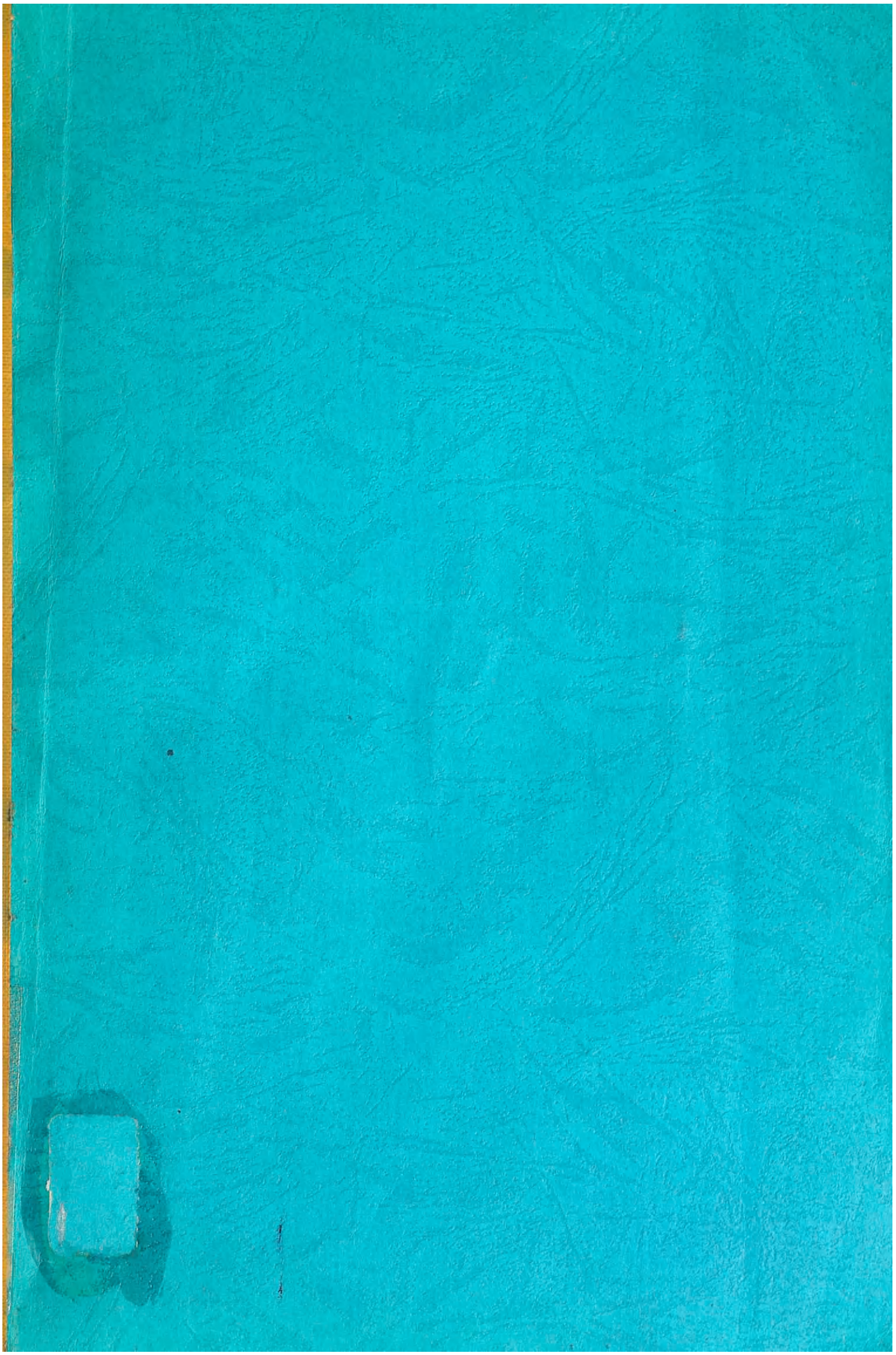

MASTER OF SCIENCE
UNIVERSITI PERTANIAN MALAYSIA

1994

WATER CIRCULATION PATTERN OF KUALA TERENGGNU

By

MAGED MAHMOUD MARGHANY

Thesis Submitted in Fulfilment of the Requirements for the Degree of Master Science in the Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia

July 1994

ACKNOWLEDGEMENTS

The author would like to thank Allah for letting him the first Arabian, to do research on physical oceanography in this part of the South China Sea. This part of the world has been ignored by scientists. Everything was done has been by the action of Allah. He has given him the drive and the patience to continue this study.

The author wants to express his grateful appreciation to his supervisors Dr. Mohd. Nasir Saadon, Dr. Lokman Hussain and Professor Dr. Mohd. Ibrahim B.Hj. Mohamed who generously shared their expertise and time. They contributed the fruits of their great experiences and offered valuable suggestions to aid him in making this thesis.

The author extends his thanks to the staff of UNIPERTAMA I and UNIPERTAMA III boats especially Encik Mohammed Embong and Captain Rahman Muda who helped him to collect the data under bad weather conditions. Without them, this work would never have seen light.

The support from the staff of Faculty of Fisheries

and Marine Science in Kuala Terengganu are also acknowledged especially Encik Sukiman Sengat who supported me with basic programs to calculate temperature and salinity. Thanks are also to Encik Suliman Kassim and Johari Mohamed.

The author thanks his friends Muhamad Saini, Mustapha Othman and Kamel Bahrin who contributed by their efforts to prepare the figures in this thesis. He also thanks his friend Rosland Salim who translated the abstract to Malaysian language

Finally the author wants to express his deep gratitude to Mr Cornelius Anwar Abdullah of Kolej Agama Sultan Zainal Abidin in Kuala Terengganu who edited mistakes of grammar and vocabulary in this thesis.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF PLATES

Plate **page**

Abstract of thesis submitted to the Senate of Universiti Pertanian Malaysia in Fulfilment of the requirements for the degree of Master of Science

WATER CIRCULATION PATTERN OF KUALA TERENGGNU

By

MAGED MAHMOUD MARGHANY

JULY 1994

Chairman : Mohd. Nasir Saadon

Faculty : Faculty of Fisheries and Marine Science

The aim of this study was to determine the type of the current patterns in the coastal water of Kuala Terengganu. This study was divided in two parts. The first one was to determine the pattern of thermohaline circulation. This was done by sampling of 25 stations along the coastal water of Kuala Terengganu. The second one was to measure the subsurface current by ONO-self recording current meter and drogue. The current meter was deployed at Station 1 while the drogue was deployed at Stations 3 and 5.

The thermohaline circulation was dominated by mixing during the north-east monsoon period (October

1992, February and March 1993) due to the turbulence resulting from the action of wind and tide. A dominant feature of this study was the occurring of lighter upwelling during the south-west monsoon period (May to August 1992). The downwelling occurrences are in the north-east monsoon.

The study showed that the subsurface current in the coastal waters of Kuala Terengganu were influenced by the tide. The current speed throughout this study varied from 0.012 to 2.6 m/s. The tide throughout this study was a diurnal tide. Tidal current was a dominating feature through this study, while the wind acted as a modifier to the water movement shaped by tide. Finally the data of surface current illustrated that the water meanders in the month of April 1993. Meander rotated in clockwise direction with an average current speed of about 0.4 m/s.

Abstrak tesis yang dikemukakan kepada Senat Universiti Pertanian Malaysia sebagai memenuhi keperluan untuk Ijazah Master Saians.

CORAK PUSINGAN AIR DI KUALA TERENGGANU

Oleh

MAGED MAHMOUD MARGHANY

JULAI 1994

Pengerusi : Mohd. Nasir Saadon

Faculti : Faculti Perikanan dan Saians Samudera

Tujuan kajian ini adalah untuk menentukan jenis corak-corak arus di perairan pantai Kuala Terengganu. Kajian ini dibahagikan kepada dua bahagian. Bahagian pertama adalah mengenai Kitaran Termohalin. Ini dilakukan ke atas 25 buah stesen kajian sepanjang perairan pantai Kuala Terengganu. Bahagian kedua pula adalah untuk mengukur arus sub-permukaan menggunakan meter arus "ONO self recording" dan "drogue". Meter arus telah dipasang di stesen 1 manakala drogue telah dipasang secara di stesen 3 dan 5.

Kitaran Termohalin telah didominasikan percampuran

khasnya semasa tempoh Monsun Timur Laut (Oktober, 1992; Februari dan Mac, 1993) akibat daripada penggeloraan hasil dari tindakan angin dan pasang surut. Satu ciri dominan dalam kajian ini adalah kejadian upwelling yang tinggi semasa berlakunya Monsun Barat Daya (Mei hingga Ogos, 1992) berbanding dalam tempoh Monsun Timur Laut (Oktober, 1992; Februari dan Mac, 1993). Tetapi, kejadian downwelling adalah lebih kerap pada Monsun Barat Daya berbanding Monsun Timur Laut.

Kajian ini menunjukkan bahawa arus sub-permukaan di perairan pantai Kuala Terengganu adalah dipengaruhi oleh pasang-surut. Kelajuan arus sepanjang kajian adalah berubah-ubah dari 0.012 hingga 2.6 m/s. Pasang-surut sepanjang kajian adalah diurnal. Arus pasang-surut adalah ciri yang dominan sepanjang kajian, sementara angin bertindak sebagai pengubah kepada pergerakan air yang dibentuk oleh pasang-surut. Akhirnya, data bagi arus permukaan yang diperolehi menggambarkan bahawa pembelokan air berlaku pada bulan April 1993. Pembelokan berlaku mengikut arah jam dengan kelajuan purata arus lebihkurang 0.4 m/s.