A new landscape of storm surge risk for the United States

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When hurricanes make landfall, they can cause loss of life, extensive damage to buildings, their contents, and other infrastructure, as well as crop and forest destruction and water contamination. In addition to wind- and rain-related damage, hurricanes also produce effects known as storm surge. Storm surge refers to the rising ocean water levels along coastlines affected by a hurricane that can cause widespread flooding. To assess the storm surge risk at a site it is not sufficient to know the elevation and distance to the coast, and the hurricane landfall parameters, but it depends on the full history of the storm before it makes landfall. Hurricane Ike in 2008, which made landfall as a Category 2 only storm, caused enormous damage and loss of life from storm surge and demonstrates this fact clearly. Hydro-dynamical models that solve the Shallow Water equations on an unstructured grid, are particularly well suited to simulating the surge levels over the Atlantic hurricane affected coastline, taking into account the storm's history and features caused by the complexity of coastlines and estuaries. This contribution highlights how storm surge accompanying tropical cyclone that has often been neglected as a loss driver in the past, and how our model allows now a more complete quantification of storm surge costs in the United States.