



Sensitivity of tropical cyclone surge risk to changes in sea level and sea surface temperature

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Sea level is projected to continue to rise. Even small differences in sea level have significant impacts on storm surge risk to life and property. Projecting losses to property in the future as sea level rises is made difficult by several factors that result in uncertainty in the future inventory of real estate along the coast. Here the focus is directly on property loss for the current real estate inventory. In addition climate change will affect many other geophysical factors. We make a first order attempt to include the impact on storm surge risk of the interaction of rising sea surface temperatures with rising sea level.

The change in expected risk is quantified for a sea level rise immediately by an amount equivalent to a conservative projection of sea level rise over twenty years. Upper and lower bounds of this projection are also evaluated. We then apply a state-of-the-science catastrophe model to quantify the change in risk of storm surge to property along the U.S.~Gulf and East Coasts. In twenty years, we estimate that U.S. expected annual losses will increase by 8% due to sea level rise alone and by 19% if tropical storm activity increases to a level similar to that of those recent years that had warmer than normal SST. There is considerable variation with location of these results reflecting the varying rates of sea-level rise and vulnerability to storm surge along the coast .