



National Water Research Institute of
Malaysia (NAHRIM)



Ministry of Water and Environment
(KASA)

PROCEEDING OF RESEARCH PRESENTATIONS: COASTAL AND OCEANOGRAPHY



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COASTAL AND OCEANOGRAPHY RESEARCH CENTRE
NATIONAL WATER RESEARCH INSTITUTE OF MALAYSIA (NAHRIM)
MINISTRY OF ENVIRONMENT AND WATER (KASA)

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PREFACE

Proceeding of Research Presentations: Coastal and Oceanography is a compilation of presentation slides presented at the National Water Innovation Conference and Exhibition (NWICE) 2022, held at the Kuala Lumpur Convention Centre, Kuala Lumpur on 19 - 21 July 2022. This report represents one of the themes in the conference, "Coastal morphology and Oceanography," which is a compilation of studies that NAHRIM researchers in this field have conducted.

Coastal morphology is the study of natural processes ongoing at the shoreline and the impact due to human interventions within the coastal zone, whereas oceanography is the study of all aspects of the ocean. Oceanography covers a wide range of subjects, from marine life and ecosystems to currents and waves, the movement of sediments, and seafloor geology.

The primary focus of this conference was to bring together academicians, researchers, and scientists for knowledge sharing in various areas of water related research activities. It also promotes the establishment of data exchange and collaborative research networks in the region.

It is hoped that this report will be helpful, and with the dissemination of more information, there will be better understanding and co-operation on matters related to coastal and oceanography within this country as well as regionally. The editor would like to thank all participants for their contributed presentation slides and a tremendous appreciation for the efforts of the conference organizer and everyone whose contributions have made the publication of this special issue possible. Thank you.

By,

Editor

EXECUTIVE SUMMARY

Malaysia has a long shoreline, with most cities located near the coast. NAHRIM has carried out several studies as a preparation to face global warming issues in terms of projections for sea level rise in Malaysia, and the production of Potential Sea Level Rise (SLR) Inundation Maps and Coastal Vulnerability Assessments for high risk areas. These Potential SLR Inundation Maps can be used as a guide for planning and implementation agencies such as the Department of Town and Country Planning (JPBD), the Drainage and Irrigation Department (DID), the Public Works Department (PWD) and Local Authorities in their development and adaptation planning, avoiding massive development in critical areas. Although the global prediction for sea level rise is about 1.7 – 3.1 mm/year, Malaysia's regional sea level rise is expected to be higher, owing to local climate and topographical conditions. Low lying areas with high population and socio-economic activities are at risk of being inundated.

Three main factors contributing to the rising seas are ocean thermal expansion, melting of the Greenland and Antarctica glacier and ice sheets, and changes in terrestrial storage, with ocean thermal expansion as the dominant factor. Warming of the ocean surface will give impacts to the biodiversity and the growth rates of species that are sensitive to temperature, such as corals. Damage to structures, infrastructure, and crops during tropical cyclones and water shortages are the main impacts from climatic extremes in the tropical regions. On atolls, storm surges, high wave events and king tides would bring a severe problem of freshwater salinization.

Although risks cannot be entirely eliminated, disaster risk management and adaptation to climate change are crucial to reduce exposure and vulnerability, and increase resilience to the potential adverse impacts of climate extremes. Furthermore, adaptation and mitigation will complement each other hence reducing the risks of climate change significantly. Some of the alternative methods recommended by the Malaysian Drainage and Irrigation Department's Manual (DID Manual, 2009) to mitigate the damage of coastal storms and forces are accommodation, protection, beach nourishment, retreat; integrated shoreline management plan, and refurbishment on coastal bund. Therefore, awareness, improved governance, proper development and preparedness are fundamental in coping with climate change impacts in developing countries.