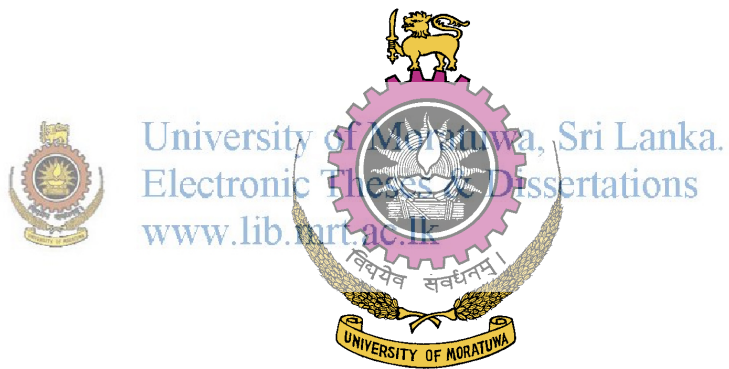


IMPACT OF CLIMATE CHANGE ON THE WAVE CLIMATE OF SRI LANKA

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118005 T

Dissertation submitted to the University of Moratuwa
For the degree in Master of Science



Department of Civil Engineering
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NOVEMBER 2013

DECLARATION

“I declare that this thesis/dissertation does not incorporate without acknowledgement any material previously submitted for a Degree or Diploma in any University or other institute of higher learning and to the best of my knowledge and belief it does not contain any material previously published or written by another person except where the acknowledgement is made in the text”

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On the 08th day of October 2013

ABSTRACT

Climate change and climate change driven impacts are most widely argued topics among contemporary researchers and scientists. Broadly there are two schools of philosophies that process entirely contrasting concepts about this whole concept of climate change and its impacts. While one of the concepts state about frequently varied climate change and occurrence of extreme weather events the others are banking upon the concept that there is no climate change and it is only the indifferences in occurrence of weather and climate events. The title of this dissertation itself implies the fact that this research study supports the concept of climate change and its probable impacts, thus leaving out the other approach on climate change.

Extensive concentrations of green house gasses emitted to the earth's atmosphere and vast amounts of aerosols govern the majority of anthropogenic causes for climate change, while many of the natural causes such as changes in solar radiation also contributes immensely to earth's climate change.



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Absence of detailed studies carried out on investigating probable impacts on wave climates due to projected climate changes is one of the major drawbacks in handling the unique coastal echo systems in Sri Lanka. As a country where coastal resources play a major role in its development, it is absolutely necessary to have a clear idea about the probable impacts that could arise on its coastal areas. This detailed investigation provides vital information on probable impacts that might cause on the western coast of Sri Lanka under the influence of global climate change.

The outcomes of this study indicate that there is certain threat to the coasts in Sri Lanka due to a considerable increment in mean wave height and shifted wave directions. It also indicates that not only the number of extreme wave events increase very significantly but also its intensity upsurges in a considerable amount as well.

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LIST OF ABBREVIATIONS

CCAM	- Conformal Cubic Atmospheric Model
CSIRO	- Commonwealth Scientific and Industrial Research Organization
NCEP –DOE	- National Centers for Environmental Prediction, Department of Energy
AIT	- Asian Institute of Technology
WW3	- WaveWatch 3
SWAN	- Simulating Waves Near-shore
WAM	- The Wave Model
NOAA	- National Oceanic and Atmospheric Administration
ECMRWF	- European Centre for Medium-Range Weather Forecasts
PDF	- Probability Density Function
AOGCM	- Atmosphere–Ocean General Circulation Models
GCM	- General Circulation Models
GHG	- Green House Gasses
IPCC	- Intergovernmental Panel on Climate Change
SRES	- Special Report on Emission Scenarios
H_s	- Significant Wave Height
Dir	- Wave Direction
Var	- Variation
Std	- Standard Deviation
$H_s (i\%)$	- i^{th} Percentile of Significant Wave Height
Dir ($i\%$)	- i^{th} Percentile of Wave Direction

