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Wave-Particle Interactions in the Turbulent Plasmaspheric Boundary Layer EVGENY MISHIN, Air Force Research Laboratory, Space Vehicles Directorate — We present in situ satellite observations of plasmaspheric lower hybrid/fast magnetosonic turbulence and broadband hiss-like VLF emissions related with substorm subauroral ion drifts/polarization streams (SAID/SAPS) in the magnetosphere 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 plasmoid (injection front) over the plasmasphere. As with the well-documented plasmoid-magnetic barrier problem, plasma turbulence ensures the circuit resistivity and magnetic diffusion as well as significant electron heating and acceleration. The SAID/SAPS-related VLF emissions were used to simulate interactions with the outer zone electrons. These emissions appear to constitute a distinctive subset of substorm/storm-related VLF activity in the region co-located with freshly injected energetic ions equatorward of the plasma sheet boundary. 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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