Role of ULF Wave Index in Magnetospheric Dynamics and Space Weather Predictions

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Various geomagnetic indices viz. K_p, A_E, Dst etc. and averaged solar wind IMF parameters govern the energy supply in certain regions of magnetosphere-ionosphere cavity. Recently Kozyreva et al., 2007 developed a new ULF wave index to characterise the solar wind interaction and relativistic electron dynamics. Using the same data and model to derive the ULF wave index, we have shown that the ULF wave index can be used as a tool in understanding the problems related to magnetospheric plasma dynamics. The variation of energy and momentum of relativistic electrons with ULF wave index causes the variability of IMF, geomagnetic field and solar wind plasma which are significant to study low frequency turbulence. The energy of relativistic electrons is not directly affected by intensity of magnetic storm and has reciprocal relation with interval of these indices by the incident of elevated ULF pulsation in the magnetosphere. The possible applications of the ULF wave index in the space-weather predictions is described in the present literature to develop a statistical approach to analyse various space weather related problems.

Keywords: ULF wave index, solar wind, interplanetary magnetic field (IMF), geomagnetic pulsations, space weather.