Flood-risk mapping from storm surges and future sea-level rise in Antigonish County, Nova Scotia

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It has been determined that the east coast of Canada is highly susceptible to sea-level rise, which means these areas are highly vulnerable to erosion and flooding. The Third Assessment from the Intergovernmental Panel on Climate Change (IPCC) projects an increase of global mean sea-level from 1990 to 2100 to be between 0.09 m and 0.88 m. Due to the high sensitivity of some regions to sea-level rise, it is useful to construct flood-risk maps and determine return periods for present day and future high water levels from storms. Antigonish County, Nova Scotia is located in the southern Gulf of St. Lawrence, along the coast of St. Georges Bay. The purpose of this project is to look at the extent and impact of various flood levels for the Antigonish county coastline and assign return periods for present day and future sea-level rise conditions from climate change. Some of the tools that will be used to achieve this include; (1) Light Detection And Ranging (LiDAR), (2) Water Modeler, and (3) TuFlow. LiDAR data were collected for the area by the Applied Geomatics Research Group (AGRG) in December 2008. LiDAR is used to build high-resolution digital elevation models (DEMs) as a base within a GIS to be used for the production of inundation maps. The impact of wave runup is still problematic in this methodology and not addressed. Water Modeler uses a time series of water level records (tide gauge data) to determine the risk associated with high water levels from storm surges and future sea-level rise conditions and generates return periods. TuFlow simulates the complex hydrodynamics of a flood and predicts flood inundation patterns. It predicts the time it will take for water to move across a surface and checks for connectivity between the ocean and low-lying areas.