

## GENERAL INSURANCE — WINDSTORMS AND FLOODS

# Managing flood risks and sustainable development go hand in hand



Floods in China continue to be a regular occurrence with almost half the country's population facing flood risks, yet the annual number of fatalities caused by flooding has decreased significantly in the period from 1980 to 2016 (with one exception in 2010 due to a major landslide).

**Dr Wolfgang Kron of Munich Re** discusses the reasons behind this development, lessons learned and why the sustainable development of cities is crucial to managing flood risks.



China experienced a devastating flood disaster in 1998 when flooding on the Yangtze and Songhua rivers led to almost 4,000 fatalities and losses in the region of US\$20 billion. These floods were triggered primarily by river flooding that plagued both the Yangtze and Songhua rivers and their major tributaries. In the years after 1998, floods continued to occur, but none wreaked as much havoc as the events of 1998 and there was a marked decrease in the number of fatalities due to hydrological events falling significantly to less than 1,200 in the years that followed.

This can be attributed, to a considerable extent, to the extensive flood protection programme put in place by the Chinese government after the events of 1998. They invested more than CNY620 billion (US\$87 billion) over the next 10 years. Centres were set up for data collection, flood forecasting and early warning, and a flood management strategy was drawn up.

By the end of 2006, 85,800 dams, retention basins and polders had been built or retrofitted. Roughly 28,000km of dykes were built providing protection for 550 million people and 45 million hectares of farmland. These measures have played an important role in reducing the impact of the annual floods and in reducing number of fatalities caused by flooding. (See Hydrological events in China chart).

## Flash floods

Then in 2016, disaster struck again in the form of flash floods, which wreaked havoc in both rural and built-up areas. Even though there were many similarities between the events of 1998 and 2016 – both floods were preceded by an exceptionally strong El Niño – there were also striking differences.

The 1998 floods were caused by river flooding, whereas the 2016 floods were the result of a significant number of extreme local precipitation events – critical flood stages were reached on 363 small and medium-sized rivers. New flood flashpoints developed on an almost weekly basis starting in June, earlier than usual, resulting in over 600 fatalities. Flash floods tend to develop much more quickly than river floods, and are much more powerful and more dangerous.

Rainy season in China – known locally as mei-yu or plum rain season – occurs in different parts of the country at different times over the spring and summer from April to July. In the Yangtze region in central China, the mei-yu period occurs in June and July.

In 2016, the mei-yu was unusually harsh with one rainstorm after the other interspersed by thunderstorms and hailstorms. Cities in the region were badly damaged from the resulting floods. Nanjing, situ-