AMO influences on coastal water levels and extremes

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The Eastern seaboard of North America is highly sensitive to coastal water level fluctuations owing to low topographies, high population densities and socieoeconomic importance of areas such as New York, Hampton Roads and South Florida. Seasonal fluctuations in water levels regularly inundate urban areas of South Florida and Hampton Roads, a situation which will be exacerbated as sea levels rise. In addition to secular sea level rise, climate oscillations are known to impact coastal sea levels through both atmospheric and oceanographic (hydraulic) forcings. The AMO has been linked to coastal sea level anomalies and extremes along the Eastern seaboard (Park and Dusek 2012, Park et. al. 2010), and as understanding of the AMO matures, partial attribution of these interannual sea level anomalies may become possible. However, it is recognized that shorter term climate oscillations such as ENSO produce a significant signal in the AMO index (Park and Dusek 2012). Care needs to be taken when analyzing and attributing geophysical responses such as water level anomalies to AMO. Here we quantify the extent to which ENSO is expressed in the raw AMO index, and we quantify decadal scale coherence between coastal water level anomalies and the AMO index. Further, if the AMO can be forecast in terms of 'regime shifts' (warm or cold bipolar states) then the ability to anticipate sea level anomalies linked to AMO on interannual or decadal scales may be tenable (Park et. al. 2011). Such information would be valuable to coastal planners and actuaries preparing for future climate.

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