

CHAPTER V  
FINDINGS AND DISCUSSION



V.1 Findings

Observations made of the amplitude and occurrence of magnetic field fluctuations of type Pc 1 during February 2 to February 24, 1970 at the TREND Site (near the equatorial latitude) can be summarized as follows:

1. This activity was most frequently observed during morning hours and in the evening.
2. The fluctuations recorded occurred in the bandwidth from 0.25 to 1.2 Hz.
3. During morning hours, Pc 1 micropulsations occurred most often between 0700 L.T. and 0800 L.T. (0000 U.T. to 0100 L.T.) and there was a tendency for higher frequencies (more than 1 Hz) to occur at that time.
4. Lower frequencies (less than 1 Hz) tended to occur in the evening or early night hours. There were also a few events occurring during noon hour. The lower frequency events most often occurred between 1700 L.T. and 1900 L.T. (1000 U.T. to 1200 U.T.).
5. Continuous oscillations of the type identified as Pc 1 were not observed with frequencies above 3 cps., although the equipment was often operated with a bandwidth setting to 12 cps. Signals of an irregular nature were recorded to even higher frequencies, but none having the regular character of Pc 1 were noted.
6. Most signals of Pc 1 oscillations came from either east-west direction or north-south direction. The maximum amplitude of Pc 1 signals from east-west was 0.65 $\gamma$ ; those from north-south direction were less than this.
7. The comparison between Pc 1 activity and ionospheric particle density in E-region showed Pc 1 activity to be minimum during the time of maximum electron density in E-region ionosphere. The Pc 1 activity of higher frequency than 1 Hz increased when the electron density in E-region started to decrease. That is, higher frequency Pc 1 activity was found to vary in reverse proportion

with particle density in E-region, although this relationship is non-linear. This comparison indicated that Pc 1 activity at frequency above 1 Hz can be attenuated by E-region ionosphere. For Pc 1 at frequency below 1 Hz, no correlation was found between attenuation of Pc 1 activity and increasing of density of particle in E-region ionosphere.

## V.2 Discussion

This study of Pc 1 micropulsations was limited to one site at near-equatorial latitude, with observation over a one-month period of this activity with respect to occurrence time, maximum amplitude and frequency. There are many details of Pc 1 activity which are beyond the scope of this study. The results indicate that the majority of Pc 1 signal came from the east-west direction but the data obtained are not enough to confirm the propagation theory that Pc 1 energy propagates across the magnetic line of force at near-equatorial latitudes. If observation time is extended to one or two years, sufficient data may be obtained to confirm this propagation theory with respect to locations near the equator, such as Thailand.

The relationship found between the Pc 1 activity and E-region ionosphere condition indicate that Pc 1 for higher frequency than 1 Hz can be attenuated by higher density of particles in E-region ionosphere. However, observation was limited to only one month, February, and this finding does not necessarily apply to other months. In this thesis we can only confirm that the Pc 1 at higher frequency than 1 Hz can be attenuated by E-region ionosphere at a low latitude station (as has been shown for high latitude stations in other studies). However, for Pc 1 at frequency below 1 Hz this relationship was not found.

This work should be extended in time. Future study should include the polarization of Pc 1 and the variations of ionosphere and Pc 1 conditions over one or two years to arrive at an equation to describe the relationship between the whole of Pc 1 phenomena and ionospheric conditions at a near-equatorial latitude.