

Significance of results of plasma wave sounder experiments by Akebono/PWS

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Plasma wave sounder experiments have been conducted by Stimulated Plasma Wave experiment (SPW) subsystem of Plasma Wave and Sounder experiments (PWS) on board Akebono (EXOS-D) satellite in the topside ionosphere and plasmasphere [Oya et al., JGG 1990]. The sounder experiments have two main purposes: One is the remote sensing of the topside ionosphere including polar region and inner plasmasphere, and another is active experiments by the stimulation of plasma waves in space. Both of them have been successfully conducted by the SPW subsystem of Akebono/PWS. As for an example of previous studies of Akebono/PWS sounder experiments, Kodama and Ono [2002] revealed the presence of the plasma bulge structures in the polar region of the topside ionosphere from the analyses of ionograms. The observation results of the radio wave echoes at an altitude of 6,000 km suggest the feature of the duct propagation at the boundary of plasmasphere. The new finding of f_{D0} , corresponding to the $n=0$ case of the sequence of diffuse plasma resonances (SDPR) [Oya, JGR 1970; Tadaoka and Oya, 1998], provides the strong evidence to support the weak turbulence theory as the generation mechanism of SDPR. In this paper we revisit the results of plasma wave sounder experiments by Akebono/PWS and discuss the significance of sounder experiments for the study of the polar region of the topside ionosphere and for the investigation of the plasma physics in the process of stimulated wave-particle interactions in space.