

Statistical analysis of the occurrence properties of the EPWAT phenomena

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In the geomagnetic equator region of the plasmasphere, remarkable enhancements of UHR mode waves have been found by PWS onboard the Akebono satellite and named EPWAT (equatorial enhancement of the plasma wave turbulence) phenomena. Previous studies of EPWAT events have shown that EPWAT phenomena occur within a geomagnetic latitude range ± 10 deg centered at the geomagnetic equator through the entire region of the inner plasmasphere. By using the PWS data of the Akebono satellite for a long period from 1989 to 2002, statistical analysis of the EPWAT events has been carried out to find the detailed occurrence characteristics of these events. The result of the present analysis has shown that EPWAT events can be divided into two groups. One group consists of very localized events close to the magnetic equator within ± 8 deg. Clear occurrence peak exists in narrower latitude range within ± 2 deg. These EPWAT events show little local time dependence. The other corresponds to the events that mainly occur in the altitude range higher than 6000km and extend in latitude range upto ± 25 deg. These events show a strong local time dependence and mainly occur in the dawn from 03h to 06h. It has been suggested from the present study that the former group of EPWAT events represents the existence of the intrinsic free energy in the geomagnetic equator region of the plasmasphere and the latter group corresponds to the injection of electrons from the magnetosphere especially for the case of geomagnetic storms.