



ATMOSPHERE and OCEAN

An Introduction to Marine Science





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An Introduction to Marine Science

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Preface

Having established the Marine Science Programme more than a decade ago in the Universiti Malaysia Sabah, the following four undergraduate courses have been introduced for the Physical Oceanography component in Marine Science Programme under the School of Science and Technology.

- Introduction to Physical Oceanography (SL 10103)
- Fisheries Meteorology (SL 20403)
- Coastal Processes (SL 30503)
- Coastal Modelling (SL 31003)

Semesters after semesters, these courses have been taught by the different academics from BMRI (Borneo Marine Research Institute). Until 2011 several different foreign textbooks have been used to run the courses. Some are very much descriptive and few are quite mathematical. Nothing is in between for the undergraduate students and the gap between the levels of these textbooks is wide. In order to enhance the availability of information and educational materials especially for the Malaysian students at the right level, the academics involved in these courses have been considering producing an appropriate monograph. This book is our attempt to bridge the gap as a reader-friendly version of in-house holistic textbook with local examples based upon the specific topics covered in the courses, including Integrated Coastal Zone Management (ICZM), SL 30603.

The significance of ocean, atmosphere and their influence on daily life are increasingly apparent. To be in line with the Atmosphere and Ocean aspects of the courses offered, our attempt and contribution to the curriculum development will mainly focus on physical science. As we are aware, teaching and training in atmospheric and marine sciences throughout the world is mainly offered at the university level. In many, if not most countries, however, there is little or no general recognition of the influence of the ocean and atmosphere on all people, wherever they might live.

Despite some difficulties in writing a very flexible curriculum, an earnest effort has been made to provide a more direct theme of the subject than just to distribute the relevant general references. One might think that an appropriate curriculum on a particular subject could be easily drawn from several relevant reference materials. Theoretically, the concept is not entirely wrong, but in reality, it is much more difficult to gather main points from several topics and place them in an

appropriate sequence to strike the real goal. Obviously, more and more fine-tuning on the curriculum is always necessary and it may only be achieved through the real teaching. Difficulties encountered by the lecturers while teaching and questions asked by the students while learning, may become a great help to improve the course gradually.

In order to minimise the improvement period on the curriculum for the Malaysian students, this monograph is structured in a lecture notes style based upon the personal taste of the teaching team at BMRI. It seeks to introduce students to the ocean and atmosphere and how they work. Another objective is to introduce students to Marine Science especially Physical Oceanography, as a body of knowledge and as a process of continual inquiry and testing of ideas. Although a high school background in Physics and Mathematics are assumed, simple explanation and fundamental definitions are provided wherever necessary. This monograph is designed to make it simple and easy for the Malaysian students to familiarise themselves with the ocean and atmosphere in particular even though it does not cover every topic from the above four courses.

Although, as always in such cases, one is inclined to sacrifice elegance in presentation, nevertheless that main aim has been to service the students into the subject whose background may be restricted. Consequently, these notes have no claim for such elegance, nor are they intended to have presentations for higher merit. Finally our great obligation is to the scientists who have built the subjects, they are identified throughout the monograph. In addition, many figures are handily downloaded from different websites for this educational purpose. Being grateful to those who deserve is a special kind of merit in our Asian tradition and belief, accordingly we offer our thanks to the Director of BMRI namely Prof. Dr Saleem Mustafa, Head of Publication Unit of UMS namely Lt. Kol. (K) Prof. Dr Syed Azizi Wafa Syed Khalid Wafa and last but not least the staff of Publication Unit namely Lindsay Lorraine Majawat, Azlan Yakob and Nataniel Ebin for their continuous guidance, support and indirectly overseeing this challenging task from the contents to language correction and formatting. Thanks are also due to our post-graduate students Weliyadi Anwar and Dayang Siti Maryam for their assistance in this endeavour.

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