

# Predicting the distribution of *Montastraea* reefs using wave exposure

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In the Caribbean region, forereef habitats dominated by *Montastraea* spp. have the highest biodiversity and support the largest number of ecosystem processes and services. Here we show that the distribution of this species-rich habitat can be explained by one environmental predictor: wave exposure. The relationship between wave exposure and the occurrence of *Montastraea* reefs was modelled using logistic regression for reefs throughout the Belize Barrier Reef, one of the largest and most topographically complex systems in the region. The model was able to predict correctly the occurrence of *Montastraea* reefs with an accuracy of 81%. Consistent with historical qualitative patterns, the distribution of *Montastraea* reefs is constrained in environments of high exposure. This pattern is likely to be driven by high rates of chronic sediment scour that constrain recruitment. The wide range of wave exposure conditions used to parameterize the model in Belize suggest that it should be transferable throughout much of the Caribbean region, constituting a fast and inexpensive alternative to traditional habitat mapping and complementing global efforts to map reef extent.

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