ASSESSING CURRENT AND FUTURE NUISANCE FLOOD FREQUENCY THROUGHOUT THE U.S. MID-ATLANTIC

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Nuisance flooding, which causes public inconveniences such as frequent road closures, overwhelmed storm drains and compromised infrastructure (NOAA, 2017), has noticeably increased at multiple mid-Atlantic coastal locations in recent years. Multiple factors contribute to such flooding events, however mean seal level rise (MSLR) is a primary driver, due to its effect on increasing the exceedance probability of a given storm leading to flooding.

A sample dataset for Annapolis, Maryland showing all monthly extreme water levels above the current mean higher-high water (MHHW) datum that have occurred since the installation of this tide gage in 1928 (Figure 1), illustrates clearly an upward trend due to relative sea level rise.

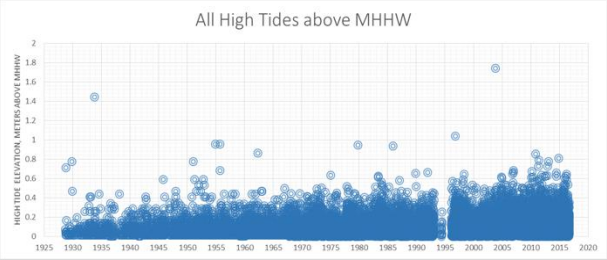

Figure 1 – All high tide elevations above the current MHHW datum that have occurred since installation of the Annapolis tide gage in 1928.

In addition to the slow increase in mean sea level, low to high amplitude excursions about the mean are seen. This study explores the frequency of the low level but chronic flood events using daily National Oceanic and Atmospheric Administration tidal gauge data from several coastal locations over the 9+ decades that the tide gages has been in operation, with the focus on several east coast mid-Atlantic stations.

Building on the methodologies of Kriebel and Geiman (2014) and Kriebel et al. (2015), which fit the probability density function of monthly maximum tide gauge records in Annapolis with a Pareto-tail distribution, we will use detrended hourly water level data to create a general best fit solution at multiple sites. A variety of distributions including, for example, Pareto and Generalized Extreme Value (GEV), will be explored.

Preliminary results show a tendency for a weakly non-Gaussian distribution of the extreme water level probability density function at multiple gage locations, which suggests that dimensionless extreme water level peaks (relative to the mean) will also be related between locations. Implications for both current and future nuisance flood frequency based on these distributions will be discussed.

REFERENCES

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