

DISASTERS BULLETIN 7: February 18th to August 7th 2005

Benfield Hazard Research Centre, University College London

Summary for the period

Even while the need for an Indian Ocean Tsunami Warning System was still under discussion, March 2005 saw a second great earthquake rupturing the sea floor off the west coast of Sumatra. Close to a thousand lives were lost on the string of islands that parallel the Sumatran mainland and once again tsunamis were generated. Fortunately, wave heights reached a maximum of only 3 m and damage was localised. The second quake had been predicted due to increased stress on neighbouring faults caused by the huge December 26th event. Stresses remain high on adjacent crustal weaknesses in the offshore Sunda Trench and on the onshore Sumatra Fault, which may trigger further large quakes in the months and years to come. In February, Iran was struck by a magnitude 6.4 earthquake that took more than 600 lives and injured over 1,400. As at Bam, little more than a year earlier, the mud-brick buildings provided little protection against even moderate ground shaking. Other earthquakes worthy of note within the period of this report, include a magnitude 6.6 event off the north coast of Japan's Kyushu island in February, which resulted in a single fatality and 500 injured, and a magnitude 7.2 quake off the north California coast in June that generated small (up to 26 cm) tsunamis.

Torrential rains and floods continued to cause death and destruction, with China and India being particularly badly hit. The perennial summer floods in China have not been as severe – so far – as those of 1998. Nevertheless, the death toll is approaching one thousand and economic losses are estimated at US\$2.77 billion. Monsoon rains struck the city of Mumbai and the surrounding region with a vengeance, and by early August, rainfall for the city – at 146.6 cm - was close to twice that expected at this time of year. The resulting death toll topped a thousand and early estimates put insured losses at more than US\$230 million. Elsewhere, economic losses due to floods reached close to US\$600 million in Romania, US\$450 million in Bulgaria and US\$400 million in Canada's Alberta province. Other lethal and damaging flood events occurred in Afghanistan, Australia, Bangladesh, El Salvador, Ethiopia, Iran, New Zealand, Pakistan, the Philippines, Russia, Saudi Arabia, Thailand, Turkey, the United States and elsewhere.

Predictions for an extremely active Atlantic hurricane were corroborated by the arrival of Hurricane Dennis in early July. Dennis briefly held the record for the most powerful early-season hurricane on record, before losing this to Hurricane Emily little more than a week later. Total economic losses in the Caribbean and US, arising from Dennis, are estimated at somewhere between US\$5 and 9 billion, while US insured losses look to be around US\$950 million. Meanwhile, in the Pacific, Typhoon Haitang triggered economic losses of around US\$1 billion.

Heat waves, drought and wildfires continue to exact a growing toll. In India, Pakistan, Bangladesh and Nepal, extreme heat resulted in the deaths of more than 400 people, while dozens more died in the United States. In Europe temperatures in excess of 40° C claimed 18 lives in Italy, 56 lives in Romania, triggered huge wildfires in Portugal, Spain and Greece, and exacerbated extreme drought conditions across much of the continent.

Selected events

Territory:	US and Caribbean
Region:	Cuba, Haiti, Jamaica and US (Florida, Alabama, Georgia, Mississippi)
Date:	4 – 13, July 2005
Event:	Hurricane
Impact:	In Haiti, 45 deaths were reported, with a further 16 lives lost in Cuba and 10 in the US. In Cuba, 120,000 houses were reported damaged to some degree, and agriculture (especially banana, citrus fruit, maize and poultry) was severely affected due to the

ferocious winds, torrential rain and widespread flooding. In the southern US states, 680,000 customers were without power at the height of the storm. Total economic losses are estimated at between US\$5 and 9 billion, with Cuban losses alone set at US\$1.4 billion, and US losses estimated at up to US\$2 – 5 billion. Original estimates for US insured losses ranged from US\$1 – 5 billion, but insurers now expect around 126,000 claims totalling US\$950 million, more than US\$640 billion in Florida. Lower than expected US insured losses are a reflection of the compact nature of the storm and its rapid passage across the coast. Offshore, the BP Thunderhorse production platform was damaged and left listing by the storm, but is repairable and will be on-stream by the year's end. Insured losses related to damage to offshore platforms are expected to be below US\$500 million.

Summary: Hurricane Dennis was the first hurricane of the 2005 Atlantic season, and the earliest fourth named tropical storm ever recorded. It was triggered by sea temperatures up to 1 degree C above normal for the time of year, and its development into the most powerful early-season hurricane on record (Note: Hurricane Emily took this record from Dennis just nine days later) was promoted by low wind shear. The storm formed in the south-east Caribbean on July 4th and achieved hurricane status on the 6th while approaching Hispaniola. By the 7th the storm had been upgraded to category 4 as it passed between Haiti and Jamaica. Dennis briefly strengthened to category 5 intensity, with sustained wind speeds reaching 240 km per hour, before making landfall as a category 4 storm in south-central Cuba on July 8th. Dennis continued north across the Gulf of Mexico and made US landfall on July 11th as a category 3 storm, between Pensacola and Navarre Beach in the Florida panhandle, before moving inland across Alabama, Georgia and Mississippi. Sustained winds at landfall were on the order of 195 km per hour, with hurricane strength winds extending up to 70 km from the storm's centre. The storm finally dissipated on July 13th.

Data sources: NASA
http://www.nasa.gov/vision/earth/lookingatearth/h2005_dennis.html

ReliefWeb
<http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm>

NOAA
<http://www.noaanews.noaa.gov/stories2005/s2473.htm>

Additional sources:

Insurance Journal
<http://www.insurancejournal.com/news/southeast/2005/07/26/57607.htm>

Insurance Information Institute
<http://www.disasterinformation.org/dennis.htm>

Territory: US

Region: Texas City, Texas.

Date: 23 March 2005

Event: Refinery explosion

Impact: The explosion and resulting fire claimed 15 lives and injured another 170 people. The blast was felt up to eight kilometres away and the fire took two hours to extinguish. BP expects to pay out US\$700 million as a result of the explosion, partly in legal and medical bills, and to pay for compensation to the dead and injured and their families.

As BP did not have third-party insurance, other costs include US\$40 million for an investigation and US\$200 million for repairs. Losses due to business interruption are also estimated at US\$200 million for every quarter until the plant is once again fully operational.

Summary: BP's Texas City refinery is the third largest in the United States, processing more than 433,000 barrels of oil a day and providing around three percent of the US petrol supply. The explosion was caused by a pressure build-up in a unit used to produce Octane for petrol, and is blamed on poor supervision and a failure to follow proper procedures. The number of dead and injured was exacerbated by the failure to sound an alarm and by the proximity of temporary workers housing units. The refinery has a history of poor safety performance. In March, 2004, the plant was evacuated after another explosion that led to the company being fined US\$63,000, while in September 2004, two workers were killed and another seriously injured by an escape of high-pressure steam.

Data sources: Business Telegraph
<http://business.telegraph.co.uk/>
BBC News
<http://news.bbc.co.uk/2/hi/business/4557201.stm>

Additional sources: CNN Money
<http://money.cnn.com/2005/07/26/news/international/bp.reut/>

Territory: Indonesia

Region: Sumatra

Date: 28 March 2005

Event: Earthquake

Impact: Islands off the west coast of Sumatra were worst affected. On Nias, up to 300 people were killed, more than 2,000 injured and several hundred buildings destroyed. On neighbouring Simeulue, the death toll was 100 and on Kepulauan more than 200. The total death toll is estimated at 905. At least 10 people are reported to have died during the evacuation of parts of the Sri Lankan coastline. More than 108,000 people were made homeless or internally displaced. Extensive damage was caused to infrastructure and lifelines, particularly on Nias, and low-lying homes were flooded due to a combination of tsunami and subsidence.

Summary: A magnitude 8.7 earthquake occurred off the west coast of the Indonesian island of Sumatra, 245 km south-west of the city of Medan and at the contact of the Indo-Australian and Burma (or Sunda) tectonic plates. The quake was shallow (~ 30 km depth) and located just 160 km to the south-east of the rupture caused by the catastrophic magnitude 9.3 earthquake of December 26th, 2004. It is highly likely that the latter event transferred stress onto the fault segment to the south, contributing directly to the second quake. The earthquake was felt as far away as India, Thailand and the Andaman Islands, and ground shaking reached intensity VI at Banda Aceh, intensity V in Medan (both in Sumatra), intensity IV in Bangkok, and intensity III in Phuket (Thailand), Singapore, and Male (Maldives). Despite the size of the quake and its submarine occurrence, the tsunami generated was relatively small. The port and airport on the island of Simeulue were damaged by a 3 m wave, while tsunami run-up heights of 1-2 m were recorded elsewhere along the west coast of Sumatra. Small tsunami were also recorded at Colombo (Sri Lanka) (25 cm) and in the

Maldives (10 – 18 cm). Initial observations indicated up to a metre of uplift and subsidence along the north-west coast of Sumatra. More than 700 aftershocks were recorded in the two days following the main shock.

Data sources: United States Geological Survey
<http://earthquake.usgs.gov/recenteqsww/Quakes/usweax.htm>

ReliefWeb
<http://www.reliefweb.int/rw/dbc.nsf/doc100?openForm>

Additional sources:

Earthquake Engineering Research Institute
<http://www.eeri.org/>

Territory: Europe

Region: Portugal, Spain, France, UK, Italy, Germany, Poland, Greece, Czech Republic, Balkan States and eastern Europe.

Date: April to August

Event: Drought, heat wave and wildfires

Impact: Fourteen fire fighters died in Guadalajara (Spain) in mid-July. In northern Italy 18 people were reported dead due to soaring temperatures at the end of June, and a further 56 in Romania in late July. Spain's worst drought on record is threatening 80 million citrus trees in Murcia (SE Spain), where water reserves are just 16 percent of normal. A 30 percent fall in the Spanish olive oil crop is expected. In Portugal, many remote villages have been evacuated for safety purposes and roads closed due to poor visibility. In northern Italy, where the Po river and regional reservoirs are too low to provide irrigation, half the melon crop and a fifth of the plum, apple, apricot and peach crops have already been lost. Soya, corn and sugar beet crops in Italy are also badly affected. In Portugal, 12,690 wildfires had been recorded through mid-June, up 55 percent on average. By the end of July, 53,000 hectares of forest had been destroyed, making a total of 820,000 hectares in the last five years – 25 percent of the country's forest. Economic losses due to a combination of drought and fires in Portugal are expected to exceed US\$1.5 billion, or around 1.5 percent of the country's GDP.

Summary: Europe is suffering under drought conditions, with much of the continent experiencing between a quarter to a half of expected rainfall over the period April 1st to June 30th. In many places, this follows a dryer than normal winter and spring. Temperatures have risen above 40 degrees C in Spain, Portugal, Italy, Romania and Greece. In France, some form of water rationing has been enacted across more than two-thirds of the country. Portugal is suffering its worst drought for 60 years, with 80 percent of the country suffering from extreme drought. In the longer term, the European Space Agency's *Desert Watch* project warns that 300,000 square kilometres of Europe's Mediterranean coast – an area hosting a population of 16.5 million people – is threatened by desertification. Wildfires have affected southern France, Spain and Greece, but Portugal has been worst affected, particularly in the north with most of the blazes located in the Porto, Braga and Aveiro districts.

Data sources: UK Met Office. World Weather Impacts Archive
<http://www.met-office.gov.uk/cgi-bin/newsid>

The Portugal Post
<http://www.portugalpost.com/>

Additional sources: NASA Earth Observatory/Natural Hazards
<http://earthobservatory.nasa.gov/NaturalHazards/>

Territory: India

Region: West Bengal, Jharkhand, Gujarat, Goa, Karnataka, Maharashtra, Orissa, and Madhya Pradesh

Date: July 24th to early August 2005

Event: Flood

Impact: As of early August the death toll was more than a thousand, with Maharashtra bearing the brunt with 1,054 lives lost; 406 of these in Mumbai. 109 deaths were reported in Karnataka and a further 8 in Orissa. In Maharashtra, 25,000 people were affected in 2,300 villages as well as in Mumbai Metropolis. Numbers affected in Orissa total close to 1.5 million, and in Karnataka 110,000 people have been affected and 24,000 homes destroyed or damaged. In total, it is estimated that around 20 million people have been affected by the rains or floods. Agriculture has suffered badly, particularly cash-crops such as sugar and oil seed, while Mumbai's Pharmaceutical and car industries have also been hit. Early, provisional estimates of losses in industry, agriculture and infrastructure range from US\$700 million to US\$2.8 billion. By early August, India's four biggest private insurers - ICICI Lombard General Insurance, Iffco-Tokio General Insurance, Bajaj Allianz General Insurance and Tata AIG General Insurance - had received claims for damages totalling 10bn rupees (US\$230 million).

Summary: Torrential monsoon rains arriving on July 24th brought unprecedented precipitation rates and devastating floods to at least eight Indian states, with Maharashtra and its capital, Mumbai being worst affected. Here 94 cm of rain in a single day (July 26th) - a record for Mumbai - overwhelmed its Victorian storm drain system, leading to massive surface run-off. The scale of the flooding was exacerbated by a number of factors. The storm drains were closed for a time to prevent high tides penetrating into the island city, but as a result stopped the flood waters from draining out. Many drains were also clogged with rubbish and debris, while a new road system has been blamed for constricting the Mithi river that carries excess surface water to the Arabian Sea. The destruction of mangrove swamps and the reclamation of land from the sea are also implicated in increasing the flood risk. In the 16th century, 95 percent of Mumbai was beneath the sea. General urbanisation is clearly a major culprit. Typically 35-40 percent of rainwater infiltrates into the ground, but rapid building and loss of open space now prevents this and increases surface run-off as a consequence. By the end of the first week of August, torrential rains were continuing, resulting in Mumbai receiving 146.6 cm of rain in just over a week. This compares with the normal July and August totals of, respectively, 86.8 and 55.3 cm.

Data sources: ReliefWeb
<http://www.reliefweb.int/rw/dbc.nsf/doc100?openForm>

NASA Earth Observatory
http://earthobservatory.nasa.gov/Newsroom/NewImages/images.php3?img_id=16985

Additional sources: Reuters Alertnet
<http://www.alertnet.org/thenews/fromthefield/219816/112318366972.htm>

Territory: China

Region: South China (Zhejiang, Fujian, Jiangxi, Hunan, Guangdong, and Guangxi provinces). North-east China (Heilongjiang and Anhui Provinces).

Date: June to August

Event: Flood

Impact: Official figures for early August put the number of dead and missing at over 900. More than 3.72 million people have been internally displaced, and more than 90 million affected in some way by the floods. As of mid-July, the floods in the southern provinces had destroyed 702,100 houses and damaged millions more. In addition, flood waters, landslides and mudflows were reported to have destroyed more than seven million hectares of crops. In a separate event in the north-east province of Heilongjiang, 105 children and 12 staff perished on June 10th when a flash flood – blamed on the deforestation of surrounding slopes - swept through a school. Heavy rains in the north-eastern provinces of Heilongjiang and Anhui, from mid-July into August, affected over a third of a million people. Around the Songhua river, in north-east China, floodwaters destroyed more than 5,000 homes and 355,000 hectares of crops. Flood loss estimates from the beginning of the year to mid-June are US\$2.77 billion. This is higher than the annual average for the 1990s, but lower than in the devastating flood years of 1991 and 1998.

Summary: Torrential rains starting at the end of May brought severe flash floods, landslides and mudflows to southern China, in particular affecting the provinces of Zhejiang, Fujian, Jiangxi, Hunan, Guangdong, and Guangxi. In early June, more than 20 cm of rain fell in 24 hours in western and central parts of Hunan province and rains continued into the middle of the month. In mid-June, the water level on Guangxi province's Xijiang and Wuzhou rivers reached close to 27 m – 9.45 m higher than the flood warning level - overtopping protective dykes and inundating the industrial city of Wuzhou. During mid-July, the Nenjiang River in north-east China's Heilongjiang province burst its banks following continuous rainfall in the vicinity of the city of Qiqihar. Heavy rains in mid-July also led to the Songhua river overtopping its banks and inundating surrounding regions. In early August, torrential rain affected parts of north-eastern China, with the eastern province of Anhui receiving up to 26 cm of rain in 24 hours. Severe thunderstorms also struck Beijing in early August, closing the international airport for several hours.

Data sources: ReliefWeb
<http://www.reliefweb.int/rw/dbc.nsf/doc100?OpenForm>

European Space Agency
http://www.esa.int/esaCP/SEM8MD808BE_index_0.html

Additional sources:

Dartmouth Flood Observatory
<http://www.dartmouth.edu/%7efloods/>

NASA Earth Observatory
http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?topic=flood

Territory: Taiwan and China

Region: Fujian and Zhejiang provinces (China);

Date: 18 July 2005

Event: Typhoon

Impact: In Taiwan, Haitang resulted in 14 deaths and thirty injuries. Ninety percent of international flights were cancelled, domestic travel was suspended, and 1.5 million homes were temporarily without power. Agricultural losses in Taiwan are estimated at US\$127 million, with 45,179 hectares of crops – mainly rice and fruit – destroyed and accompanying losses of livestock, fisheries, lumber and facilities. In the Chinese coastal provinces of Fujian and Zhejiang, twelve lives were lost and 29,000 houses destroyed. The relatively low death toll is probably a reflection of the evacuation of close to a million people from coastal communities before the storm struck. Economic losses are estimated at US\$317 million in Fujian province and a further US\$657 million in Zhejiang.

Summary: Typhoon Haitang was the strongest storm to strike Taiwan in five years. It made landfall at Hualien County on July 18th as a category 3 storm, with sustained wind speeds of 193 km per hour and gusts of up to 227 km per hour, and maintained category 2 status as it crossed the island. Rainfall levels reached 30 cm in northern Taiwan, and more than 100 cm in the most mountainous regions, triggering flash floods, landslides and mudflows. Severe flooding associated with the storm also affected the south of the island, where Tainan county experienced its worst flooding for half a century, and close to 800 rivers were placed on orange alert. Typhoon Haitang briefly strengthened to a category three storm before weakening to category 1 at landfall on the China mainland. Haitang came ashore close to the town of Huangqi in Fujian province, with sustained wind speeds of 113 km per hour that dropped rapidly as the typhoon was downgraded to a tropical storm as it headed inland towards Hunan province. Gusting winds of up to 75 km per hour were recorded in the major commercial centre of Shanghai, where heavy rains also elevated rivers to dangerous levels.

Data sources: China Daily
<http://www.chinadaily.com.cn/english/home/index.html>

Reuters Alertnet
<http://www.alertnet.org/index.htm>

Additional sources: Joint Typhoon Warning Center
<http://www.npmoc.navy.mil/jtwc.html>

NASA Earth Observatory
http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?img_id=12963

Other notable and unusual events (selected)

Date	Country/region	Event	Fatalities	Economic losses (mil US\$)	Insured losses (mil US\$)
9 August 2005	Nigeria (Jalingo)	Bridge collapse	Up to 60		
7 August	China (Guangdong province)	Mine flood	122		

Early August 2005	Bulgaria	Floods	16	200 (450 for the year due to floods)	
30 July	China (Anhui province)	Tornado	11		
Mid-late July 2005	Romania (Vrancea)	Heat wave and floods	~ 80	> 596	
27 July	India (west coast)	Oil production platform	10	300	195
12 July	China (Xinjiang province)	Mine explosion and fire	83		
7 July	London	Bombs			
Late June	El Salvador	Floods and mudslides	30		
29 June	Bangladesh (Bay of Bengal)	Storm	35		
Mid-June	Canada (Alberta)	Floods	4	400	218
June	India, Pakistan, Bangladesh, Nepal	Heat wave	400		
18 May	Chile (High Andes)	Blizzard	45		
15 May	Bangladesh (Galachipa)	Ferry sinking	51		
27 April	Saudi Arabia (Asir province)	Flash flood	30		
18 – 22 March	Afghanistan	Torrential rain, floods and mudslides	200		
20 March	Japan (Kyushu)	Earthquake	1		
22 February	Iran (Zarand)	Earthquake	612		
14 February	China (Liaoning province)	Mine explosion	209		