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التوثيق الالكتروني والميكروفيلم

قسم

نقسم بالله العظيم أن المادة التي تم توثيقها وتسجيلها
علي هذه الأفلام قد أعدت دون أية تغيرات



يجب أن

تحفظ هذه الأفلام بعيدا عن الغبار

في درجة حرارة من ١٥-٢٥ مئوية ورطوبة نسبية من ٢٠-٤٠%

To be Kept away from Dust in Dry Cool place of
15-25- c and relative humidity 20-40%

بعض الوثائق الأصلية تالفة



بالرسالة صفحات نم ترد بالاصل

**SIMULATION OF BLOCKING SYSTEM
BY LIMITED AREA MODEL**



THESIS

Submitted to Cairo university required for
The degree of Ph. D. in Meteorology

BY

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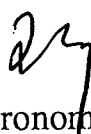
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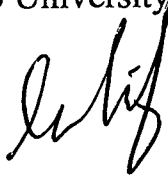
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ABSTRACT

The present thesis investigates the simulation of blocking systems by limited area model, Regional Climatic Model, (RegCM3). 6-hour datasets of geopotential height, synoptic charts and NCEP/NECAR reanalyzed at surface and 500 hpa levels through the period of 1 December 1994 – 31 December 2005 had been used in the present work. In addition to that the input data required for limited area model (RegCM3) has been used through that period.

Comparative studies using of different minimum duration criteria of blocking systems and limited area model (RegCM3) outputs with three different horizontal resolutions (100 Km, 90 Km and 60 Km) had been done. However, the area concerned of the present study is (10° S – 72° N) latitude and (55° W – 95° E) longitude. From the characteristics of blocking persistence it is liable to divide the area concerned to three distinct zones. First one from 55° W to Greenwich 0° longitude. Second zone from Greenwich 0° to 50° E longitude and the third one from 50° E to 95° E longitude.

A seasonal classification of the blocking systems for four seasons (winter, spring, summer and autumn) that existed through the period of study (1994-2005) has been made. The results revealed that the simulation of blocking systems of limited area model (RegCM3) within (90 Km) horizontal resolution give high accuracy in simulation rather than that with (100 Km) and (60 Km) horizontal resolution for all seasons over the study area. Whereas, accuracy simulation of blocking systems reached to (80 %) within (90 Km) horizontal resolution of the limited area model (RegCM3).

In fact, the simulation of blocking cases in a suitable time is very important which will limit and avoid a lot of problems which result from this phenomenon. Whereas, if abnormal weather continues from a week to may be a month over any region, this will cause more problems as to close marine and air ports, floods, drought and damage of crops and economic problems. However, the simulation of blocking systems using of limited area model (RegCM3) will clarify the role played by blocking systems in abnormal weather and eliminates the hazards of the sever abnormal weather phenomena which related to blocking systems.

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My Deep thanks for my parents.

Dedication

This work is dedicated to: My Family for their love and support

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ARABIC SUMMARY	
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CHAPTER 1

CHAPTER 1

INTRODUCTION

1.1 BLOCKING SYSTEMS

In fact the blocking systems consider standing long waves from Rossby waves, which are characterized by constant weather from one to four weeks, which the westerlies flow in North Hemisphere as a long waves patterns of ridges (clockwise wind) and troughs (anti-clockwise wind) as shown in figure (1). These long waves are called Rossby waves. They are known as planetary waves, as they owe their origin to the shape and rotation of the earth and are the most intriguing natural phenomena. In the atmosphere, are easy to observe as (usually 4-6) large-scale meanders of the jet stream. When these loops become very pronounced, they are detached of the masses of cold or warm air, that become cyclones and anticyclones are responsible for day-to-day weather patterns at mid-latitudes.

Rossby waves characterize the tropospheric westerlies above 500-hpa level, that is, above the altitude where the pressure drops to 500-hpa. Below this level the waves are distorted some what by friction and topographic irregularities of the Earth's surface. It's more vigorous in winter than in summer because in winter the temperature contrast is greater between north and south at that time of the year, but in summer the north south temperature differences are less, the pressure gradients become weaker and as a consequence this features also ably to the westerlies. (Holton 2004).

The speed of Rossby waves is given by

$$C = u - \beta/k^2 \quad (1)$$

Where c is the wave speed, u is the mean westerly flow, β is the Rossby parameter, and k is the total wave number