OCEAN-ATMOSPHERE INTERACTION

AND

THE SUMMER MONSOON OF INDIA

THESIS

BY

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CERTIFICATE

This is to certify that the thesis entitled "OCEAN-ATMOSPHERE INTERACTION AND THE SUMMER MONSOON OF INDIA" being submitted by Tushar Kanti Ray for the award of the degree of Doctor of Philosophy, is a record of the original bonafide research work carried out by him. He has worked under our joint guidance and supervision and has fulfilled the requirements for the submission of this thesis. The results presented in this thesis have not been submitted in part or full to any other University or Institute for award of any degree/diploma.

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(TUSHAR KANTI RAY)

..... to my parents.

List of symbols

Symbol	Legend
A'	Absorption coefficient.
C	Phase velocity
d	Depth
E	Evaporation; energy of waves.
e	Vapour pressure in air.
e_p	Vapour pressure at water surface.
f	Coriolis parameter; wave frequency.
F_n	Normal component of frictional force.
F_t	Tantential component of frictional force.
F_v	Net northward flux of air.
F_{q_v}	Net northward flux of water vapour.
g	Acceleration due to gravity.
H	Height of wave.
k	Wave number
L	Wave length.
p	Pressure
q	Specific humidity
R_c	Increase in phase speed
R_H	Energy used for growth of wave.
R_v	Rate of energy, transfer by wind.
R	Tangential wind stress
S	Sheltering coefficient
T	Temperature; period
t	Time
U	Wind speed
V	Wind speed

V_a Wind speed at height (a)

W Vertical velocity

ρ Density

ζ Relative vorticity (vertical component).

CONTENTS

Chapter III : Ocean waves

Chapter IV : Structure of the atmosphere during the summer monsoon.

ABSTRACT

The oceans and the atmosphere form a closely inter-related system. The interface between these two components did not receive much attention until the 1940s. Recent studies on air-sea interaction have enabled us to understand how the oceans and the atmosphere respond to forcing on different scales of space and time.

The Asian summer monsoon, known as the southwest monsoon in India, is an interesting seasonal phemomenon that occurs with regularity every year. From the latter part of the seventeenth century scientists have tried to explain the genesis and the behaviour of the southwest monsoon. From that time onwards research has helped us to understand the dynamics of the monsoon. But, a study of other aspects based on more recent data has not been made so far. The present thesis attempts to study these aspects of the Summer Monsoon. The work is based on measurements of atmospheric and oceanic variables during recent international scientific expeditions.

The expeditions with which we are concerned are : ISMEX-73, MONSOON-77 and MONEX-79. They have provided valuable data over the Indian Ocean, the Arabian Sea and the Bay of Bengal.