On the potential effect of sea level rise and climate change on Puerto Rico’s wave climate

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Marejadas causan estragos en Isabela.

Lenta muerte de las playas en Puerto Rico

Más del 70% de las playas está erosionado, un problema grave que pasa inadvertido.

El Atlántico reclama lo que le fue quitado y más

Sacava el malecón de Arecibo y sigue avanzando en una playa de Vega Baja.

Daños por las fuertes marejadas en costas de Arecibo
How can Puerto Rico’s wave be altered by climate change?

- Change in North Atlantic’s large scale wave climate
  - Some papers indicate very slight decrease in mean $H_s$ near PR, others slight increase in 20-yr $H_s$
- Change in sea level leading to changes in nearshore wave climate
  - Has not been quantified for PR
Wave propagation under increase in MSL

Extreme events: March 2008 Swell
The Caribbean Coastal Ocean Observing System
We are here
Wave height difference for 0.5m SLR scenario (run: 20160111.1200 machine:swanwrf)
Wave height difference (feet) for Tuesday Jan-12 5:00 AM local time

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Wave height difference for 0.5m SLR scenario (run: 20160111.1200 machine:swanwrf)

Wave height difference (feet) for Tuesday Jan-12 5:00 AM local time
What happens to Ocean Park with 0.5 m SLR + 35% more wave power?
SLR, wave action and coastal erosion: What can we do?

- Pilot shoreline protection projects at most critical location
  - Offshore energy dissipation, artificial reefs
  - Beach nourishment

- Problems
  - Sounds great but.. who pays for it?
  - How do we select locations?
  - Unrealistic to armor and nourish all PR beaches with chronic erosion

- We need a science-based balanced approach which protects beach resources, public beach access and private property rights

- State of the art research should be the driving force behind management decisions.
UPRM Center for Applied Ocean Science and Engineering: Forming the first generation of Caribbean coastal & ocean engineers