

Hurricane Sandy Expected Impacts at NASA Langley Research Center

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1. Introduction

As of 5am, Hurricane Sandy is located near Great Abaco Island in the Northern Bahamas or near 26.3N and 76.9W. This is also a position roughly 485 miles SSE of Charleston, South Carolina. Sandy is moving NW near 13 mph and is expected to slow down today, then turn to the north and then northeast during Saturday. Maximum sustained winds are near 80 mph which makes Sandy a Category One storm on the Saffir-Simpson Scale. Only slight weakening is expected today but Sandy is expected to remain a hurricane for the next couple of days. A tropical storm watch has been posted north to Oregon Inlet. This will likely be extended further north later today and into the weekend.

Hurricane Sandy will impact the Hampton Roads including the NASA Langley Research Center. However, there remains uncertainty in the details and magnitude of the impacts at this time. This is common for storms that are still beyond 48 hours away. Regardless, tropical storms and hurricanes are not single points. Hurricane winds and impacts extend well beyond their centers so even if the center doesn't come very close, impacts are likely. This is especially true with Hurricane Sandy as the wind field is already large and expected to expand as it interacts with mid-latitude weather features over the eastern third of the country. Details of the track and intensity forecast, main threats, and related uncertainty are discussed below.

2. Hurricane Sandy Track Forecast

There is fairly good agreement in the computer model forecasts with Sandy over the next couple of days: The storm is expected to move slowly N through tonight, then accelerate to the NE off the Southeast U.S. Coast through the end of the weekend. After that, there remain differences in the computer models as Sandy begins interacting with a large-scale upper level trough moving over the East Coast. However, we have seen many of the models turn Sandy NW back towards the Mid Atlantic and New England regions early to mid next week. Where this turn happens will be critical to the impacts for NASA Langley. A turn further to the south and west would magnify the impacts. The official forecast from the

National Hurricane Center has the storm moving back into DELMARVA late Monday night before progressing inland and weakening.

3. **Hurricane Sandy Intensity Forecast**

While minor fluctuations in intensity are expected, it appears as if Sandy will remain right around low-end hurricane status over the next few days. The main thing to recognize is that Sandy is a very large storm and expected to expand further, especially the area of tropical storm force winds. This means a large portion of the East Coast could see an extended period of tropical storm force winds.

Specific Threats for NASA Langley

4. **Wind Threat**

At this time, we expect NE winds to gradually increase during the day on Saturday but to remain below tropical storm force (below 39mph). NE winds are expected to increase further Saturday night and shift N on Sunday. Low-end tropical storm force gusts (40-45mph) should begin Saturday night and continue on Sunday. There is potential for stronger gusts of 50-55mph during the day on Sunday. Tropical storm force wind gusts (40-55mph) are currently expected to continue on Monday and potentially into early Tuesday as the direction shifts more NW then W. The winds are expected to gradually diminish later Tuesday into Wednesday from a W direction.

While there is a lower chance for sustained tropical storm force winds compared to gusts, the best chances to see sustained winds of 39mph or higher are early Sunday morning through early Tuesday morning. The probability for this occurring is roughly 15% from late Saturday night through late Sunday night, and 25% from late Sunday night through Monday night. Lower chances are expected on Tuesday. The probability for sustained winds of 50kt/57mph (considered damaging winds) or higher are lower: 2% from late Saturday night through late Sunday night, 8% from late Sunday night through late Monday night, and 2% from late Monday night through Tuesday night. The chance for sustained hurricane force winds (64kt/74mph) appears very low at this time.

5. **Rain Threat**

Bands of rain will spread into SE Virginia Saturday through Sunday and continue into early next week. At this time, total rainfall amounts of 2 to 4 inches are expected around NASA Langley, which likely would not lead to a significant flooding hazard.

6. **Tornado Threat**

Appears to be minimal since it is more likely that the west and south side of the storm will impact us, which is an area less prone to tornadoes. In addition, the atmosphere is expected to be too stable to promote significant tropical tornado potential.

7. Storm Surge/Coastal Flooding Threat

Out of all of the impacts associated with tropical cyclones, this one typically has the most uncertainty and is extremely dependent on the exact track and intensity. As such, we expect the forecast to change a bit with time. However, we do expect water to pile up in the lower Chesapeake Bay from the prolonged strong N winds expected over the area. Water levels of 1 to 2 ft. above normal tide levels are expected to begin impacting the area Saturday evening through Sunday morning. This rises to 2 to 3ft above normal tide levels through the day on Sunday and continues into Monday. Water levels should begin to improve after that as the winds shift more offshore. We will also need to monitor the potential for blow out tides/low water levels around next Tuesday/Wednesday if strong offshore flow persists long enough.

8. Summary

Tropical Cyclone Sandy will impact the NASA Langley Research Center. However, the details are still very dependent on where Sandy turns back towards the Mid Atlantic Coast early next week. Regardless, we feel fairly confident that the main threats associated with Sandy will be wind and surge related. The best chances for tropical storm force wind gusts are late Saturday night through early Tuesday morning. There is a lower chance for sustained tropical storm force winds, but it is still a possibility with the best chances also expected from late Saturday night through early Tuesday morning. There are smaller chances for sustained damaging winds of 50kts/57mph or higher, but a few gusts around this threshold appear to be likely. The chance for sustained hurricane force winds is small at this time. Water levels of 2 to 3 ft. above normal tide levels are expected to impact the lower Chesapeake Bay Sunday into early Monday. This would likely lead to some coastal flooding, especially of low-lying areas along the immediate coast. However, water levels will be very dependent on the exact track and intensity of Sandy.