PARTICLE PRECIPITATION RELATED TO GEOMAGNETIC PULSATIONS PC1 AND IPDP: SIMILARITY AND DIFFERENCE

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Geomagnetic pulsations Pc1 and IPDP are believed to be ion-cyclotron waves which should associate with ion precipitation. Using the data from low-altitude NOAA satellites along with ground-based observations of geomagnetic pulsations we could distinguish specific precipitation patterns related to these types of ion-cyclotron waves. The common feature of these patterns is the localized (~1 degree of latitude) energetic (E>30-keV) proton precipitation burst. The IPDP-related proton precipitation always contains low energy (<20 keV) component, but Pc1-related precipitation does not. The proton fluxes related to Pc1 are anisotropic (this means weak or moderate diffusion in the source region) while the IPDP-related protons are always isotropic (strong diffusion). Sometimes Pc1-related proton bursts correlate with energetic electron flux enhancements. For IPDP the correlation with energetic electrons is typical. Like Pc1 pulsations, the related precipitation has maximal occurrence on the dayside; the IPDP-related precipitation pattern is mainly observed in the evening sector. The differences in the local time as well as different correlation with geomagnetic disturbances result in different structure and density of the cold plasmaspheric plasma population in the wave-particle interaction region. The simultaneous cold plasma observations at geosynchronous orbit confirm this statement. This explains the distinction between the two types of consequences of the ion-cyclotron instability. We conclude that low-altitude satellite observations of the Pc1/IPDP related precipitation are a good tool for diagnostics of the wave-particle interaction in the near-Earth magnetosphere.