

A STUDY OF RESONANT PERIODS FOR
FRINGING REEFS WORLDWIDE

A THESIS SUBMITTED TO THE GLOBAL ENVIRONMENTAL SCIENCE
UNDERGRADUATE DIVISION IN PARTIAL FULFILLMENT OF THE
REQUIREMENTS OF THE DEGREE OF
BACHELOR OF SCIENCE
IN
GLOBAL ENVIRONMENTAL SCIENCE

DECEMBER 2008

UNIVERSITY OF HAWAII AT MANOA

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ABSTRACT

Tropical islands are surrounded by reefs, which are a significant buffer for wave energy. The dissipation of this energy depends on the frequency structure of waves. During tropical storm Man Yi, forcing of resonant motions on a fringing reef at Ipan, Guam was observed. Resonant conditions can be met on reefs when the appropriate wave climate exists to excite the reefs' natural periods. Fringing reefs have a natural or resonant period, which is proportional to their lengths and inversely proportional to the square root of the water depth. This period is associated with the reef acting as a resonator and allowing a significant amount of wave energy to reach the shore. A literature review was carried out to assess the resonant periods of 53 fringing reefs worldwide. These periods correspond to reefs located in Australia, Hawaii, Guam, Seychelles, and the Virgin Islands. This study is aimed at evaluating fundamental resonant periods of these reefs for present day water levels and for elevated levels due to sea level rise from climate change. The main trend obtained from the results was that the majority of reef resonant periods fall in the infragravity to far-infragravity band. If the resonant periods of the reefs are matched with appropriate wave climate forcing to excite these periods, resonant conditions may be seen and coastal inundation is potentially more likely to happen.