

# sciform-097228: On Assessing the Exposure of Urban Coastal Areas to Storm Surge Flooding: Application at Miami Metropolitan Area (Florida, USA)

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The scope of this study is to evaluate the interannual spatial variability in impacts from coastal inundation due to seawater flooding over characteristic urban settings and important residential areas of Miami (South Miami-Dade County, Florida, USA). Our analyses refer to the recent 30-year period from 1994 to 2023. The aim is to identify in great detail (i.e., at the property and building scales) all the important environmental and socioeconomic implications recognized as important factors in the sustainability of coastal environments. In this work, we also validate an updated version of the CoastFLOOD model for littoral inundation and apply it in very high resolution (dx=1-2m) throughout the densely populated urban area around Biscayne Bay, including Miami Beach areas that are more exposed to the storm surges of the Atlantic Ocean. Moreover, we investigate the long-term variability in and trends of Sea Level Elevation measured by tide-gauge records. We further assess the 50- up to 1000-year return values of Total Water Level (TWL) on the coast, and finally we map the respective inundation patterns over coastal low-land areas. New metrics of exposure to flood impacts at the building and property levels are introduced and post-processed for portrayal via high-resolution GIS maps. The main motivation of this study is to contribute to a better understanding of climatic impacts along the exposed coastal areas of Miami supporting local stakeholders' and real-estate actors' needs for focused research on the impacts on public plot-holdings and implications for individual properties' prices and insurance fees.



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