



Surfing the Pacific Island chains: linking internal wave energetics to coral reef benthic community patterns.

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The ocean is saturated with internal waves at tidal frequency. The energy associated with conversion from barotropic to baroclinic can enhance mixing and upwelling at sites of generation and dissipation, which in turn can drive primary production. Hotspots of internal wave generation are located at sudden changes in topography with the Hawaiian archipelago identified as an area of intense internal wave activity. The role of internal waves as a driver of benthic reef community is unexplored and could be key to coral reefs survival in the unknown future. Using a Pacific wide map of internal wave flux and barotropic-to-baroclinic conversion at an unprecedented 1/30th degree resolution, energy budgets were developed for four islands to evaluate dissipation and generation of internal waves. Spatiotemporal variations in benthic community structure were plotted around each island and related to changes in internal wave energetics using a boosted regression tree. Contrasting spatial patterns and species assemblages were seen around islands with distinct internal wave regimes. The relative importance and influence of internal waves on coral reef ecosystems is evaluated.