

DISASTERS BULLETIN 4: July 8, 2003 – February 20, 2004

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Summary for the period

With no devastating earthquake since the Gujarat (NW India) quake in January 2001, it was inevitable that a major seismic event would happen soon. This time, SE Iran was the target, with the city of Bam taking the brunt of a magnitude 6.6 earthquake in the early hours of December 26th 2003. Highlighting the worth of enforced anti-seismic building codes, a magnitude 6.5 quake in central California just four days earlier had little impact, killing two and damaging around forty buildings. In contrast, the Iranian event is estimated to have killed perhaps 43,000 people and damaged or destroyed 85 percent of buildings. Other smaller earthquakes occurred in Panama, the Dominican Republic, Japan, Pakistan, Indonesia, and China, although casualties and damage were limited. The Chinese government reported an annual number of 22 damaging quakes, together taking 290 lives and causing damage totalling 365 million US\$.

For 2003 as a whole, Munich Re. report 50,000 deaths due to natural catastrophes (close to five times the 2002 figure), with economic losses exceeding 60 billion US\$ (up from 55 billion in 2002), and insured losses totaling around 15 billion US\$ (up from 11.5 billion in 2002). Using different criteria, Swiss Re. report an annual death toll of 22,000 due to 350 natural and technological disasters, quoting figures of 65 billion US\$ for economic losses and 17 billion US\$ for insured losses. As for the first half of 2003, financial losses in the second half were dominated by weather-related events, in particular Hurricane Isabel, Typhoon Maemi, the California wildfires and the French floods. The annual death toll was dominated by the Bam earthquake, with the balance being made up primarily by the victims of earthquakes in Algeria and China, floods in South and SE Asia and China, and heat waves and cold waves in South Asia.

In the US, the ISO reports that insured catastrophe losses for 2003 overall – at 12.8 billion US\$ - were the third highest in the last decade, exceeded only by 2002 (28.1 Billion US\$) and 1994 (17 billion US\$). Major losses arose, in the latter half of the year, from Hurricane Isabel (1,685 billion US\$) and wildfires in California (2 billion US\$). Severe weather and the Californian wildfires contributed to fourth quarter losses of 2.64 billion US\$, the highest for ten years. In total, 39 states were affected by catastrophic events during 2003, with California (2.1 billion US\$), Texas (1.5 billion US\$), Tennessee (1.2 billion US\$), Oklahoma (1.1 billion US\$) and Virginia (1 billion US\$) bearing the brunt of insurance payouts. In Europe, the unprecedented heat wave, and accompanying drought and wildfires, contributed to economic losses of 15 billion US\$. Apart from this, however, Europe escaped lightly during the second half of 2003 and early 2004, with only the French floods in December totting up a substantial loss. The Chinese government reported annual economic losses for 2003 due to natural catastrophes of 22.8 billion US\$, with 2,145 lives lost; the summer floods alone (see *Catastrophe Risk Management, August 2003*) cost 8 billion US\$.

Selected major events

Territory:	UK and Europe
Region:	UK, the Netherlands, France, Spain, Portugal, Switzerland, northern Italy, Germany, Poland, eastern Europe and the Balkans.
Date:	July – August, 2003
Event:	Heat wave
Impact:	At least 20,000 people died as a result of the unprecedented temperatures, and some estimates put the figure as high as 35,000. Over 15,000 people, many elderly, died in France and over 7,000 in Germany. Others death tolls are Italy (4,175), Spain (4,300), UK (2,045), the Netherlands (1,400) and Portugal (1,300). The heat triggered major wildfires in many countries, including Italy, Poland, the Balkans, Spain, France and Portugal, with the worst fires in Portugal and France. A combination of

the high temperatures, drought conditions and wildfires devastated agriculture, particularly in France where half of the 95 départements were forced to introduce water rationing. The heat wave is estimated to have reduced the global grain yield by 32 million tonnes as well as badly affecting the wine crop. In the UK, speed limits were imposed on the railways due to worries about heat-buckled tracks. In economic terms, the event constituted the biggest loss of the year, at 15 billion US\$. Due to minimal insurance penetration in the agricultural arena, however, only around one billion of this loss was borne by the insurance market. Agricultural losses alone are set at more than 10 billion US\$.

Summary: A severe heat wave started in western Europe during July and continued into the second half of August. Temperatures reached 40 degrees C across much of the continent, peaking at 41 degrees in southern Spain, 40 in France, and 38.5 in northern Italy. In the UK, the all-time maximum temperature record was broken and Heathrow airport and later at Gravesend (Kent), where temperatures reached 38.1 degrees C (100.6 degrees F).

Data sources: NOAA. World Weather and Climate Events
<http://wfw.ncdc.noaa.gov/oa/reports/weather-events.html#2003>

Earth Policy Unit
<http://www.earth-policy.org/Updates/Update29.htm>

Additional sources:

NASA Earth Observatory
http://earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img_id=15783

Territory: Japan, South Korea

Region: Western Japan (Kyushu, Okinawa Islands); Southern and south east South Korea

Date: 11 – 13 September, 2003

Event: Typhoon

Impact: Wind speeds of up to 216 km/h caused severe damage and flooding and took 118 lives. 25,000 people required evacuation, 5,000 buildings were destroyed and a further 13,000 damaged. Infrastructure was also badly affected, with 774 roads and 26 bridges damaged and downed power lines disrupting electricity supplies to 1.5 million homes. Port facilities were badly damaged and 18 ships sunk. Flooding due to torrential rains and accompanying storm surge inundated 43,000 acres of agricultural land. In Japan's Okinawa Islands, the storm killed one person, damaged 22 buildings and left 20,000 homes without power. At 4.8 billion US\$, Maemi is ranked fifth in 2003 in terms of economic losses. Insured losses, at 0.5 billion US\$, are, however, substantially less.

Summary: Typhoon Maemi formed as a tropical depression in the Philippine Sea on September 5th, and reached tropical cyclone status two days later. Peak intensity was reached on the 10th when the storm achieved Category 5 (super-typhoon) status with maximum sustained wind speeds of 280 km/h. After passing south of Japan, Maemi made landfall in south eastern Korea, as a Category 3 storm, on the 12th, battering the region with sustained winds close to 200 km /k, making the typhoon the strongest to hit the country since records began in 1904. Up to 35cm of rainfall was recorded as the storm passed, with wave heights reaching 10m.

Data sources: ReliefWeb

<http://www.reliefweb.int/w/rwb.nsf/vLND>

NOAA NGDC Hazards/Climate Extremes

<http://www.ncdc.noaa.gov/oa/climate/research/2003/sep/hazards.html>

Additional sources:

NASA Earth Observatory

http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?img_id=11699

- Territory:** United States, Canada
- Region:** East coast, especially North Carolina, Virginia and Maryland
- Date:** 18 – 20 September, 2003
- Event:** Hurricane
- Impact:** Over 360,000 homes were damaged or destroyed, either due to strong winds or to coastal (storm surge) or inland flooding. Most damage occurred in eastern North Carolina, south east Virginia, and eastern Maryland, although damage also extended to West Virginia, Delaware, New Jersey, Pennsylvania, New York and into Ontario (Canada). Thirteen deaths are attributed directly to Isabel, with another seventeen indirect deaths reported. Two million homes lost power in Virginia as winds toppled thousands of trees and power lines. Further power outages also occurred in Ontario. With economic losses totalling 5 billion US\$, and insured losses set at 1.68 billion US\$, the storm was the costliest of the year.
- Summary:** Hurricane Isabel reached hurricane status east of the Leeward Isles on September 7th and peaked at category 5 on the 11th. From then on the storm weakened, making landfall as a category 2 hurricane on the evening of the 17th between Cape Hatteras and Cape Lookout in North Carolina. Maximum sustained winds at landfall were in excess of 154 kph, with the accompanying storm surge approaching 3m in the Potomac, York and other rivers in east Virginia. Isabel brought hurricane conditions to parts of eastern North Carolina and south east Virginia, and tropical storm conditions as far north as New York. Extensive storm surge flooding occurred along the coasts of North Carolina and Virginia and in Chesapeake Bay, and above normal tides were reported as far north as Long Island. Up to 30cm of rain fell in parts of North Carolina and Virginia, with up to 6cm in Ohio, Pennsylvania and New York.
- Data sources:** NOAA National Hurricane Center
<http://www.nhc.noaa.gov/>
- The Canadian Hurricane Centre
http://www.ns.ec.gc.ca/weather/hurricane/index_e.html

Additional sources:

NOAA Coastal Services Centre

<http://www.csc.noaa.gov/coos/isabel.html>

NOAA Hurricane Media Central

<http://www.publicaffairs.noaa.gov/hurricanes.html>

Territory: United States

Region: California

Date: October - November

Event: Wildfires

Impact: Fifteen large fires burned 750,000 hectares of forest and brush, taking 22 lives and destroying 3,640 homes, 33 commercial properties and 1,141 other structures. Economic losses are estimated at 3.5 billion US\$, with insured losses reaching more than 2 billion US\$.

Summary: A combination of strong, warm, Santa Ana winds and tinder dry vegetation contributed to the ignition and spread of a number of major wildfires across California, many probably started deliberately. Widely distributed fires threatened Los Angeles as well as burning along the Mexican border and extending into the neighbouring states of Arizona and Nevada. Two major fires (named Paradise and Cedar) close to San Diego together burned an area of a third of a million acres, destroyed 2,453 homes, and took 16 lives. Another huge fire (named Old) on the north east outskirts of Los Angeles burned over 91,000 acres, destroyed 993 homes and 10 commercial properties, and took six lives. Most fires started in late October and many continued to burn throughout November before coming under control in early December. At one point, 40,000 residents of the resort of Big Bear were evacuated as fires threatened the town. The fires are the worst ever recorded in the state, topping the Oakland fires of 1991, which took 26 lives and destroyed 2,900 buildings at a cost of 2 billion US\$ (economic).

Data sources: San Bernardino Fire Information Joint Information Center
<http://www.esri.com/jicfire/index.html>

National Fire News
<http://www.nifc.gov/fireinfo/nfn.html>

Additional sources:

National Fire Weather page
<http://fire.boi.noaa.gov/>

NOAA Fire Weather Information Center
<http://www.noaa.gov/fireweather/>

Territory: France

Region: Southern France. Rhone valley - Marseilles and Lyon areas. Bouches-du-Rhone region. Vaucluse, Ardeche, Charlieu, Avignon, Orange. Herault, Gard, Arles, Ardeche.

Date: 2 – 8 December , 2003

Event: Floods

Impact: Flood water depths of up to a metre and an affected an area of over 80,000 km² led to damage to thousands of buildings and the evacuation of 27,000 people. Road and rail traffic along the Rhone Valley was severely affected and the town of Arles was under water as one of the Rhone dykes failed. Marseilles and Montpellier were also badly

affected, with Marseilles declared a natural disaster zone. Damage also resulted from accompanying strong winds, gusting up to 150 km/h. Two out of four nuclear reactors at the Cruas-Meyssse power plant (Ardeche) were shut down to prevent debris carried in floodwaters clogging the cooling systems. 250,000 people lost their drinking water supply due to fears of contamination. First estimates of economic losses are put at 1.5 billion US\$, with insured losses set at 1 billion US\$, the fifth largest of 2003.

Summary: Following near-constant rain since October the level of the Rhone and tributaries rose steadily throughout the Autumn. A powerful mid-latitude storm brought further torrential rain to southern France between December 1st and 3rd, with 20cm of rain in the Rhone Valley and Marseilles areas leading to the Rhone reaching – at 6.42 m - its highest recorded level. Flooding occurred along the Rhone itself and its tributaries, the Herault, Tarn, and Upper Loire rivers. This was the eighth time the Rhone had flooded in the last 11 years.

Data sources: NASA Earth Observatory
<http://earthobservatory.nasa.gov/NaturalHazards/>

Dartmouth Flood Observatory
<http://www.dartmouth.edu/~floods/2003282.html>

Additional sources:

SPOT Image
http://www.spotimage.fr/html/167_240_241_370_.php

Territory: Iran

Region: Bam and surrounding villages (Kerman province, SE Iran)

Date: December 26th, 2003

Event: Earthquake

Impact: As of February 18th, official figures put the death toll at 43,200, with 30,000 injured and 75,600 left homeless. About 85 percent of buildings and infrastructure are reported to have been destroyed. The cost of reconstruction is presently estimated at one billion US\$.

Summary: A magnitude 6.6 earthquake struck close to the city of Bam in Iran's south east province of Kerman, at 05.27 local time. The quake was shallow, at just 10km, and surface rupturing appears to show that it occurred on the Bam Fault, which runs less than a kilometre from the city. Ground shaking reached IX on the 12-point Modified Mercalli Scale, and the highest ground acceleration was 0.98 g. This is an area of high seismic hazard as a result of stress accumulation arising from the northward movement of the Arabian Plate against the much larger Eurasian Plate, at a rate of about 3cm/y. The quake occurred 100km south of an area where two earthquakes in 1981 took 4,500 lives. Severe damage and major loss of life arose as a consequence of the poor construction materials (mud bricks) used in most buildings together with an absence of anti-seismic building codes and/or their enforcement. Should a large earthquake strike the capital Teheran, it is estimated that around half a million buildings will be destroyed and over 380,000 killed.

Data sources: USGS Earthquake Hazards Program
http://neic.usgs.gov/neis/eq_depot/2003/eq_031226/

Additional sources:

Earthquake Engineering Research Institute
http://www.eeri.org/lfe/iran_bam.html

ReliefWeb
<http://www.reliefweb.int/w/rwb.nsf/vLND>

Other notable and unusual events (selected)

Date	Country/region	Event	Fatalities	Economic losses (mil US\$)	Insured losses (mil US\$)
2004					
18 February	Iran	Train derailment and explosion	328		
26 January – 4 February	Madagascar	Tropical cyclone	29		
19 January	Algeria	Liquid gas plant explosion	27		500
2 January	Indonesia (Bali, Lombok)	Earthquake	1	12.1	
January	India (Bihar, Uttar Pradesh, Punjab, Kashmir Valley)	Cold wave	400		
2003					
23 December	China (Chongqing province)	Gas well explosion	234	3	
20 -22 December	Haiti (northern)	Floods and landslides	38		
22 December	US (California)	Earthquake	2	> 100	40 - 60
8 December	Dominican Republic	Tropical storm Odette	10		
1 – 4 December	Australia (Victoria)	Severe weather and hail		50	37
December	Philippines (southern Leyte)	Flash floods and landslides	154		
12 – 14 November	US	Severe weather	8	600	425
2 November	Indonesia (northern Sumatra)	Flash floods	239		
November	Vietnam (southern and central)	Floods	61		

25 October	China (Gansu provnse)	Earthquake	10		
13 October	Congo (North West)	Lightning	11		
28 – 29 September	Canada (Nova Scotia)	Hurricane	8	100	14.3
22 September	Mexico (Baja California)	Tropical Storm Marty	10		
5 – 6 September	Bermuda	Hurricane Fabian	4	500	400
June - September	India, Bangladesh, Pakistan, Nepal	Monsoon floods and landslides	1,400		
16 August	China (Inner Mongolia)	Earthquake	4		
August	Peru (Huancavelica province)	Cold wave	13		
26 July	Philippines; China (Guangxi and Guangdong provinces)	Typhoon Imbudo	42	120 (China)	
21 – 23 July	US (north east states)	Severe weather	7	800	600
21 July	China (Yunnan province)	Earthquake	16		
20 July	Cameroon (southern)	Landslide	20		
July	Sudan	Floods	12		
July - September	Portugal	Wildfires	19	1,100	
Summer	China	Floods	800	8,000	1,000