Sequence of Pi2 Pulsations and Poloidal Standing Alfven Waves Observed in the Midnight Sector

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Pi2 pulsations are routinely observed in the midnight sector during substorms. These are considered to be large-scale fast mode waves, which propagate to various latitudes on the ground. We report a sequence of Pi2-band oscillations observed by the Van Allen Probes (RBSP) spacecraft in the midnight sector during a moderately active period on 24 March 2013. In the time series plots of the electric and magnetic field data from each RBSP spacecraft, all events appear similar with a classical Pi2-type wave packet structure. However, cross-phase analysis of the wave fields from the two RBSP spacecraft reveals that some wave packets represent poloidal mode standing Alfven waves with a large (˜50) azimuthal wave number (m). Data from ground magnetometers, the ETS-VIII spacecraft, and the QZS1 spacecraft indicate radial localization of the high-m waves. Presence of high-m poloidal waves in the midnight sector during substorms means that we need to be careful in interpreting Pi2-band pulsations in the inner magnetosphere.