

Quantifying risk in the coastal environment: Can it be effectively mapped and modeled?

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People have been living on coastlines for thousands of years and continue to develop these areas for many varied benefits. The downside that comes from living in the coastal zone arises from the hazards that exist there such as flooding and erosion. These hazards are most impactful during major storm events when ocean waters inundate normally dry land. Assessing the risk posed to coastal communities by storms and quantifying the hazards that come with these events is important work that can help communities plan, prepare for storms, and evacuate areas when needed. Storm surges that form from low pressure systems and wind forcing are a major component of flooding and can be defined as excess water levels above the predicted tide. These surges of water are critical when assessing risk to areas on the coast. Two main types of models are used for mapping potential storm damage: hydrostatic models and hydrodynamic models. Hydrostatic models produce flood risk maps that do not account for variables such as time, currents and wave run up, whereas hydrodynamic models are more data intensive, take more time to run and are dependent on correct inputs in order to predict inundation extents. Both models have their upsides and downsides, and accuracy errors exist in each but which models should be used when quantifying risk in the coastal zone is yet to be resolved.