

**THE LONGITUDINAL AND LATITUDINAL
EFFECTS ON EARTH'S ELECTROMAGNETISM
OBSERVED BY MAGDAS/CPMN**

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ABSTRACT

Geomagnetic parameters with different stations and latitudes give effects on the magnetic variations due to local geomagnetic signatures and this has been proven by many researchers. However, the analysis on the changes rate of local geomagnetic activities is not well established yet. This paper discuss the correlation between the longitudinal and latitudinal effects on earth's electromagnetism observed by Magnetic Data Acquisition System/Circum-Pan Pacific Magnetometer Network (MAGDAS/CPMN) developed by International Center for Space Weather and Education (ICSWSE) of Kyushu University in Japan. To investigate the longitudinal effect of geomagnetic data, three different stations from Tirunelveli, India (8.70°N , 77.80°E), Langkawi, Malaysia (6.30°N , 99.78°E) and Yap Island, Federated States of Micronesia (9.50°N , 138.08°E) have been analysed. For investigation on latitudinal effect, three different stations from Paratunka, Russia (52.94°N , 158.25°E) for high latitude, Ashibetsu, Japan (43.46°N , 142.17°E) for mid latitude and Davao, Philippine (7°N , 125.40°E) for low latitude also have been considered. All stations are located at northern hemisphere. To characterize the possible variations occurred at these stations, horizontal (H) parameter of MAGDAS data will be discussed due to its significant variations for analysing different geomagnetic data. The data was analysed during one month period at three consecutive years, 2007, 2008 and 2009. From this project, the geomagnetic parameters varies according to different geomagnetic monitoring stations. The analysed on H-component of geomagnetic variation shows higher dependence rate latitudinal as compared to longitudinal effect.

Keywords— MAGDAS, Northern Hemisphere, Geomagnetic Parameters, Magnetic field

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CHAPTER 1

INTRODUCTION

1.1 BACKGROUND OF STUDY

There have a communication between the Sun and Earth as well. Therefore, some variations, changing area and different environment can give effects to the Earth. Furthermore, there have many factors that can influence to the variations of Earth's electromagnetism such as solar activity and solar wind. Space weather is a relatively new field of science dedicated to the understanding of the Solar-Interplanetary-Terrestrial System [1]. Weather of the space can be described by changing the environmental conditions between the Sun's atmosphere and Earth's atmosphere. Space environment is complying from the changes of plasma, magnetic fields, radiation and other matter in space. In addition, the weather that produced from the near sun to the Sun's atmosphere is called solar wind. There have some effect when the phenomenon occurs. Moreover, layer between the sun and earth is magnetosphere, while ionosphere and thermosphere the lower layer in the space weather system [2].

Parameters of index can be influenced to the geomagnetic parameters. Distance between equatorial to the plasmopause is known to be sensitive on the magnetic activity, decreasing during periods of increasing magnetic disturbance. These process can induced by the two difference index which is Kp index (Estimated Planetary K-index) and Disturbance storm time (Dst index). Dst reported every hourly based on series of stations near the magnetic equator and provides a measure of ring current activity. While Kp Planetary indexes observe in term of latitude range [3].