Abstract Submitted
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Turbulent Plasmaspheric Boundary Layer: Observables and Consequences[1] EVGENY MISHIN, Air Force Research Laboratory — In situ satellite observations reveal strong lower hybrid/fast magnetosonic turbulence and broadband hiss-like VLF waves in the substorm subauroral geospace at and earthward of the electron plasmasheet boundary. These coincide with subauroral ion drifts/polarization streams (SAID/SAPS) in the plasmasphere and topside ionosphere. SAID/SAPS appear in ∼10 min after the substorm onset consistent with the fast propagation of substorm injection fronts. The SAID channel follows the dispersionless cutoff of the energetic electron flux at the plasmapause. This indicates that the cold plasma maintains charge neutrality within the channel, thereby short-circuiting the injected plasma jet (injection fronts over the plasmasphere. Plasma turbulence leads to the circuit resistivity and magnetic diffusion as well as significant electron heating and acceleration. As a result, a turbulent boundary layer forms between the inner edge of the electron plasmasheet and plasmasphere. The SAID/SAPS-related VLF emissions appear to constitute a distinctive subset of substorm/storm-related VLF activity in the region co-located with freshly injected energetic ions inside the plasmasphere. Significant pitch-angle diffusion coefficients suggest that substorm SAID/SAPS-related VLF waves could be responsible for the alteration of the outer radiation belt boundary during (sub)storms.

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