

**Coastal Storms and the Winter of 2009-2010:  
Impacts on New Jersey's Coast**

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The Winter of 2009-2010 will go down as one of the stormiest in New Jersey's recent past and one of the most costly as well. Damage estimates within the state ran into the hundreds of millions of dollars, and resulted in the two presidential disaster declarations. Stage frequency analyses based on the maximum water level reached during each of the winter's major storms suggest that the most significant of these events was a 5-year storm, a result contradicted by the observed damage. Herrington and Miller (2010) showed that by considering a more complete set of factors including the storm duration, and corresponding wave heights, parameters such as the Storm Erosion Index (SEI) (Miller and Livermont, 2008), the Dolan and Davis (1992) parameter, and the Kraus and Wise (1993) Run-up parameter provided a more accurate assessment of the November, "Friday the 13<sup>th</sup>" storm. The analysis presented in Herrington and Miller has been extended and applied to several of the other large storms that occurred this past winter. It was found that once again traditional stage frequency analyses failed to identify a major storm in March as a significant event. Although the storm surge during the event was over 4 feet, the timing of the storm was such that the surge peaked during low tide, and the maximum water level was below that associated with a 2-year storm. The damages during the storm were significant however, and resulted in the second presidential disaster declaration of the season. Based on the SEI, the March storm had a return period of closer to 6-years, a result which more closely matches the observed damage.

The winter of 2009-2010 was remarkable, not only for the severity of its signature events, but also for the consistency with which storms impacted the coastline. Borrowing from the methodology used to categorize tropical storm seasons, the relative significance of this year's storm events was evaluated by comparing cumulative totals of storm parameters such as the SEI and the Accumulated Storm Wave Energy (ASWE). The results are shown below in Figure 1, where it is clear that even though the data for 2010 are still incomplete (annual totals run from July to June such that winter storm seasons are considered together), this past winter already ranks as the stormiest in the record, with nearly three months to go.

**References**

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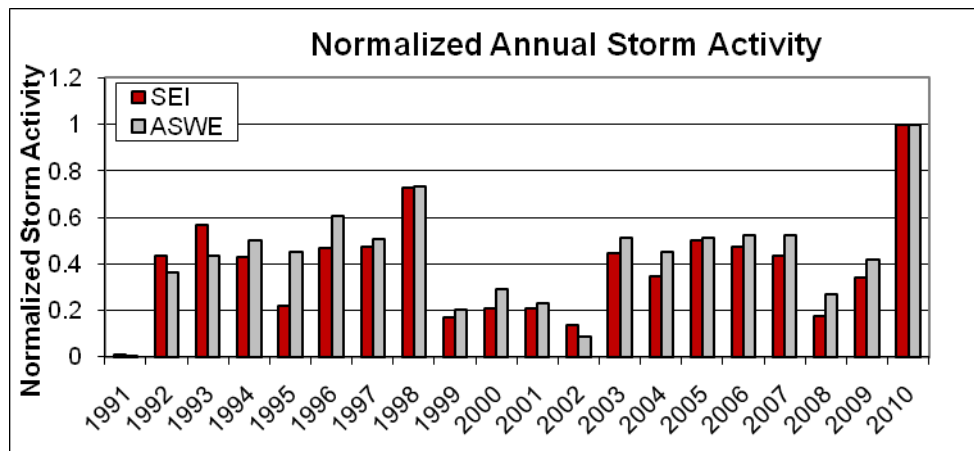


Fig. 2. Normalized annual storm activity in terms of accumulated SEI and ASWE parameters

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Biography:

Jon Miller is a research assistant professor at Stevens Institute of Technology in Hoboken, NJ. He currently also serves as the assistant director of the NJ Coastal Protection Technical Assistance Service, and the NJ Sea Grant Coastal Processes Specialist. Dr. Miller received his undergraduate degree in civil engineering in 1999 from Stevens Institute of Technology and his Masters and Ph.D. in coastal engineering from the University of Florida in 2002 and 2004, respectively.