

Numerical modeling of beach nourishment and shoreline protection performance during Hurricane Matthew

Matthew



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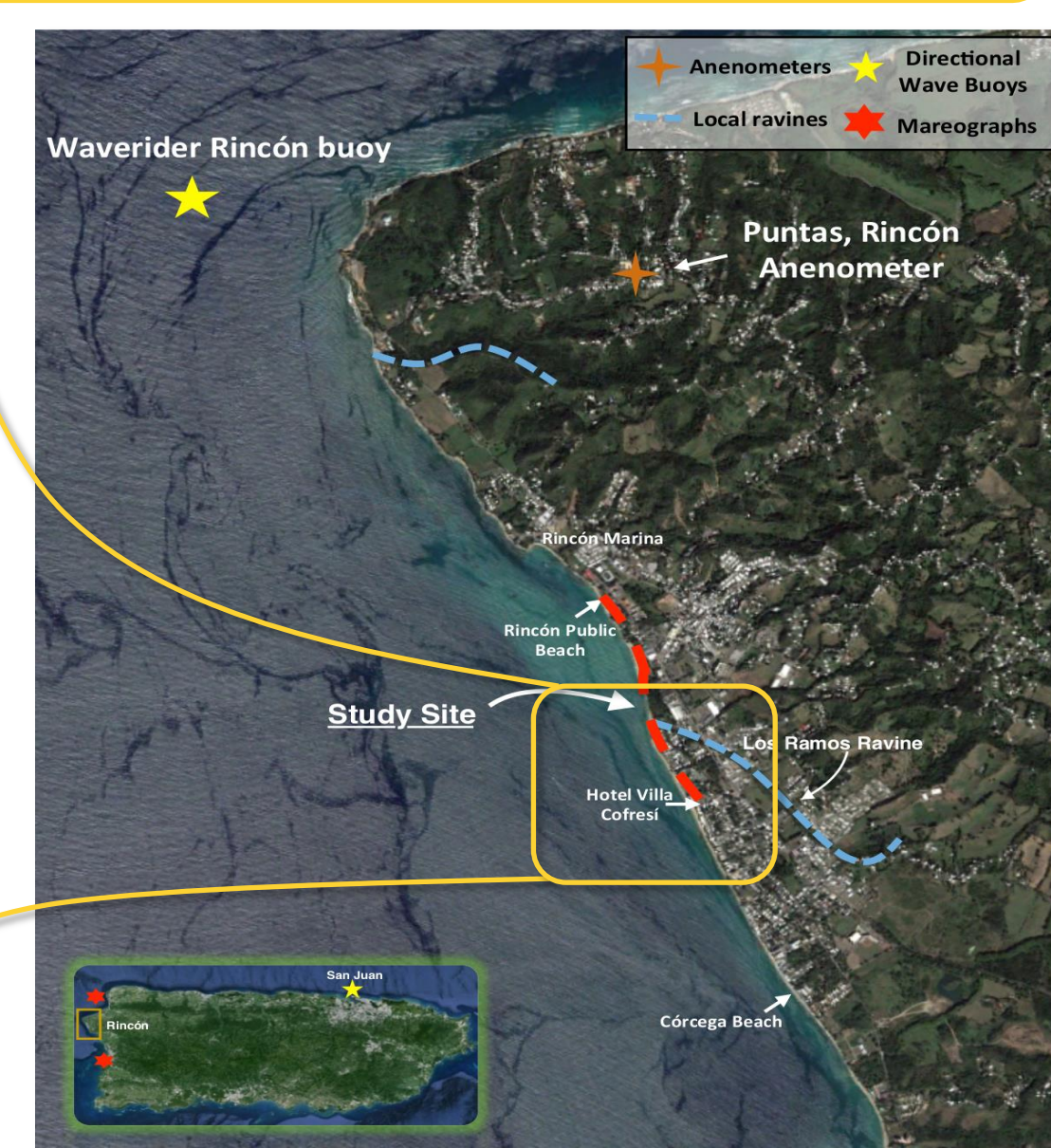
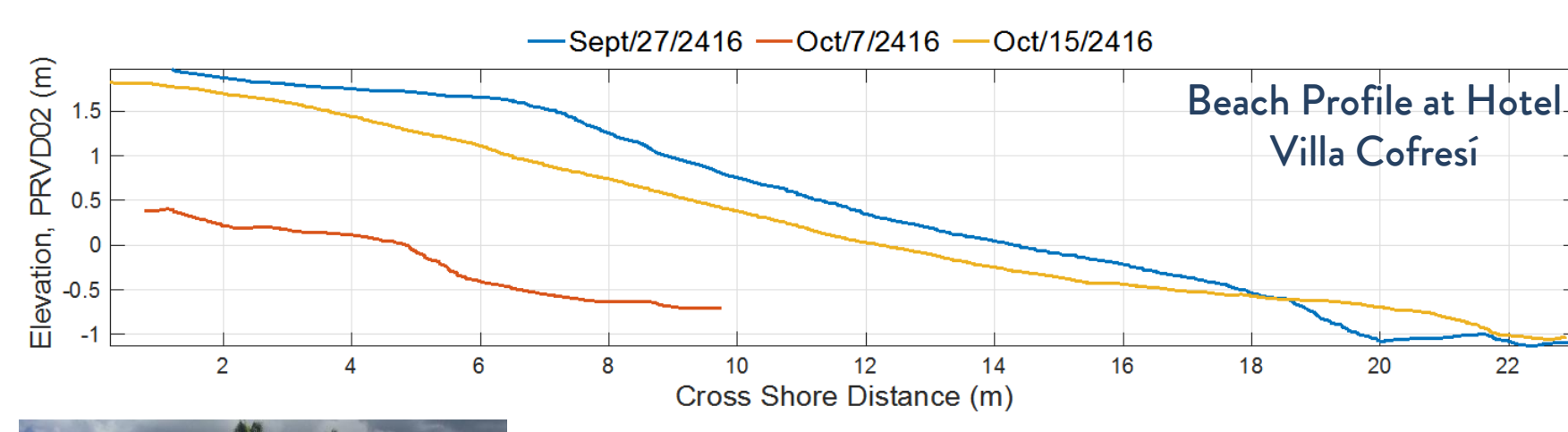
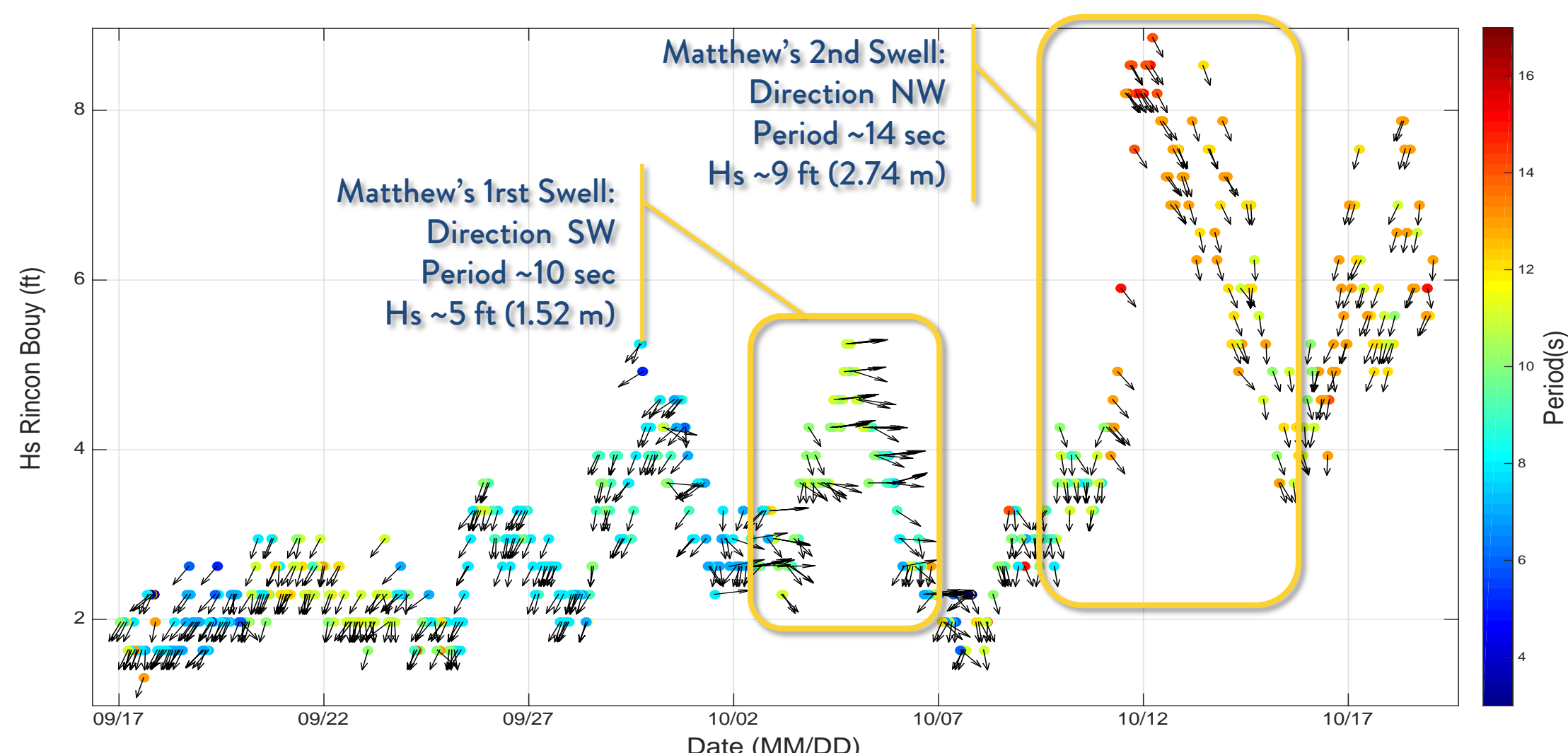
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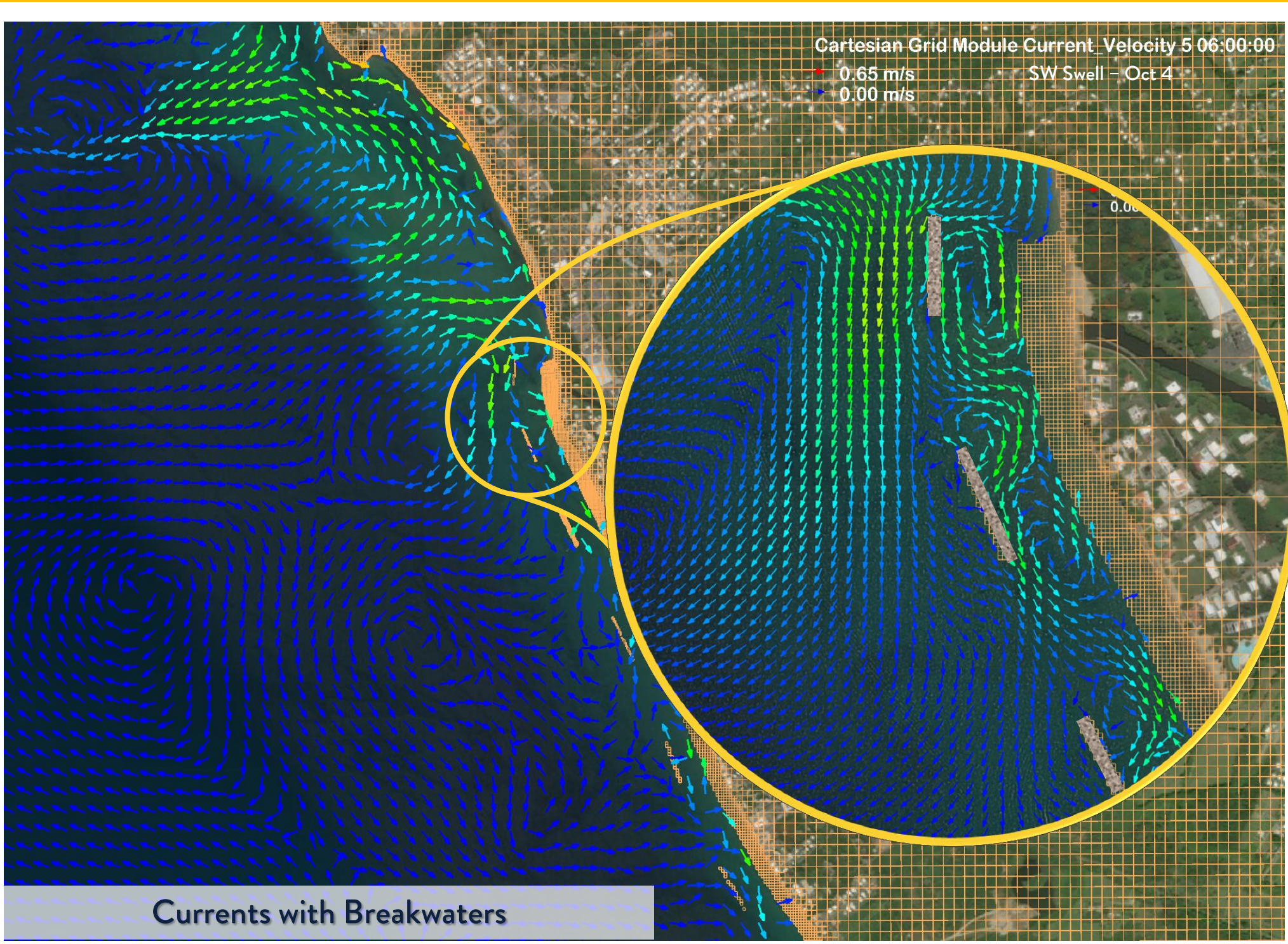
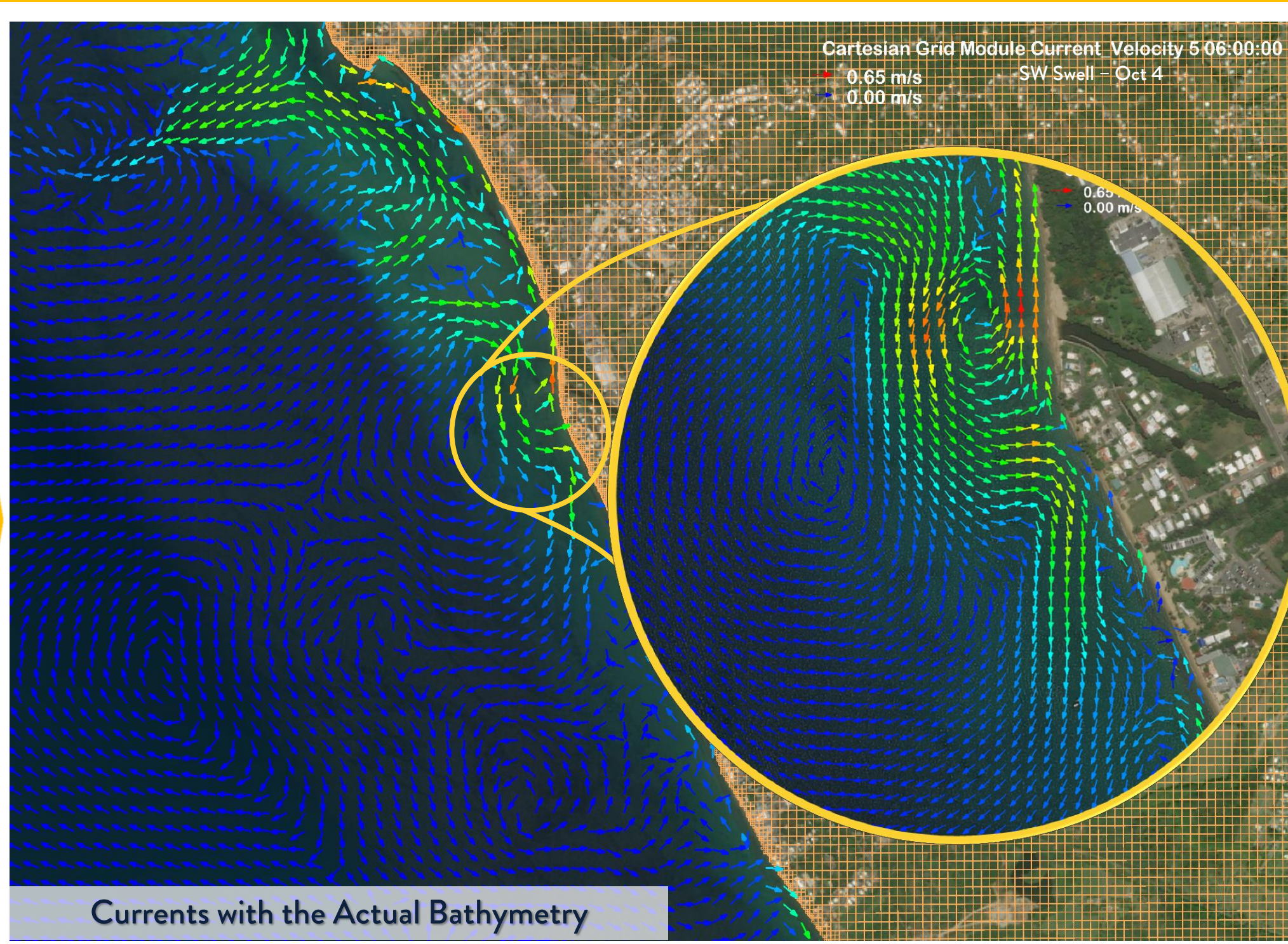


Model Overview

During October 2016, Hurricane Matthew generated swells to the coast of Rincon that caused erosion and accretion in a span of days. To understand the hydrodynamic and morphological phenomena during the event, the USACE CMS-Flow and CMS-Wave models were implemented using high resolution numerical domains with a special focus on the area between Rincon Public Beach and Hotel Villa Cofresí.



Circulation Modeling



The numerical simulations were run under two cases: (1) with the actual bathymetry and (2) with breakwaters and beach nourishment. The figures show the peak conditions generated from Hurricane Matthew's first swell (SW direction). During this event, the angle in which the waves impacted Hotel Villa Cofresí induced an alongshore current that transported sand northward. Adding breakwaters would decrease the magnitude of such a current, thus decreasing the amount of eroded sand. However, further numerical modeling tuning should be conducted to obtain a more complete understanding of the hydrodynamic and sediment transport processes affecting this stretch of coast.

Wave Modeling

