

Nat. Hazards Earth Syst. Sci. Discuss., author comment AC2  
<https://doi.org/10.5194/nhess-2021-31-AC2>, 2021  
© Author(s) 2021. This work is distributed under  
the Creative Commons Attribution 4.0 License.

## Reply on RC2

Scott Curtis et al.

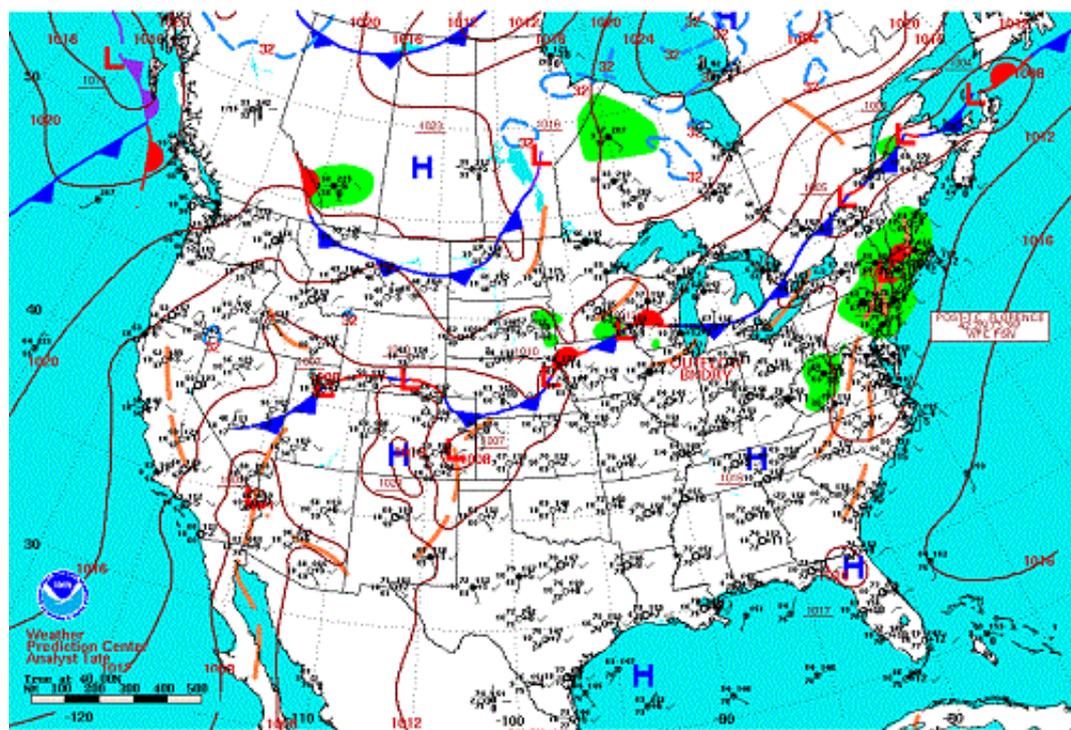
---

Author comment on "Spatially compounded surge events: an example from hurricanes  
Matthew and Florence" by Scott Curtis et al., Nat. Hazards Earth Syst. Sci. Discuss.,  
<https://doi.org/10.5194/nhess-2021-31-AC2>, 2021

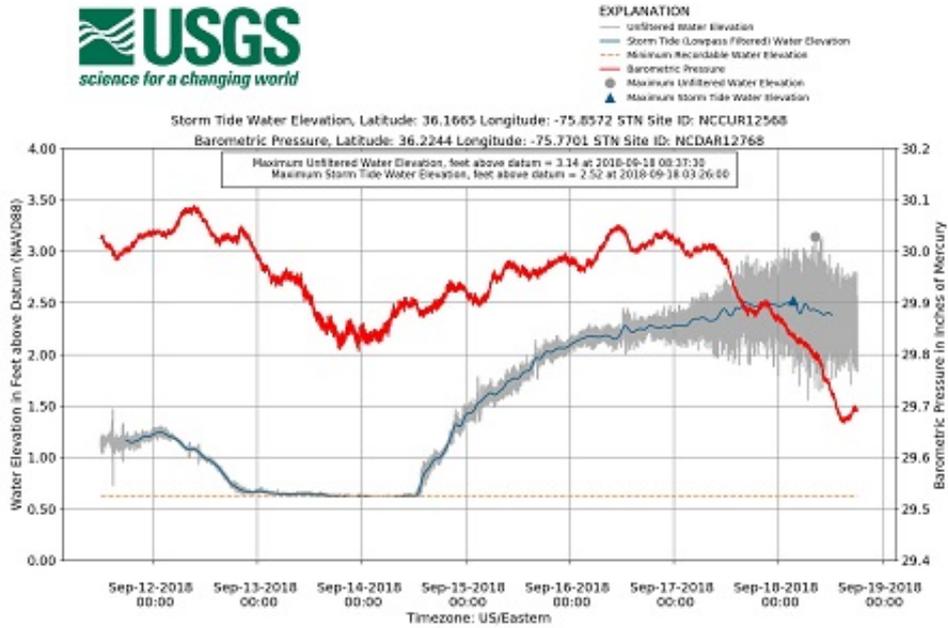
---

General comments.

We appreciate the reviewer's observation and we were remiss in describing the evolution of Hurricane Florence from September 15 to 18. During that time Florence recurved to the north and by 5am EST on the 18<sup>th</sup> the storm was classified as extratropical and positioned at 41.3N and 75.9W (see daily weather map below). At the time many of the northern coasts of the northern estuaries (Albemarle Sound) were receiving significant SE winds, lowest pressure, and highest surge. An example is given for NCCUR12568. This important information is now included in the manuscript.



Surface Weather Map and Station Weather at 7:00 A.M. E.S.T.



Specific comments.

Line 106: The methodology has been clarified.

Line 125: There are several semivariogram models to choose, but over half are inappropriate for the data. For example, the exponential semivariogram, used by Touma et al. (2018), gives an unphysical range for Florence (see Table A below). After a visual inspection and some experimentation, we selected the stable semivariogram. By in large, the results from other candidate models yield the same key result – Matthew has a larger range than Florence. We can add more information as a supplement if necessary.

Table A. Statistics of the exponential semivariogram models of  $\Delta t_{ps-lf}$  for Hurricanes Matthew and Florence.

Storm	Sill (Co)	Shape (s)	Range (a)	Nugget (b)
Matthew	0.047	N/A	36,877 m	0.012
Florence	0.894	N/A	1,369 m	0.0

Line 115: We apologize for the omission. It should be number of tide gauge stations.

Figure 3: We have removed Figure 3 and point out these features in Figure 6.

Figure 4: The crosses are representative rivers in the Eastern Branch of the NCDEM that were affected by the two hurricanes (squares in Figure 5). Only the Cape Fear Lock #1 location contains both a river gauge and a rain gauge. The coloring of the crosses and labeling probably adds to the confusion. The figure and table caption have both been revised and the accompanying text clarified.

Figure 6: We have plotted the graphs separately. However, one reason to plot them on the same scale is to emphasize that Florence has much larger values of  $\gamma$  than Matthew indicating that Florence was more “dissimilar” than Matthew even at short distances between tide gauges.

Technical corrections

We have addressed all the technical corrections.