# Kp Dependence of the Frequency of Pc4 Geomagnetic Pulsations at Very Low Latitudes in India

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A recent study has been carried out for Pc4 geomagnetic pulsations which are ultra low frequency magnetohydrodynamic (MHD) waves (in the 6.7 to 22.2 mHz frequency range) observed mainly in the dayside (0400 – 2000 hrs LT) magnetosphere using an array of three very low latitude stations, viz Pondicherry (PON) (geomagnetic latitude 2.5° N, geomagnetic longitude 151.97° E), Nagpur (NAG) (geomagnetic latitude 11.72° N, geomagnetic longitude 151.93° E), Hanley (HAN) (geomagnetic latitude 23.28° N, geomagnetic longitude 151.89° E) in India employing three axis fluxgate magnetometers, established and operated by the Indian Institute of Geomagnetism (IIG), Navi Mumbai. Digital dynamic spectra (DDS) for the north-south (X), east-west (Y) and vertical (Z) components of the recorded data were constructed for each day for one-year duration (January 1 to December 31, 2005). The X- and Y-components of these DDS were investigated for carrying out statistical study of the dependence of diurnal and seasonal variation of frequency of Pc4 events on Kp.

The monthly variation of Pc4 frequency has an over all Kp dependence range of 0 to 8+ with major peaks in the frequency occurring between Kp = 1 to 5-. However some secondary Pc4 frequency peaks lying between Kp = 4 to 8+ were also observed. The yearly Pc4 frequency was found to be distributed with magnetic activity over Kp = 1+ to 8+ at all the three stations with major peak occurrence in the frequency at 4-<Kp<5+. The magnitude of frequencies of Pc4 occurrence increases slightly with Kp. The prominent peaks in the seasonal variation of Pc4 frequency were observed for Kp = 4+ (spring and winter seasons), 5 (autumn season) and 5- (summer season). However additional peaks in Pc4 frequency were also observed at Kp = 2+, 3 (spring season), 2-, 2+, 3 (autumn season), 3-, 3+, 4+ (summer season) and 0+, 2, 3+ (winter season). It is also worth noting that Pc4 frequency in winter was observed to have prominent occurrence during intense magnetic activity when 5+<Kp<8. It is conclusively observed that on an yearly basis the over all Pc4 average and higher frequencies were observed to be slightly increasing with increasing values of Kp as well as with increasing geomagnetic latitude. These observations indicate that the Pc4 occurrence may be considered to be due to standing hydromagnetic waves in a cavity bounded by the magnetopause and the ionosphere. The plasmapause will move inwards at the same time as the magnetopause providing the observed increase in the Pc4 frequency with latitude.