

ANALYSIS OF TIDES AND STORM SURGE FROM OBSERVATIONAL RECORDS IN THE DELAWARE INLAND BAYS

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The Delaware coast has been hit hard in recent times by the Mother's Day Storm in 2008, Hurricane Irene in 2011, and Superstorm Sandy in 2012 as well as in the past by the Hurricane of October 1878 and the Ash Wednesday Storm in March of 1962. Although coastal events bring many types of natural hazards (beach and dune erosion, winds, waves, precipitation) and public infrastructure damage (powers loss, road damages), flooding from storm surge is often the greatest threat to life and property. Additionally, Delaware falls within a "hot spot" of relative sea level rise due to both eustatic (global sea level rise) and isostatic (land subsidence) processes with relative SLR rates approximately double the global rate. The Delaware Inland Bays (DIB), a complex hydrodynamic system comprised of Rehoboth Bay, Indian River Bay, and Little Assawoman Bay, is a primary concern due to its importance to Delaware's economy and industry, population and development along the Bays' coasts, and low-lying elevation. This project analyzes water level observations to develop statistical relationships of tides and storm surge at observed locations throughout the DIB. Water level data from USGS and NOS, as well as from local agency gages, are used for the data analysis. Harmonic analysis is performed to separate the astronomical tide from the sub-tidal residuals, with these data then being used for developing the statistical relationships of timing and magnitude. The analysis includes a breakdown based on meteorological conditions. Meteorological data are provided by the National Weather Service (NWS) and Delaware Environmental Observing System (DEOS) meteorological stations. The results of the project can facilitate the inclusion of the DIB into the Delaware Coastal Flood Warning System, an online early warning system for Delaware, to assist emergency managers and local officials to prepare for impending flooding events.