

Hurricane Sandy: What caused the recent superstorm and how to prepare for the next one

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It has been just over a month since Hurricane Sandy devastated the coastal communities of New York and New Jersey, causing billions of dollars in damages and affecting tens of millions of people. According to scientific experts, next time the results could be far worse. And there will be a next time, say Queens College Earth and Environmental Sciences professors Nicholas K. Coch and Stephen Pekar.

As Coch explains, Sandy was only a Category 1 storm at its peak with winds never going above 90 miles per hour near New York. If something like a Category 3 or 4 storm were to hit New York – Coch points to the Great Hurricane of 1938 that killed about 700 people as an example – "the impact would be catastrophic, given the population density in the Northeast."

Pekar adds that Sandy was considered an unusual event, what many call a "perfect storm." The collision of three elements contributed to Sandy's severity: a powerful hurricane with the energy and moisture from above-normal [sea surface temperatures](#) in the Atlantic Ocean; an unusually shaped dip in the jet stream that scientists believe may have been caused by warming in the Arctic, steering the storm from East to West; and lunar high tides that raised the sea level several feet along the East Coast.

The more complex question that scientists are still debating is whether [climate change](#) played a role in this particular storm and what its impact

will be for future hurricanes. "Global warming has contributed to abnormally warm water and higher [moisture content](#) in the atmosphere, which act as the fuel for storms, higher sea levels (we expect at least a three-foot rise in [sea level](#) this century), and unusual [weather patterns](#) that may be attributed to the rapidly disappearing [Arctic sea ice](#)," says Pekar. "These are ideal conditions for more hurricanes and superstorms."

Lessons learned: Preparing for future superstorms

Coch, who has been studying for many years all the hurricanes that have occurred north of Virginia, has been sounding the alarm about how vulnerable the Northeast Coast is because of its unique topography, geography, geology, oceanography and demography. With New York in post-Sandy recovery mode, Coch advises the government to "take remedial action now to floodproof ourselves and retreat from the shoreline." His recommendations include:

- Raise flooded power grid equipment to levels higher than possible storm surges
- Rezone flood areas and in the event of a disaster, make their evacuation mandatory
- Secure fuel delivery systems (perhaps by pipeline), and require backup generators at all gas stations
- Begin an infrastructure project to put power lines underground in the rest of NYC
- Find ways to shut off the tunnels and subway stations and make them waterproof by using giant inflatable bladders or plugs that expand to seal off entrances, steel floodgates, additional water-pumping stations and air-vent closures
- Raise subway entrances and reinforce entrances to the lower floors of high-rise buildings

- Install two backup systems in critical facilities such as hospitals, one of which should be waterproof

Provided by The City University of New York

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