SUDAN UNIVERSITY OF SCIENCE AND TECHNOLOGY

COLLEGE OF SCIENCE

PHYSICS DEPARTMENT

A project submitted as partial fulfillment for the requirements of B. Sc (honor) degree in physics science

SUNSPOTS RELATION WITH GEOMAGNETIC INDICES

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الاية

((وَالشَّمْسُ تَجْرِي لِمُسْتَقَرٍّ لَهَا ذَلِكَ تَقْدِيرُ الْعَزِيزِ
الْعَلِيمِ ۝ وَالْقَمَرَ قَدَّرْنَاهُ مَنَازِلَ حَتَّى عَادَ كَالْعُرْجُونِ الْقَدِيمِ ۝))

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Abstract

In this project we studied the Sun, its structure and the relation of sunspots to the geomagnetic indices. The geomagnetic indices have been very well defined to describe the conditions on the Sun-Earth system; in this regard, it is worth to mention that the Sun heats the Earth’s atmosphere and a degree of ionization in the ionosphere increases at the dayside and this causes convection in ionosphere. Solar wind sweeps towards Earth at supersonic speed ranging from 300 to 1000 km/s distorts the Earth’s magnetic field and shape the magnetosphere. And when calculating the disturbance storm time index (Dst) we shall find that the negative Dst value means that the Earth's magnetic field is weakened. This is particularly the case during solar storms, which weakened the Earth’s magnetic field at or near the magnetic equator.

الملخص

في هذا المشروع درسنا الشمس وتركيبها وعلاقة البقع الشمسية بالمؤشرات الجيومغناطيسية. لقد تم تعريف المؤشرات الجيومغناطيسية تعريفا جيدا لتصف كل الأحوال التي تحيط بنظام الشمس-الأرض؛ وفي هذا الصدد, تجدر الإشارة إلي أن الشمس تسخن الغلاف الجوي للأرض, ودرجة التأين الأيونوسفير تزداد نهارا وهذا يسبب الحمل الحراري في الغلاف الجوي المتأين. الريح الشمسية تتجه نحو الأرض بسرعة تفوق سرعة الصوت تتراوح بين 300 و 1000 كم / ث وهذه الريح تقوم بتشويه المجال المغناطيسي الارضي وتشكل الغلاف المغناطيسي الأرضي.عند حساب مؤشر الوقت لإضطراب العواصف الشمسيه نجد أن القيمه السالبه تعني أن المجال المغناطيسي للأرض قد ضعف. وهذا هو الحال أثناء العواصف الشمسيه حيث تقوم بإضعاف المجال المغناطيسي للارض عند وبالقرب من منطقة الإستواء المغنطيسي.

Introduction

Outline of the project

In this project the sun and the sunspot and the effect of sunspot On the earth weather are the main task, and the project structured as follows: in chapter one we introduced the sun as a typical star; In chapter two we introduced the sunspot; in chapter three we introduced the Earth's space environment; in chapter four we in introduced an observation results.

The importance of the project

The sunspots are the one of the most important phenomena in the Sun and directly effect on the Earth's space weather and studying sunspots helps us understanding and explanation some changes on Earth's space weather and predicting the incoming changes on the Earth's space weather.

The main objectives of the project

Studying the Sun and sunspot and the effect of sunspots on near-Earth's and Earth's space weather.

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