

## **DISASTERS BULLETIN 10: July 25<sup>th</sup> – November 8<sup>th</sup> 2006**

**Benfield - UCL Hazard Research Centre**

### **Summary for the period**

The period from the end of July to early November 2006 has been reasonably quiet from the perspective of natural hazards. Most notably, the Atlantic hurricane season has proven – so far - to be much reduced in relation to pre-season forecasts. The Pacific, on the other hand, has seen continued typhoon activity, with seven tropical storms and eight typhoons affecting the region over the period. Of these, typhoons Saomai, Xangsane and Prapiroon proved to be the most lethal and costly, together taking more than 700 lives and costing in excess of US\$2.2 billion, mainly through damage to mainland China and Vietnam. Major flooding again proved to be a problem in many parts of the world, often associated with tropical cyclone activity. Severe river flooding affected Ethiopia, and other countries in the Horn of Africa, leading to hundreds of deaths, affecting many hundreds of thousands of people and bringing food shortages and disease. Other floods were reported in Afghanistan, Greece, India, Nepal, Niger, Nigeria (dam collapse), Turkey, Pakistan, and Sri Lanka. No large earthquakes were recorded over the period, but a magnitude 4.5 event took three lives and caused damage totalling US\$22 million in Tajikistan, while – more unusually – a magnitude 6.7 quake caused widespread damage and economic losses of around US\$73 million on Hawaii's Big Island. Heat waves dominated summers in both North America and western and central Europe, with temperatures in the former reaching a staggering 47° C (117° F) in South Dakota. Continuing high temperatures and drought conditions also helped to elevate the wildfire threat, contributing to the deliberately started fire that destroyed more than 40,000 acres in southern California in October. Cold also featured during the period of the report, with an unprecedented 60 cm early season lake-effect snowfall causing more than US\$130 million of damage in Buffalo, New York State..

### **Selected events**

**Territory:** United States, Canada

**Region:** All regions

**Date:** 15 July – 27 August

**Event:** Heat wave

**Impact:** At least 225 deaths have been blamed on the heat wave conditions, including 163 in California and 31 in New York City, although this is likely to be a considerable under-estimate.

NOAA calculated that the residential energy demand rose by close to a quarter in response to the elevated temperatures. This was reflected in the fact that all seven regional independent electricity grid operators, which serve two-thirds of the US population, satisfied new record demands in July, totalling 475,717 MW. High temperatures, lightning and heat-related storms resulted in 765,000 customers in California losing their electricity supply, along with over half a million in Illinois and Missouri, including half the population of St. Louis. New York was also affected by power outages. In California, the heat killed 25,000 head of cattle and 700,000 fowl. The former reduced dairy production by up to 15 percent and is expected to have a serious impact on the state's US\$4.5 billion dairy industry. Dairy, beef and poultry losses in Fresno County alone amounted to US\$85 million. Californian crops were also badly affected, in particular, walnuts, peaches, nectarines and plums. Natural gas prices surged as demand shot up, with a possible consequence that bills could rise in the winter.

**Summary:** Between 15 and 22 July, an exceptional heat wave spread across the United States and Canada, leading – on 17 July – to all but one of the contiguous US states

experiencing temperatures in excess of 32° C (90° F). In the remaining state – North Dakota – temperatures had peaked at 40° C (104° C) the day before. Over the next week, the west coast and south-west deserts were worst affected, before the highest temperatures migrated to the east at the end of the month and in early August. For the rest of August, the SE states and the Southern Plains suffered the highest temperatures, before the heat wave finally broke on August 27<sup>th</sup>. July 2006 ended as the second hottest on record, with 2,300 daily temperature records broken. The average July-August 2006 temperature for the contiguous United States was 1.3° C (2.4° F) above the average of 22.3° C (72.1° F), making the summer the second hottest since the ‘dustbowl’ year of 1936. The highest temperatures recorded were 47° C (117° F) in Pierre (South Dakota) on July 15<sup>th</sup> and 46° C (115° F) in California’s Central Valley on July 23<sup>rd</sup>. In Canada, temperatures peaked at 42.1° C (107.8° F) in Lytton, British Columbia.

**Data sources:** NOAA Climate of 2006 – July  
<http://www.ncdc.noaa.gov/oa/climate/research/2006/jul/jul06.html>

NOAA Climate of 2006 – August  
<http://www.ncdc.noaa.gov/oa/climate/research/2006/aug/aug06.html>

**Additional sources** The International Research Institute for Climate and Society (IRI)  
<http://iri.columbia.edu/climate/cid/Aug2006/impacts.html#USheat>

**Image:** US temperature anomaly map for July 2006. Source: Courtesy NOAA.

**Territory:** Mariana Islands, Philippines, Japan, Taiwan, China

**Region:** Northern Philippines, northern Taiwan, Okinawa, South East China – Zhejiang, Fujian, and Jiangxi provinces.

**Date:** 4 – 11 August 2006

**Event:** Typhoon Saomai

**Impact:** Saomai brought heavy rains to the Marianas, but no deaths or significant damage were reported. The Philippines fared less well, with over 400 homes destroyed by storm surge and nine people killed or missing. In Okinawa, the typhoon brought Japan’s heaviest rain for a century and took a further seven lives as a result of flooding and landslides. In Taiwan, torrential rains disrupted traffic and led to flight cancellations. Typhoon Saomai was the most powerful typhoon to strike China in half a century, causing massive disruption in the country’s south-east province of Zhejiang. Despite the precautionary evacuation of around one million residents, at least 87 lives were reported lost in the province, with many missing. More than 18,000 buildings were destroyed, over 200 boats capsized, wharf facilities and sea defences severely damaged, and 20,000 hectares of farmland inundated. In neighbouring Fujian province, while over half a million residents were evacuated before the storm struck, at least 138 people still lost their lives – mostly by storm surge - including eight when an evacuation shelter collapsed. A further 37,000 homes were destroyed by flooding and strong winds, and 38,000 hectares of farmland flooded. Total economic losses are estimated at around US\$1.5 billion. No data on insured losses are yet available.

**Summary:** Super-typhoon Saomai started life as a tropical disturbance east of the Chuuk Islands in the western Pacific. The disturbance tracked north-westwards over several days, strengthening to a tropical depression on August 4<sup>th</sup> and into a tropical storm the following day. After crossing the Mariana Islands on the 6<sup>th</sup>, the storm organised and intensified itself into a tropical cyclone on August 7<sup>th</sup> – one of three typhoons active simultaneously in close proximity. Peak intensity was reached two days later, with

sustained wind speeds of 175 km h, and gusts to 260 km h.. Saomai passed south of Japan's southernmost island, Okinawa, overnight, before brushing the north coast of Taiwan early on August 10<sup>th</sup>, and making landfall later in the day, as a Category 4 storm, in China's south-east province of Zhejiang.

**Data sources:** People's Daily Online  
[http://english.people.com.cn/english/200009/15/eng20000915\\_50597.html](http://english.people.com.cn/english/200009/15/eng20000915_50597.html)

China Daily  
[http://www.chinadaily.com.cn/china/2006-08/11/content\\_662220.htm](http://www.chinadaily.com.cn/china/2006-08/11/content_662220.htm)

**Additional sources:** NASA Earth Observatory  
[http://earthobservatory.nasa.gov/NaturalHazards/natural\\_hazards\\_v2.php3?img\\_id=13767](http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?img_id=13767)

**Image:** Three Pacific typhoons – Saomai, Maria and Botha – appear in a single satellite image on August 7<sup>th</sup> 2006. Courtesy: NASA; Jeff Schmaltz, MODIS Rapid Response Team, Goddard Space Flight Center.

**Territory:** Ethiopia

**Region:** Countrywide

**Date:** 5 – 31 August 2006

**Event:** Floods

**Impact:** The August 2006 floods were the worst in Ethiopia's history, affecting 363,000 people and making close to 200,000 homeless. The final death toll is estimated at in excess of 647. Dire Dawa city was particularly badly affected as a result of the river Dechatu bursting its banks on the night of August 6<sup>th</sup>, sending torrents of water through the streets. More than 200 buildings were destroyed and over 250 people killed instantly, including 40 young children. The South Omo region, in the south of the country, was also badly hit. Life lines were affected across the country, with telephone and power lines cut and the main roads to Addis Ababa impassable. The floods have had a severe impact on agriculture, leading to widespread food shortages in one of the world's poorest states. Six million people are estimated to require food assistance, half of these until at least the end of the year. Total economic losses arising from the disaster remain to be determined.

**Summary:** Unprecedented rains started on August 5<sup>th</sup> in the south and east of the country, causing severe floods that affected the country's second city, Dire Dawa, 525 km east of the capital, Addis Ababa. Continued torrential rains continued in the highlands, resulting in saturation of the ground, all major rivers swelling to dangerous levels, the country's five dams reaching maximum capacity, and some rivers feeding the lowlands breaking their banks and spreading the floods to all five regions of the country in ensuing weeks. Flooding regularly strikes low-lying areas of the country between June and September, but they have been particularly bad recently. Over the past two years, floods in the south and east of the country have killed hundreds and displaced hundreds of thousands.

**Data sources:** International Research Institute for Climate and Society  
<http://iri.columbia.edu/climate/cid/Sep2006/impacts.html#GHAflood>

ReliefWeb

<http://www.reliefweb.int/rw/rwb.nsf/doc106?openForm&rc=1&emid=FL-2006-000112-ETH&po=0&so=63>

**Additional sources** Dartmouth Flood Observatory  
<http://www.dartmouth.edu/~floods/>

**Image:** Good image at: [http://en.wikinews.org/wiki/Image:Ethiopia\\_flooding.JPG](http://en.wikinews.org/wiki/Image:Ethiopia_flooding.JPG) Need to check copyright.

The river Dechatu, close to Ethiopia's second city of Dire Dawa, approaches bursting point in early August 2006.

**Territory:** United States

**Region:** Illinois, Indiana, Kentucky, Missouri, Michigan, Alabama, Tennessee.

**Date:** 22 – 24 September 2006

**Event:** Severe storms, Tornadoes and torrential rains

**Impact:** In Crosstown (Perry County, Missouri), a direct hit from an F4 tornado – with wind speeds in excess of 320 km h - left five people injured and 80 percent of homes uninhabitable, while damage was also sustained in Caledonia (Michigan). In total, an estimated 400 buildings were damaged or destroyed. The worst flooding occurred in Kentucky, where rainfall exceeded 35cm, causing flash floods that claimed at least 12 lives, mainly in the Lexington and Elizabethtown areas. Interstate highways were closed around Elizabethtown due to flood waters, and also around Louisville, where more than 30 cm of rain fell. Economic and insured losses are not currently available.

**Summary:** A very intense area of low pressure (98.5 mb) moved across the mid-west from 22 – 23 September, bringing very strong winds and torrential rain. On the 22<sup>nd</sup>, severe thunder storms developed rapidly across central Missouri and headed eastwards to eastern Missouri and southern Illinois, while others formed in the Chicago area of Michigan. More than 41 tornadoes were reported, with the most destructive an F4 storm that struck Perry County, Missouri. Further west, tornadic thunder storms crossed south-central Missouri. Severe storms continued on the 23<sup>rd</sup> in Michigan and southern Illinois, and a small (F0) tornado caused damage to the town of Caledonia in Michigan. Southern Illinois, much of western and northern Kentucky, southern Ohio, and Tennessee also received exceptional rainfall, with totals in excess of 7 times the normal weekly precipitation in a two-day period causing localised, serious, flooding. Several tornadoes of F2 strength also occurred north of Birmingham, Alabama.

**Data sources:** Midwest Climate Watch  
<http://mcc.sws.uiuc.edu/cliwatch/0609/060930.htm>

NOAA National Weather Service Weather Forecast Office  
[http://www.crh.noaa.gov/crnews/display\\_story.php?wfo=pah&storyid=3793](http://www.crh.noaa.gov/crnews/display_story.php?wfo=pah&storyid=3793)

**Additional sources** NASA Earth Observatory

[http://earthobservatory.nasa.gov/NaturalHazards/natural\\_hazards\\_v2.php?img\\_id=13901](http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php?img_id=13901)

**Image:** F4 Tornado damage near Crosstown, Missouri. Courtesy: NOAA National Weather Service Weather Forecast Office.

**Territory:** Philippines, Vietnam, Thailand

**Region:** Luzon and central Philippines, central Vietnam, north and central Thailand.

**Date:** 25 September – 1 October 2006

**Event:** Typhoon Xangsane

**Impact:** Xangsane was the most powerful storm to score a direct hit on Metro Manila for 11 years, and resulting damage was widespread. Across the central Philippines in general, flooding and landslides cut lifelines, and power and water was lost in several provinces, with power lost across the whole of Luzon. The total death toll is estimated at close to 200, with economic losses estimated at around US\$118 million. In central Vietnam, the port city of Da Nang was worst affected, with the provinces of Quang Nam and Nghe An also badly hit. Here, an estimated 320,000 homes were damaged or destroyed. Strong winds and severe flooding took at least 169 lives and caused major problems for agriculture, with 300,000 hectares of crops (mainly rice) damaged, and heavy livestock and poultry losses. Over 1,300 hectares of aquaculture were also destroyed, and close to 800 fishing boats lost. Total economic losses are estimated at US\$624 million. In Thailand, torrential rains caused severe flooding in 35 provinces, and took 14 lives.

**Summary:** Xangsane started life on September 25<sup>th</sup> as a tropical depression to the east of the Philippines. The depression rapidly intensified, achieving severe tropical storm status the following day, before making landfall on the central Philippine island of Samar. Xangsane intensified further to typhoon status on the 27<sup>th</sup>, as it crossed the Philippine archipelago and passed over Metro Manila as a Category 3 storm. After entering the South China Sea as a weak typhoon, the storm once again strengthened to Category 3 before making a second landfall on October 1<sup>st</sup> close to the city of Hué in Vietnam. Xangsane continued across Cambodia and Thailand as a tropical depression, before hovering over central Indochina for several further days as an area of low pressure.

**Data sources:** China Daily  
[http://www.chinadaily.com.cn/world/2006-10/05/content\\_701909.htm](http://www.chinadaily.com.cn/world/2006-10/05/content_701909.htm)

ReliefWEB  
<http://www.reliefweb.int/rw/dbc.nsf/doc108?OpenForm&emid=TC-2006-000144-PHL&rc=3>

**Additional sources** People's Daily Online  
[http://english.people.com.cn/200610/01/eng20061001\\_308048.html](http://english.people.com.cn/200610/01/eng20061001_308048.html)

**Image:**Image shows rainfall totals estimated in part from data collected by the Tropical Rainfall Measuring Mission satellite (TRMM). Rainfall totals of over 30cm are shown over Samar in the east-central Philippines (red areas), while a broad area of up to 15 cm (green) stretches from the central Philippines to the coast of Vietnam. Courtesy: NASA Goddard Space Flight Center.

**Territory:** United States

**Region:** Buffalo, New York State

**Date:** 12 – 13 October 2006

**Event:** Snowstorm

**Impact:** Lake-effect storm 'Aphid' was the worst of its type ever recorded, and affected over one million people. The wet snow exerted a weight of close to 50 kg per square metre, leading to severe damage to trees and power lines. More than 90 percent of the city's trees were damaged – many severely – while 400,000 people lost power, a quarter of this total for a week. Fourteen deaths were reported as a direct result of the storm, along with several hundred injured. Clean up of debris is estimated to cost on the order of US\$130 million, and expected to take several months. Buffalo Niagara International Airport was closed, and a 150 km stretch of the New York State Thruway shut for several hours. Affected parts of Erie, Genesee, Orleans, and Niagara Counties in Western New York were declared major disaster areas by President George Bush.

**Summary:** Lake-effect storm 'Aphid' struck the City of Buffalo, New York State, from the night of 12 October through the morning of October 13<sup>th</sup>, leaving behind a record 60 cm of snow in parts of the Buffalo urban region. The snowstorm, a rare example of *Thundersnow*, due to the accompanying thunder and lightning, was extremely localised, with little or no snow 15 km from the city. The event was an unseasonably early lake-effect storm, fed by cold air picking up moisture from a warm Lake Erie, converting it to snow and dumping it on Buffalo at the east end of the Lake. The resulting snow was wet and heavy, and – as a consequence – particularly damaging to trees and power and communication lines. The snow did not linger and all signs had disappeared within 48 – 60 hours.

**Data sources:** NOAA National Weather Service Forecast Office  
<http://www.erh.noaa.gov/buf/storm101206.html>

BBC News online  
[http://news.bbc.co.uk/1/hi/in\\_pictures/6049054.stm](http://news.bbc.co.uk/1/hi/in_pictures/6049054.stm)

**Additional sources** St. Louis Business Journal  
<http://stlouis.bizjournals.com/stlouis/othercities/buffalo/stories/2006/10/23/daily25.html?t=printable>

**Image:** Lake-effect storm 'Aphid' extent and snow depths. Courtesy: NOAA National Weather Service Forecast Office.

**Territory:** United States

**Region:** California

**Date:** 26 October 2006

**Event:** Wildfire

**Impact:** The fire killed five fire fighters who were trapped in their fire engine and destroyed 34 homes and 20 other buildings. Initial cost estimates are around US\$10 million, but can be expected to rise. In total, 40,200 acres were destroyed before the fire was brought under control. The event is the latest in a record US wildfire season that has seen fires consume 9.4 million acres, topping the previous year's total of 8.6 million acres.

**Summary:** The so-called ‘Esperanza’ fire was started deliberately in an area of *chaparral* near the town of Cabazon, Riverside County, in southern California, and burned for four days before being brought under control. *Chaparral* is dense scrub wood that is highly flammable and difficult to fight once ablaze. This is reflected by the fact that the fire spread extremely rapidly, driven by a powerful Santa Ana wind, and consumed an estimated 24,000 acres in the first 18 hours.

**Data sources:** California Department of Forestry and Fire Protection  
[http://cdfdata.fire.ca.gov/incidents/incidents\\_details\\_info?incident\\_id=161](http://cdfdata.fire.ca.gov/incidents/incidents_details_info?incident_id=161)

NASA Earth Observatory

[http://earthobservatory.nasa.gov/NaturalHazards/natural\\_hazards\\_v2.php3?img\\_id=13945](http://earthobservatory.nasa.gov/NaturalHazards/natural_hazards_v2.php3?img_id=13945)

**Additional sources** Wikipedia  
[http://en.wikipedia.org/wiki/Esperanza\\_Fire](http://en.wikipedia.org/wiki/Esperanza_Fire)

**Image:** Smoke from the Esperanza fire cross the mountains southeast of Los Angeles and head out over the Pacific on October 26. Courtesy: NASA; Jeff Schmaltz, MODIS Rapid Response Team, Goddard Space Flight Center.

### Other notable and unusual events (selected)

Date	Country/region	Event	Fatalities	Economic losses (mil US\$)	Insured losses (mil US\$)
Early November	Ethiopia (Somali region)	Flood	67		
Early November	Turkey (Istanbul and Mersin Provinces; eastern Turkey)	Flood	39		
Late October	Sri Lanka (Colombo, Galle, Gampaha district)	Flood	25		
29 October	Philippines (Luzon)	Typhoon Cimaron	19 +	8.8	
15 October	Hawaii (Big Island)	Earthquake		73	
10 October	Greece (northern)	Flood	1		
7 October	Papua New Guinea (Rabaul)	Volcanic eruption			
3 October	Nigeria (Zamfara state)	Dam collapse	50		
Late September	Ivory Coast (Abidjan)	Toxic waste	5?		
13 – 18 September	Mexico (Sinaloa state)	Tropical Storm Lane	4	55	
Late August – Mid - September	Nepal (western)		60 +		
16 August	Ecuador (Tungurahua)	Volcanic eruption	1	150	

Mid – July to mid - August	Pakistan (northern)	Flood	> 230		
Early August	India (Andhra Pradesh, Maharashtra and Gujarat)	Flood	106		
3 August	China (Guangdong Province)	Typhoon Prapiroon	> 80	900	
Late – July to early August	Afghanistan	Flood	33		
July - August	Europe (UK, Germany, France, Spain, Italy, Netherlands)	Heat wave	80 +		
29 July	Tajikistan (Kumsangir district)	Earthquake	3	22	
25 July	China (Anhui, Fujian, Jiangxi, Hunan, and Guangdong provinces)	Tropical storm Kaemi	34	367	