

INTERNAL WAVES: MODELING ENERGY
DISPERSION AT THE OCEAN'S SURFACE

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

BACHELOR OF SCIENCE

IN

GLOBAL ENVIRONMENTAL SCIENCE

DECEMBER 2012

By
Joseph Martinelli

Thesis Advisor(s)

Glenn S. Carter

ABSTRACT

Using the Princeton Ocean Model, internal waves are generated by forcing waters over three different idealized stratification profiles. One profile is of constant stratification while the other two have moderate pycnoclines near the ocean surface followed by constant stratification at depth. The pycnocline in the two stratified cases is defined by a Gaussian curve with a different maximum value in each case. Building on work done by Gerkema (2001), these cases will be analyzed to determine how the internal wave energy rays interact with the pycnocline. Based on the output from POM, focus will be placed on visually interpreting energy reflections off the pycnocline and the ocean surface. The goal is establish an understanding of potential long distance internal wave propagation in ocean regions with similar stratification.