What is a storm surge and why is it so dangerous?

3 May 2019

A storm surge was to blame for many of the 7,350 deaths in 2013's Super Typhoon Haiyan, which saw a wall of water estimated to be 7.5-metres-high (more than 24-feet), blast into coastal towns like Tacloban

Severe cyclone Fani, which blasted ashore Friday in India, is expected to pack a frequently underestimated yet lethal threat: storm surge.

The surge happens when sea levels rise dramatically during a storm, sending a destructive wall of water gushing over people and property on land.

Here are key questions and answers on the phenomenon:

How does it work?

Storm surge is not the result of rainfall or flooding, rather it happens when powerful winds push ocean water rushing toward land.

The phenomenon is an "abnormal rise of water generated by a storm, over and above the predicted... tides," according to the US National Oceanic and Atmospheric Administration (NOAA).

Indian forecasters said a surge of 1.5 metres (five feet) could hit the eastern state Odisha, where the monster cyclone is forecast to make landfall.

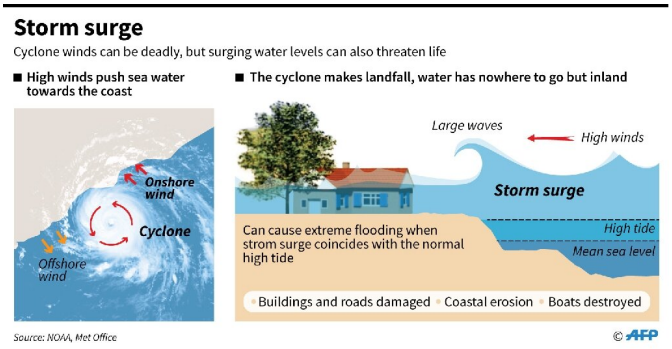
Why is it so dangerous?

In previous storms, people have failed to flee because they did not grasp the storm surge's deadly threat.

That was the case for 2013's Super Typhoon Haiyan, which left 7,350 dead or missing in the central Philippines, primarily due to the surge.

A wall of water estimated to be 7.5 metres (24.6 feet) high, blasted into coastal towns like Tacloban, a city of 240,000 people.

Also, surges can extend for dozens of miles inland, overwhelming buildings quickly and cutting off roads. People can end up drowning in their cars or homes.



Graphic showing how cyclones can create storm surges which flood coastal areas

The walls of water can begin before storms even make landfall, making it harder to sound the alarm in time to save lives.

What are the contributing factors?

The power of a surge is dictated by factors including a storm's size and intensity, as well as the geography of the coastline and sea level.

Bays tend to funnel the surge, pushing water to higher levels, according to the Hong Kong Observatory.

Tacloban, the worst hit city in Haiyan, sits less than five metres above sea level.

The town and others nearby were defenceless against the surge that was also funnelled through a shallow bay sandwiched between neighbouring islands.

Rising seas and warming oceans due to climate change are also expected to amplify the effects of storm surge in the coming decades.

Numerous studies have predicted that storm surges will become more frequent and deadly as the planet warms.

Can we protect against storm surge?

One of the best protections is clear, early warnings to people in the surge's sights and evacuations to areas of higher elevation.

Low-lying areas like the US state of Louisiana have also long used levees as a measure of protection against flooding and, by extension, storm surge.

However, most of the 1,800 deaths from Hurricane Katrina, which struck the US Gulf Coast in 2005, are attributed to storm surge, NOAA said.

Eighty percent of New Orleans found itself submerged when the levees that surround it broke and the water rushed in.

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