A generation of Pi2 pulsation: A coupling of Alfven and Slow mode waves in the midnight magnetosphere

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A Pi2 pulsation is globally observed on the ground and in space in conjunction with the substorm expansion onset. In space, the Pi2 accompanies dusk-to-dawn current in the vicinity of the geosynchronous altitudes and diverted field-aligned current of substorm current wedge type. We suggest that the injection of fresh plasmas in the midnight magnetosphere could set up such a current system. The current system responded at Pi2 periods that can be determined by the eigen-frequency of toroidal mode oscillation of the field-aligned current. Such a transient response in the midnight sector can be interpreted by the coupling of the Alfven mode and the slow mode in a global scale. In particular, we suggest that the slow mode wave in the midnight magnetosphere could invoke the field-aligned expansion of the lower energy plasmas (less than few keV) out of the equator. While the higher energy plasmas, the expansion is interrupted.