CORRELATION AND ANALYSIS OF GEOMAGNETIC PARAMETERS DURING GEOMAGNETIC STORM

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ABSRACT

The Sun is the most important driver of space weather phenomenon. Energetic particles thrown out from the Sun interact with the Earth's magnetic field producing geomagnetic disturbances (storms) and increased ionization in the ionosphere. Geomagnetic storms have seriously effects on the electric power systems. This paper presents the analysis of geomagnetic data during three geomagnetic storm events of 9th April 2006, 14th April 2006 and 14th December 2006. The data were taken from MAGDAS unit at Ashibetsu Stataion, Japan which supplied by Space Environment Research Center (SERC) Kyushu Universiti, Japan. The analysis shows higher variations detected on geomagnetic parameter (H parameter) on the day of geomagnetic storm and long lasting until two days after the event.

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CHAPTER 1

INTRODUCTION

1.1 PROJECT OVERVIEW

Space weather is the concept of changing environmental conditions in near-Earth space. Within the solar system, the space weather is greatly influenced by the speed and density of the solar wind and the interplanetary magnetic field (IMF) carried by the solar wind plasma. A variety of physical phenomena are associated with space weather, including geomagnetic storms, ionospheric disturbances and scintillation at Earth's surface. Coronal Mass Ejection (CME) and their associated shock waves are also important drivers of space weather as they can compress the magnetosphere and trigger geomagnetic storms. The study of geomagnetic storms is one of the main topics of space weather. During geomagnetic storm, the Sun and the magnetosphere are connected, giving rise severe changes both in interplanetary space and terrestrial environment. Some examples are the acceleration of charged particles, enhancement of electric currents, auroras and magnetic variations on the Earth surface. These changes can produce important damages in electrical power supplier, radio communications and spacecrafts. Researchers have doing some research to study on the space weather. The way of doing space weather forecasting is by using Magnetic Data Acquisition System (MAGDAS). This device was developed by the Space Environment Research Centre, Kyushu University, Japan. The scientific objectives of using MAGDAS data is to carry out space weather studies during 2005 – 2008 time frames. It is also used to clarify the dynamics of geospace plasma changes during magnetic storms and auroral sub storms, the electromagnetic response of ionospheris magnetosphere to various solar wind changes and the penetration mechanism of DP2-ULF range disturbances from the solar wind region into the equatorial ionosphere.