**Cyclone Tracks, Atmospheric Blocking, and Storm Surge Extremes for the North America Eastern Seaboard**

**James F Booth1,2,3, Katherine Towey2, Veeshan Narinesingh3**

1 Earth and Atmospheric Sciences Dept. 160 Convent Ave. Marshak Bldg. Rm 926. New York NY, 10031

2 Earth and Environmental Science Dept. The CUNY Graduate Center, New York, NY 10016

3 Physics Dept. The CUNY Graduate Center, New York, NY 10016

**Abstract**

Storm surge can generate dangerous flooding, and it is not fully understood in terms of duration and response to difference types of atmospheric forcing. Focusing on observations along the Northeast United States, storm surge is sorted based on duration and intensity to reveal distinct time-evolving behavior. Two distinct extreme conditions are found: (1) strong, short-duration surge, and, (2) log-duration surge. Using Lagrangian track information, the tropical and extratropical cyclones and atmospheric blocks that generate the surge events are identified. For the extremes based on duration, the shortest-duration strong surge events are caused by tropical cyclones, while the longest-duration events are most often caused by extratropical cyclones. At least half of long-duration surge events involve anomalously strong atmospheric blocking poleward of the cyclone, while strong, short-duration events are most often caused by cyclones in the absence of blocking. The dynamical influence of the blocks leads to slow-moving cyclones that take meandering paths. In contrast, for strong, short-duration events, cyclones travel faster and take a more meridional path. Next, we analyze surge events that occur in succession, i.e., temporally clustered surge events. For these caused by cyclones, the sequential behavior of the storms, as there are multiple storms clustered into a single event. Clustered storm activity is rare, can lead to dangerous surge situations, these unique dynamical scenarios provide better insight for interpreting the threat of surge in medium-range forecasts.