby industrial buildings and vehicles destroyed	23 dead 135 injured
20.11.	United States AL	Fire at fertiliser plant	
25.11.	Bangladesh Dhaka	Fire at garment factory	112 dead
6.12.	Vietnam Bac Ninh	Fire triggers explosion at gas plant	56 injured
24.12.	South Korea Chungnam	Fire at electronic plant	

Aviation disasters

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
2.4.	Russia Tyumen	UTAir ATR-72-201 crashes shortly after take-off	33 dead, 12 injured
20.4.	Pakistan Islamabad	Bhoja Airlines Boeing 737-236 crashes shortly before landing	127 dead
9.5.	Indonesia Jakarta	Sukhoi Superjet 100-95 strikes the side of a mountain during a demonstration flight	45 dead
1.6.	Space	Reduced satellite power due to solar array deployment anomaly	
3.6.	Nigeria Lagos	Dana Air McDonnell Douglas MD-83 crashes shortly after take-off	153 dead
20.6.	Japan Tokyo	ANA Boeing 767-381ER is damaged in hard landing	
7.8.	Space	Total loss of 2 satellites due to launch failure	
19.8.	Sudan Talodi	Alfa Airlines Antonov 26-100 crashes upon landing	32 dead
30.11.	Congo, Republic of Brazzaville	Aéro-Service Ilyushin 76Tb crashes on landing hitting several dwellings	32 dead
8.12.	Space	Launch vehicle upper stage anomaly left satellite short of intended orbit	
25.12.	Kazakhstan Shymkent	Kazakhstan Border Guards´ Antonov 72 100 crashes on landing	27 dead

Maritime disasters

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
2.1.	Indian Ocean, Kenya Lamu Island	Collision between passenger ferry and ship carrying oil barrels	73 dead
13.1.	Mediterranean Sea, Italy Isola del Giglio	Cruise liner Costa Concordia capsizes after hitting rocks	30 dead, 2 missing 60 injured USD 515 m insured loss
16.1.	Nigeria	Fire on offshore drilling platform	2 dead
16.1.	Gulf of Mexico, Mexico Bay of Campeche	Fire at offshore drilling platform	
28.1.	Mediterranean Sea, Libyan Arab Jamahiriya	Boat carrying illegal immigrants capsizes	55 dead
2.2.	Papua New Guinea Papua New Guinea	Overcrowded ferry capsizes	246 dead
6.2.	Caribbean Sea Samana Bay (Dominican Republic)	Overcrowded boat carrying migrants capsizes in bad weather	56 dead
15.2.	Arctic Ocean, United States Alaska, Beaufort Sea	Explosion at exploratory well	
17.2.	Mediterranean Sea, Greece Skyros	Luxury super yacht sinks in rough weather	
27.2.	Indian Ocean, Seychelles	Cruise liner goes adrift after fire knocks out power supply	
10.3.	Mediterranean Sea, Italy Siracusa	Tanker runs aground in rough weather	
13.3.	Bangladesh Dhaka, Meghna River	Ferry capsizes after colliding with cargo ship	123 dead
15.3.	Persian Gulf, Indian Ocean, Qatar	Tanker catches fire and is destroyed	1 missing
15.3.	East China Sea, China Xiangshan	Containership runs aground in rough weather; severe hull damage	
25.3.	North Sea, United Kingdom	Gas leak at offshore platform	
25.3.	Zambia Luapula River	Three boats capsize after being hit by waves from a passing boat	20 dead
30.4.	India Dhubri	Ferry capsizes on Brahmaputra River	105 dead, 100 missing
12.6.	Bahamas	Ferry capsizes	24 dead
13.6.	Philippine Sea, Philippines Palawan	Ferry capsizes in rough weather	24 dead
17.6.	Indian Ocean, Indonesia Buru island	Overcrowded boat carrying asylum seekers capsizes	58 dead
21.6.	Malawi Lake Malawi	Boat capsizes in Lake Malawi	48 dead
21.6.	Indian Ocean, Australia Christmas Island	Overloaded boat carrying asylum seekers sinks	75 dead
25.6.	Mediterranean Sea, Tunisia Galite Islands	Bulk carrier runs aground in rough weather	
14.7.–14.12.	Atlantic Ocean	Fire on chemical container ship	3 dead 2 injured
18.7.	Indian Ocean, Tanzania Zanzibar	Ferry capsizes in rough weather	144 dead
26.7.	Indian Ocean, Malaysia Labuan (Borneo)	Fire and explosion on tanker	5 dead
8.8.	Namibia Walvis Bay	Fire on cable laying ship	
25.8.	United States Baltimore	Tanker hits coal pier; pier closed for two months	1 injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
31.8.	Indian Ocean, India Andhra Pradesh	Blowout at offshore drilling platform	
31.8.	North Atlantic, Guinea Conakry	Overcrowded boat sinks	30 dead
6.9.	Mediterranean Sea, Turkey Menderes	Boat carrying immigrants capsizes after hitting rocks	61 dead
13.9.	Indonesia Mahakam River	Overcrowded ferry sinks on Mahakam River	23 dead
26.9.	Zambia Lake Tanganyika	Overcrowded ferry capsizes on Lake Tanganyika	25 dead
26.9.	Indian Ocean, Indonesia Sumatra	Ferry collides with cargo ship and capsizes	38 dead
1.10.	North Pacific Ocean, South China Sea, Hong Kong Lamma Island	Collision between two passenger boats	38 dead 100 injured
28.10.	Indian Ocean, Bangladesh Cox's Bazar	Boat carrying Burmese refugees capsizes	100 dead
29.10.	Mediterranean Sea, France Marseilles	Ferry runs aground against a dock	
7.11.	Indian Ocean, Bangladesh Cox's Bazar	Overcrowded boat with illegal immigrants capsizes	50 missing
14.11.	France, Indian Ocean Crozet Islands	Supply vessel runs aground	
5.12.	North Sea, North Atlantic, Netherlands	Cargo carrier hits container ship and sinks	5 dead, 6 missing
21.12.	Congo, Democratic Republic of (DRC) Maluku	Boat sinks on the Congo River	9 dead, 100 missing
27.12.	Guinea-Bissau Boloma	Overcrowded boat sinks in rough weather	22 dead
31.12.	United States Sitkalidak Island	Drilling vessel runs aground after breaking its tow lines in stormy weather	USD 290m total damage

Rail disasters including cableways

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
22.2.	Argentina Buenos Aires	Commuter train derails at a station after hitting a barrier	51 dead 703 injured
3.3.	Poland Szczekociny	Two trains running on the same track collide head-on	16 dead 60 injured
21.4.	Netherlands Amsterdam	Two commuter trains collide head-on	1 dead 117 injured
13.7.	South Africa Mpumalanga	Track crashes with goods train at level crossing	23 dead
17.11.	Egypt Assiut	Nursery school bus crashes with train at rail crossing	50 dead 15 injured

Mining accidents

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
29.8.	China Panzhihua (Sichuan)	Gas explosion at coal mine	45 dead, 1 missing
25.9.	China Baiyin (Gansu)	Steel cable breaks and overturns the two carriages	20 dead

Miscellaneous

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
4.1.	Mexico Altamira (Tamaulipas)	Clashes between rival gangs in a prison	31 dead 13 injured
5.1.–6.1.	Nigeria Gombe State	Series of terrorist attacks against Christian worshippers	28 dead
9.1.–16.1.	Nigeria	Mass protests against government withdrawal of subsidy on petrol	10 dead 600 injured
10.1.	Pakistan Jamrud	Bomb explosion at bus terminal; damage to vehicles and to nearby gasoline pump	35 dead 70 injured
15.1.	Romania Bucharest	Violent protests against government austerity measures	59 injured
20.1.	Nigeria Kano	Gunmen attacks on police buildings	185 dead
31.1.	United States San Diego	Radiation leak at nuclear reactor	
1.2.	Egypt Port Said	Clashes between rival fans after football match	74 dead 1 000 injured
10.2.	Nigeria Mubi	Gunmen attacks at students at University	46 dead
17.2.	Pakistan Parachinar (Kurram)	Suicide bomb explosion outside mosque	31 dead
19.2.	Mexico Apodaca (Monterrey)	Riots in a prison	44 dead
22.2.–27.2.	Afghanistan	Deadly protests against the burning of copies of the Qur'an by US soldiers	41 dead 270 injured
25.2.	Yemen Mukalla	Suicide bombing attack in front of presidential palace	26 dead 30 injured
27.2.	China Yecheng	Casual stabbing of pedestrians in crowded street	24 dead 18 injured
4.3.	Nigeria Benue	Clashes between two ethnic groups over land row	21 dead 13 injured
31.3.	Thailand Songkhla Province, Yala	Series of car bomb explosions	16 dead 321 injured
8.4.	Nigeria Kaduna	Suicide car bombing outside church during Easter service	41 dead 33 injured
29.4.	Nigeria Kano	Gunmen attacks against Christian worshippers at University	20 dead
3.5.	Russia Dagestan	Two suicide bomb explosions at traffic police checkpoint	13 dead 100 injured
4.5.	Pakistan Khaar	Suicide bomb explosion at crowded market	20 dead 45 injured
19.5.	China Zhuzhou (Hunan)	Explosion in tunnel on road under construction	20 dead 4 injured
8.6.	Pakistan Peshawar	Remote-controlled explosion in a bus carrying government employees	21 dead 42 injured
16.6.	Pakistan Landi Kotal (Khyber)	Bomb explosion at bus stand in bazaar	29 dead
17.6.	Nigeria Zaria, Kaduna	Suicide bombings at three churches	21 dead 125 injured
19.6.	Pakistan Punjab	Anti-government demonstrations over unscheduled power cuts; damage to Government, commercial buildings and vehicles	3 dead 83 injured
1.7.	Nigeria Garissa	Launch of grenades and shootings at church	18 dead 66 injured
7.7.	Nigeria Kushen	Terrorists attacks on Christian villages; 40 houses destroyed	80 dead, 300 injured 200 homeless
8.7.	Nigeria Barkin-Ladi	Gunmen attacks at funeral	23 dead One injured

Date	Country Place	Event	No. of victims/amount of damage in original currency and (USD)
12.7.	Nigeria Rivers State	Petrol tanker explodes while villagers were scooping fuel	100 dead 35 injured
30.7.–31.7.	India Northern India	Massive power outage; 350 m people left with no electricity	>USD 107m total damage
16.8.	South Africa Marikana	Shootings at platinum mine during strike	34 dead 78 injured
20.8.	Turkey Gaziantep	Remote-controlled car explosion outside police station	9 dead 69 injured
2.9.–4.9.	United Kingdom Belfast, Northern Ireland	Clashes with police over parades dispute	62 injured
12.9.–18.10.	South Africa	Series of labour strikes at gold and platinum mines	4 dead ZAR 4.5bn (USD 530m) total damage
12.9.–13.9.	Egypt, Yemen Cairo	Clashes at US embassy over anti-Muslim film	1 dead 70 injured
15.9.–16.9.	China Changsha, Qingdao	Anti Japan demonstrations over disputed islands; damage to Japanese companies' facilities	USD 250m total damage
25.9.	Spain Madrid	Anti government demonstrations against austerity measures	64 injured
2.10.–2.10.	Nigeria Mubi (Adamawa State)	Gunmen attacks at University student hall	20 dead
7.10.	Tunisia Djerba	Clashes with police against reopening of rubbish dump	51 injured
14.10.	Nigeria Yogbo	Ethnic clashes over land dispute	30 dead
19.10.	Lebanon Beirut	Car bomb explosion in Christian suburb	8 dead 78 injured
28.10.	Nigeria Kaduna	Suicide car bomber rams into a Catholic church during service	7 dead 100 injured
30.10.	Saudi Arabia Abqaiq	Electricity pole falls on wedding tent	25 dead 30 injured
22.11.	Pakistan Rawalpindi	Suicide bombing at religious procession	23 dead 62 injured
27.11.	Egypt Cairo	Anti-government demonstrations	One dead 260 injured
5.12.	Egypt Cairo	Anti-government demonstrations	7 dead 600 injured
14.12.	United States Newtown, CT	Mass shooting at Sandy Hook elementary school	26 dead 2 injured
17.12.	Pakistan Jamrud	Car bomb explosion at a market	21 dead 80 injured
30.12.	Pakistan Baluchistan	Series of bomb attacks against buses carrying pilgrims	20 dead 25 injured

Tables showing the major losses 1970–2012

Table 9
The 40 most costly insurance losses (1970–2012)

Insured loss[27] (in USD m, indexed to 2012)	**Victims**[28]	**Date** (start)	**Event**	**Country**
76 254[29]	1 836	25.08.2005	Hurricane Katrina; floods, dams burst, damage to oil rigs	US, Gulf of Mexico, Bahamas, North Atlantic
35 735	19 135	11.03.2011	Earthquake (M_W 9.0) triggers tsunami; aftershocks	Japan
35 000[30]	237	24.10.2012	Hurricane Sandy; floods	US et al
26 180	43	23.08.1992	Hurricane Andrew; floods	US, Bahamas
24 349	2 982	11.09.2001	Terror attack on WTC, Pentagon and other buildings	US
21 685	61	17.01.1994	Northridge earthquake (M 6.6)	US
21 585	136	06.09.2008	Hurricane Ike; floods, offshore damage	US, Caribbean: Gulf of Mexico et al
15 672	124	02.09.2004	Hurricane Ivan; damage to oil rigs	US, Caribbean; Barbados et al
15 315	815	27.07.2011	Floods caused by heavy monsoon rains	Thailand
15 315	181	22.02.2011	Earthquake (M_W 6.3), aftershocks	New Zealand
14 772	35	19.10.2005	Hurricane Wilma; floods	US, Mexico, Jamaica, Haiti et al
11 869	34	20.09.2005	Hurricane Rita; floods, damage to oil rigs	US, Gulf of Mexico, Cuba
11 000[31]	123	15.07.2012	Drought in the Corn Belt	US
9 784	24	11.08.2004	Hurricane Charley; floods	US, Cuba, Jamaica et al
9 517	51	27.09.1991	Typhoon Mireille/No 19	Japan
8 467	71	15.09.1989	Hurricane Hugo	US, Puerto Rico et al
8 421	562	27.02.2010	Earthquake (M_W 8.8) triggers tsunami	Chile
8 205	95	25.01.1990	Winter storm Daria	France, UK, Belgium, Netherlands et al
7 994	110	25.12.1999	Winter storm Lothar	Switzerland, UK, France et al
7 453	354	22.04.2011	Major storm with wind up to 340km/h, over 355 tornadoes	United States (Alabama et al)
7 198	155	20.05.2011	Major tornado outbreak, storms with winds up to 405km/h	United States (Missouri et al)
6 748	54	18.01.2007	Winter storm Kyrill; floods	Germany, UK, Netherlands, Belgium et al
6 264	22	15.10.1987	Storm and floods in Europe	France, UK, Netherlands et al
6 255	38	26.08.2004	Hurricane Frances	US, Bahamas
5 952	55	22.08.2011	Hurricane Irene, extensive flooding	United States et al
5 607	64	25.02.1990	Winter storm Vivian	Europe
5 568	26	22.09.1999	Typhoon Bart/No 18	Japan
5 263	-	04.09.2010	Earthquake (M_W 7.0), over 300 aftershocks	New Zealand
4 972	600	20.09.1998	Hurricane Georges; floods	US, Caribbean
4 673	41	05.06.2001	Tropical storm Allison; floods	US
4 622	3 034	13.09.2004	Hurricane Jeanne; floods, landslides	US, Caribbean: Haiti et al
4 357	45	06.09.2004	Typhoon Songda/No 18	Japan, South Korea
4 000	45	02.05.2003	Thunderstorms, tornadoes, hail	US
3 890	70	10.09.1999	Hurricane Floyd; floods	US, Bahamas, Columbia
3 775	59	01.10.1995	Hurricane Opal; floods	US, Mexico, Gulf of Mexico
3 724	6 425	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
3 489	25	24.01.2009	Winter storm Klaus, wind up to 170km/h	France, Spain
3 308	45	27.12.1999	Winter storm Martin	Spain, France, Switzerland
3 119	246	10.03.1993	Blizzard, tornadoes, floods	US, Canada, Mexico, Cuba
2 947	38	06.08.2002	Severe floods	UK, Spain, Germany, Austria et al

[27] Property and business interruption, excluding liability and life insurance losses; US natural catastrophe figures: based on Property Claim Services (PCS)/incl. NFIP losses (see page 48 "Terms and selection criteria").
[28] Dead and missing
[29] Includes flood claims covered by NFIP
[30] Swiss Re estimate includes flood claims covered by NIFP
[31] Swiss Re estimate includes losses from MPCI

Table 10
The 40 worst catastrophes in terms of victims (1970-2012)

Victims[29]	**Insured loss**[30] (in USD m, indexed to 2012)	**Date** (start)	**Event**	**Country**
300000	–	14.11.1970	Storm and flood catastrophe	Bangladesh, Bay of Bengal
255000	–	28.07.1976	Earthquake (M 7.5)	China
222570	105	12.01.2010	Earthquake (M_W 7.0)	Haiti
220000	2431	26.12.2004	Earthquake (M_W 9), tsunami in Indian Ocean	Indonesia, Thailand et al
138300	–	02.05.2008	Tropical cyclone Nargis; Irrawaddy Delta floods	Myanmar (Burma), Bay of Bengal
138000	3	29.04.1991	Tropical cyclone Gorky	Bangladesh
87449	391	12.05.2008	Earthquake (7.9) in Sichuan, aftershocks	China
73300	–	08.10.2005	Earthquake (M_W 7.6); aftershocks, landslides	Pakistan, India, Afghanistan
66000	–	31.05.1970	Earthquake (M 7.7); rock slides	Peru
55630	–	15.06.2010	Heat wave in Russia	Russia
40000	202	21.06.1990	Earthquake (M 7.7); landslides	Iran
35000	1574	01.06.2003	Heat wave and drought in Europe	France, Italy, Germany et al
26271	–	26.12.2003	Earthquake (M 6.5) destroys 85% of Bam	Iran
25000	–	07.12.1988	Earthquake (M 6.9)	Armenia, ex-USSR
25000	–	16.09.1978	Earthquake (M 7.7) in Tabas	Iran
23000	–	13.11.1985	Volcanic eruption on Nevado del Ruiz	Colombia
22084	303	04.02.1976	Earthquake (M 7.5)	Guatemala
19737	130	26.01.2001	Earthquake (M_W 7.6) in Gujarat	India, Pakistan, Nepal et al
19184	35735	11.03.2011	Earthquake (M_W 9.0) triggers tsunami	Japan
19118	1378	17.08.1999	Earthquake (M_L 7) in Izmit	Turkey
15000	–	11.08.1979	Macchu dam bursts in Morvi	India
15000	–	01.09.1978	Floods following monsoon rains in the North	India, Bangladesh
15000	138	29.10.1999	Cyclone 05B devastates Orissa state	India, Bangladesh
11069	–	25.05.1985	Tropical cyclone in Bay of Bengal	Bangladesh
10800	–	31.10.1971	Floods in Bay of Bengal and Orissa state	India
10000	303	12.12.1999	Floods, mudflows, and landslides	Venezuela, Colombia
10000	–	20.11.1977	Tropical cyclone in Andhra Pradesh	India, Bay of Bengal
9500	687	19.09.1985	Earthquake (M 8.1)	Mexico
9475	–	30.09.1993	Earthquake (M 6.4) in Maharashtra	India
9000	704	22.10.1998	Hurricane Mitch in Central America	Honduras, Nicaragua et al
6425	3724	17.01.1995	Great Hanshin earthquake (M 7.2) in Kobe	Japan
6304	–	05.11.1991	Typhoons Thelma and Uring	Philippines
6000	–	02.12.1984	Accident in chemical plant in Bhopal	India
6000	–	01.06.1976	Heat wave, drought	France
5749	46	27.05.2006	Earthquake (ML 6.3); Bantul almost destroyed	Indonesia
5422	–	26.06.1976	Earthquake (M 7.1)	Papua New Guinea, Indonesia et al
5374	–	10.04.1972	Earthquake (M 6.9) in Fars	Iran
5300	–	28.12.1974	Earthquake (M 6.3)	Pakistan
5000	–	30.06.1976	Earthquake in West Irian	Indonesia
5000	1354	05.03.1987	Earthquake; oil pipeline damaged	Ecuador
5000	714	23.12.1972	Earthquake (M 6.3) in Managua	Nicaragua

[32] Dead and missing
[33] Property and business interruption, excluding liability and life insurance losses

Terms and selection criteria

A natural catastrophe is caused by natural forces.

Natural catastrophes
The term "natural catastrophe" refers to an event caused by natural forces. Such an event generally results in a large number of individual losses involving many insurance policies. The scale of the losses resulting from a catastrophe depends not only on the severity of the natural forces concerned, but also on man-made factors, such as building design or the efficiency of disaster control in the afflicted region. In this *sigma* study, natural catastrophes are subdivided into the following categories: floods, storms, earthquakes, droughts/wild 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 21–34), 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.

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

Thresholds for insured losses and casualties in 2012.

For the 2012 reporting year, the lower loss thresholds were set as follows:

Insured losses:		
Maritime disasters	USD	18.3 million
Aviation	USD	36.7 million
Other losses	USD	45.5 million
or Total losses:	USD	91.1 million
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 (2012) 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 1 045.7million
Insured loss at 2012 prices: USD 1 394.4 million

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 2012 prices of USD 1 504 million, 8% more than with the standard *sigma* method. The reason for the difference is that the value of the GBP rose by almost 9% against the USD in the period 2000–2012, ie more than the difference in inflation between the US (33.3%) and the UK (32.2%) over the same period.

Figure 6
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 2012	123.0			229.6
Inflation factor	1.322			1.333
Adjusted for inflation to 2012	925.1	1.625	1 503.6	1 394.4
Comparison			108%	100%

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

If changes to the loss amounts of previously published events become known, *sigma* takes these into account in its database. However, these changes only become evident when an event appears in the table of the 40 most costly insured losses or the 40 disasters with the most fatalities since 1970 (See Tables 9 and 10 on pages 35–36).

Only public information used for man-made disasters.

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 2012 according to loss category. *sigma* does not provide further information on individual insured losses or about updates made to published data.

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

Sources

Information is collected from newspapers, direct insurance and reinsurance periodicals, specialist publications (in printed or electronic form) and reports from insurers and reinsurers.[34] 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 the impresum).

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

Exchange rate used,35 national currency per USD

Country	**Currency**	**Exchange rate, end 2012**
Australia	AUD	0.9632
Bangladesh	BDT	79.6800
Brazil	BRL	2.0483
Canada	CAD	0.9958
China, P.R.C.	CNY	6.2333
Colombia	COP	1767.5000
Europe	EUR	0.7586
Fiji	FJD	1.7730
United Kingdom	GBP	0.6153
Georgia	GEL	1.6562
Indonesia	IDR	9714.0000
India	INR	54.8750
Iran	IRR	12285.0000
Japan	JPY	86.4650
South Korea	KRW	1063.8500
Mexico	MXN	12.9865
Nigeria	NGN	156.3500
Nepal	NPR	87.7600
Philippines	PHP	41.0200
Saudi Arabia	SAR	3.7505
Ukraine	UAH	8.0450
U.S.A.	USD	1.0000
Venezuela	VEF	4.3000
Vietnam	VND	20825.0000
South Africa	ZAR	8.4847

Source: Swiss Re, *sigma* catastrophe database

[34] Natural catastrophes in the US: those *sigma* figures which are based 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.
[35] The losses for 2012 were converted to USD using these exchange rates. No losses in any other currencies were reported.

Recent *sigma* publications

2013	No 1	Partnering for food security in emerging markets
	No 2	Natural catastrophes and man-made disasters in 2012: A year of extreme weather events in the US
2012	No 1	Understanding profitability in life insurance
	No 2	Natural catastrophes and man-made disasters in 2011: historic losses surface from record earthquakes and floods
	No 3	World insurance in 2011: non-life ready for take-off
	No 4	Facing the interest rate challenge
	No 5	Insuring ever-evolving commercial risks
	No 6	Insurance accounting reform: a glass half empty or half full?
2011	No 1	Natural catastrophes and man-made disasters in 2010: a year of devastating and costly events
	No 2	World insurance in 2010
	No 3	State involvement in insurance markets
	No 4	Product innovation in non-life insurance markets: where little "i" meets big "I"
	No 5	Insurance in emerging markets: growth drivers and profitability
2010	No 1	Natural catastrophes and man-made disasters in 2009: catastrophes claim fewer victims, insured losses fall
	No 2	World insurance in 2009: premiums dipped, but industry capital improved
	No 3	Regulatory issues in insurance
	No 4	The impact of inflation on insurers
	No 5	Insurance investment in a challenging global environment
	No 6	Microinsurance – risk protection for 4 billion people
2009	No 1	Scenario analysis in insurance
	No 2	Natural catastrophes and man-made disasters in 2008: North America and Asia suffer heavy losses
	No 3	World insurance in 2008: life premiums fall in the industrialised countries – strong growth in the emerging economies
	No 4	The role of indices in transferring insurance risks to the capital markets
	No 5	Commercial liability: a challenge for businesses and their insurers
2008	No 1	Natural catastrophes and man-made disasters in 2007: high losses in Europe
	No 2	Non-life claims reserving: improving on a strategic challenge
	No 3	World insurance in 2007: emerging markets leading the way
	No 4	Innovative ways of financing retirement
	No 5	Insurance in the emerging markets: overview and prospects for Islamic insurance
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