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U.S. NEWS | Updated October 29, 2012, 11:00 p.m. ET

## Range of Events Feeds Surge

Confluence of Natural Forces Adds Intensity as Walls of Water Rise Along Coast

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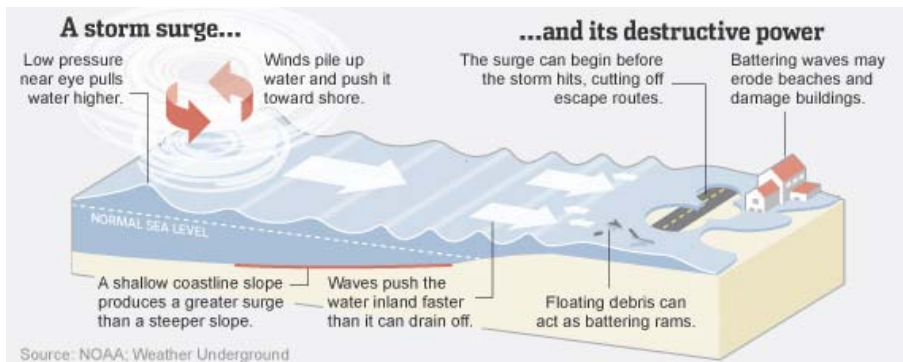
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By ROBERT LEE HOTZ

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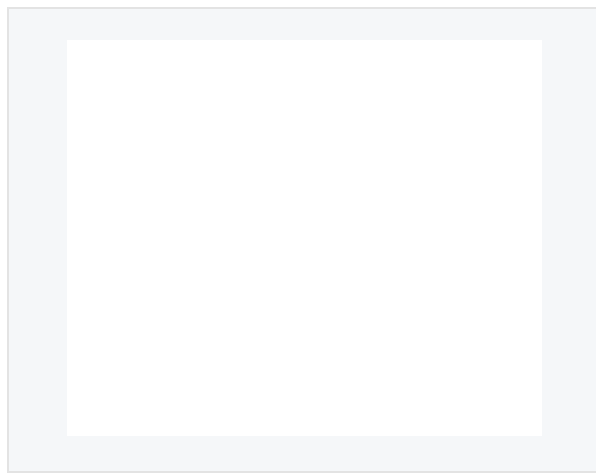


The walls of seawater Hurricane Sandy drove into the beaches and towns of the East Coast on Monday stemmed from a rare combination of natural forces: the fullness of the moon, the breadth of the storm and the collision of Arctic and tropical weather fronts.

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shoreward across an unusually broad expanse of ocean. The current was given an extra kick by the effect of the Earth's rotation, which pushed the waters west toward the East Coast shoreline. Worse yet, the offshore ocean bottom is relatively shallow in the Northeast, allowing Sandy's winds to build up a higher tide of storm water.

A storm surge is the rise of water driven toward shore by storm winds, over and above predicted tide levels, according to the National Oceanic and Atmospheric Administration. Storm-surge flooding varies widely, depending on the height of terrain along local coastlines.



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High water at the tip of Manhattan was expected to reach levels not seen since 1985, when, at low tide, Hurricane Gloria drove a storm surge of almost seven feet up against the sea walls of Battery Park.



Getty Images

A car plows through a flooded street in Atlantic City, N.J., on Monday.

Coming this time at high tide, the storm surge late Monday was expected to be at least that high in many areas. Coastal monitors and hydrographers usually measure the height of a storm surge separately from the height of a high tide. The combined effect of Monday's high tide and storm surge together was expected to add up to a storm tide of 11 feet high or more, experts said.

"The water is going to be piling up here," said storm-surge researcher Brian Colle at Stony Brook University. "We are going to have a combination of storm surge and high tide."

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Lee Hotz stopped by The Wall Street Journal This Morning.



As the storm approached landfall late Monday, offshore winds gusted to 90 miles an hour and generated 20-to-30-foot ocean waves. The storm winds drew their energy in part from the ocean water, which was several degrees warmer than usual this time of year, NOAA experts said.

By pushing sea water well up tidal rivers and streams, the storm surge also was expected to worsen inland flooding by blocking the drainage of heavy rains, expert said.

Late Monday afternoon, the storm was moving more quickly than predicted and several experts said the risk of the most severe storm surge would peak with the high tide Monday evening. Surges were expected to continue to peak with the tides on Tuesday and Wednesday, experts said.

But they are not expected to be as severe, in part because the surges will have time to subside between tides.

Write to Robert Lee Hotz at [sciencejournal@wsj.com](mailto:sciencejournal@wsj.com)

A version of this article appeared October 30, 2012, on page A8 in the U.S. edition of The Wall Street Journal, with the headline: Range of Events Feeds Surge.



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