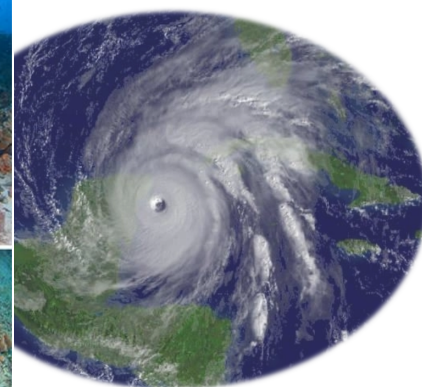
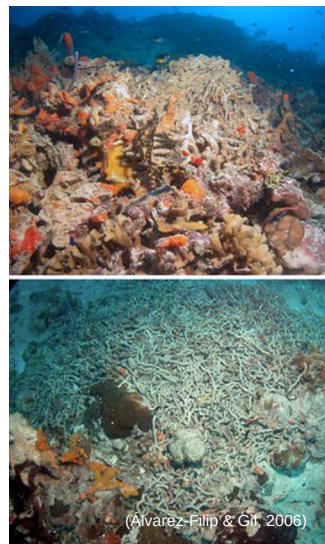


CORRELATION OF HURRICANE DAMAGE TO CORAL REEFS WITH THE FEATURES OF BOTH OF THEM.

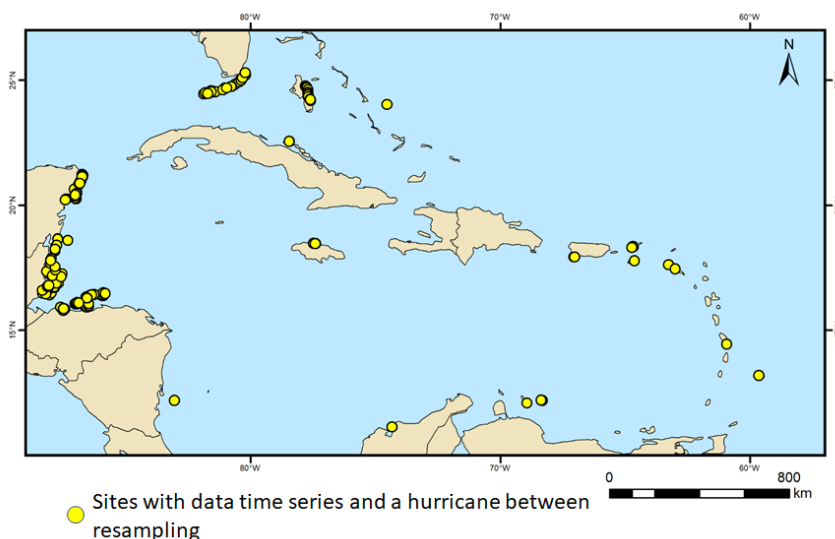
M. en C. Esmeralda Pérez Cervantes
M. en B. Fernando Pardo Urrutia.

Hurricanes are an integral part of the coral reef ecology: depending on their intensity, they can contribute to reef dynamics by means of fragmenting coral colonies, hence supporting recruiting. Nevertheless, in some cases, the damage can be so severe that complete coral reef regeneration will not be possible. In this sense, knowing which features explain coral reef damage after a hurricane impact is crucial for the planning of effective mitigation measures against these, sometimes catastrophic, impacts. One such measure that is being evaluated right now concerns taking out a parametric insurance for coral reefs damaged by hurricane impacts.



Reefs before and after a hurricane.

The aim of this project was to find the features of coral reefs and impacting hurricanes that were related with damage to the first (measured in terms of coral cover and complexity change), creating a scientific foundation for the creation of such insurance. To measure those effects, we obtained historical data related to coral reef samples taken before and after hurricane impact from databases, scientific articles, monitoring programs and direct contact with people owning such data; we collected hurricane data from the databases: HURDAT2 for the Atlantic Ocean (NOAA) and SURGEDAT.



**+200
SITES**

Sites with data time
series

**+40
HURRICANES**

HURDAT2 ((NOAA)

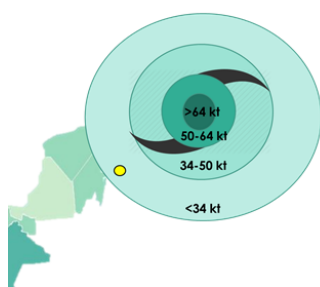


**DATA INFORMATION:
1973 -2017**

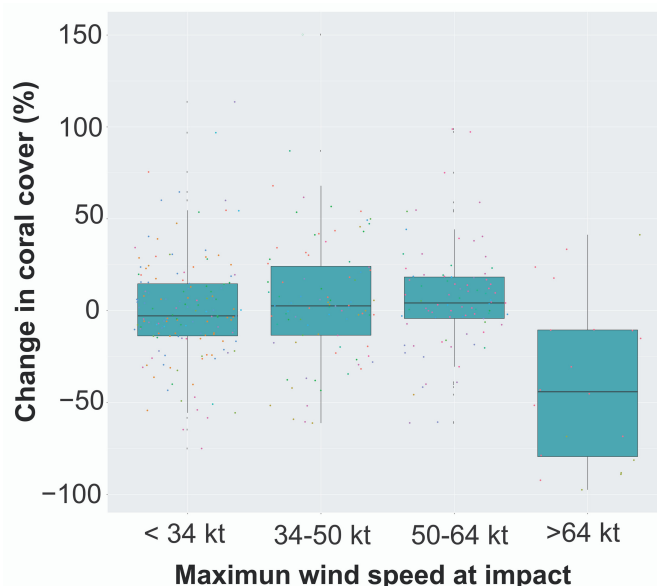
After collecting the data, we performed statistical analysis to study the effects of the following variables: initial coral cover, initial rugosity, reef type, reef zone, depth, exposure, reef size, fetch (open water distance over which wind can blow along a given direction), wind speed, central pressure, duration of the affectation, distance between the hurricane and the coral reef, hurricane intensity, maximum wind speed at impact and storm surge, and concluded that the features to consider for the insurance are the following: initial coral cover, site exposure, maximum wind speed at impact and initial rugosity.

Maximum wind speed at impact

Hurricane wind speeds that passed over the study area. Categories: Less than 34 knots (<34 kt), 34-50 knots, 50-64 knots and more than 64 knots (> 64 kt).



SITES IMPACTED BY HURRICANES WITH WIND SPEEDS GREATER THAN 64KT SHOW GREATER CORAL COVER LOSS.



Finally, we fitted a model that will help calibrate the parameters that will activate the payment of the insured amount; however, this is a preliminary model, that's why we are proposing an extension of the project in order to fit more effective models that will allow a more accurate damage prediction.

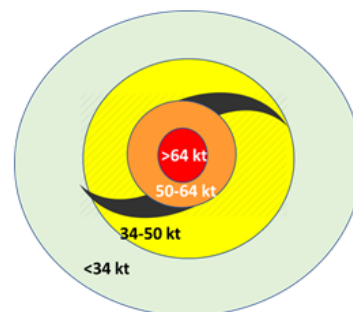
The following variables significantly explain coral cover loss:



Coral cover



Reef exposure



Maximum wind speed at impact

THANK YOU

