

# Windstorms – A shifting threat?



The warm waters of the Pacific Ocean generate about 26 tropical storms per year on average. The western North Pacific is the most active base for these tropical storms – a problem for the coastal areas of South East Asia. Countries such as the Philippines have been particularly hard hit. Research shows, however, that these storm patterns may be shifting further north, and that the storms of the future that make landfall could be even stronger and more devastating.

**Mr Markus Stowasser** of **Allianz Re** elaborates.



**I**t takes several “perfect” conditions to transform a couple of harmless thunderstorm clouds over the ocean into a tropical cyclone: warm ocean surface temperature (above or around 27° C), winds near the ocean surface blowing from different directions, which then converge and cause air to rise and more clouds to form; low wind shear, meaning that the winds do not vary greatly in height, allowing for the clouds to rise very high; and enough distance from the equator to let the rotation of the Earth provide enough spin, a phenomenon known as the Coriolis force.

Most of these conditions come together between June and November in the northern hemisphere, with a peak in September, although it is not unusual to have the occasional tropical cyclone outside of this period in the western North Pacific.

## A northward shift

Over the past 30 years, researchers have been observing a geographical shift northwards of where tropical cyclones reach their peak intensity.

This migration means that the regional hazard will most likely shift over time, with fewer tropical cyclones affecting the region of the Philippines

and the South China Sea, and more tropical cyclones occurring in the region of the East China Sea, including Japan and Korea.

And northward migration is set to continue under increased CO2 levels, according to climate model projections.

## Stronger and deadlier

Typhoons that strike East and Southeast Asia have intensified by up to 15% since 1977, and the proportions of storms in the category 4 and 5 have doubled in that time.

Typhoons that remained over the open ocean, however, have only slightly changed in intensity. Researchers believe that this development is due to the locally enhanced ocean warming along the coastal rim of East and Southeast Asia. To say this is directly linked to global warming and climate change is difficult, as 40 years of data is too little to clearly separate this signal from natural variability.

However, climate models project ocean waters off the coast of China and Southeast Asia to continue to warm up. So an important ingredient of stronger and deadlier storms is likely to occur increasingly in the future. Climate models still have problems in predicting how the other ingredients

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for a “perfect” storm will develop in the future, though.

## Nat CAT damage on the rise again

In terms of losses, the global damage caused by natural catastrophes overall was relatively moderate in the years 2013 to 2015.

Last year, however, was one of the 10 costliest years on record with total damages reaching US\$175 billion due to a number of devastating earthquakes and powerful storms, a level last reached in 2012. Storms were accountable for half of all insured losses, according to Munich Re, the worst one being Hurricane Matthew, which caused devastation in Haiti.

Will we see another windstorm with the magnitude of Haiyan? Classed as a super typhoon, the November 2013 storm was one of the strongest tropical cyclone ever observed based on wind speed. More than 6,300 people died in the Philippines alone during the event, and the economic damage amounted to \$9.7 billion, of which only \$700 million were insured.

But devastating wind speeds are not the only threat of typhoons. Along the coast, storm surge is often the greatest threat to life and property from the storm system. Tropical cyclones often produce widespread torrential rains, which may result in deadly and destructive floods. In fact, flooding is the major threat from tropical cyclones for people living inland. Flash flooding and landslides can occur quickly due to intense rainfall.

Typhoons and tropical storms can also produce tornadoes. These tornadoes most often occur in thun-

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derstorms embedded in rain bands well away from the centre of the storm.

## Forecast for 2017

Will we see a similarly devastating storm in 2017? It is hard to say. Researchers can give a rough estimate of the frequency of the storms based on the current state of the ocean and atmosphere. The collection of ENSO (El Niño-Southern Oscillation) prediction models indicates increasing chances of El Niño into the summer and fall of 2017.

An El Niño state occurs when the central and eastern equatorial Pacific sea-surface temperatures are substantially warmer than usual. The occurrence of El Niño and La Nina patterns has quite a bit of influence on the tropical cyclone activity both

in the Western North Pacific and in the Atlantic.

In the Western North Pacific, El Niño usually tends to enhance activity. Accordingly, the latest forecast from the University College London calls for slightly above activity level with predicted 17 typhoons up from the long-term average of 16 (1965-2016). However, uncertainties are usually quite large at this time of the year.

And remember: it only takes one storm to lead to devastation as shown by Haiyan in 2013, a season with only 13 typhoons. Or take another example from the Atlantic: The 1992 season only produced four hurricanes and only one made landfall. However, this one was Hurricane Andrew, which devastated South Florida as a Category 5 hurricane. 

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