Decomposition of the wave elements of the global high-correlation Pi 2

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Global high-correlation Pi 2 pulsations are observed in wide latitudinal and longitudinal ranges on the nightside [e.g., *Uozumi et al.* 2009, 2011, 2016; *Keiling et al.*, 2014]. In those Pi 2 events, the waveforms observed at different stations were highly correlated. It is noted that localized and low-correlation Pi 2 oscillations, such as those observed near the auroral electrojet currents [e.g., *Pashin et al.*, 1982; *Samson and Rostoker*, 1983], should be treated separately from high-correlation Pi 2 events. In high-correlation Pi 2 events, systematic group delays ($|dT| <\sim 100$ s) were typically observed in the *H* components of middle- to high-latitude Pi 2 pulsations, which typically have high correlations with low-latitude *H* component oscillations. While the time lags of the *D* component oscillations relative to the low-latitude *H* component oscillations were not significant ($|dT| <\sim 10$ s) in the low- to high-latitude nighttime sector, high correlations with the low-latitude *H* component oscillations were observed.
The generation mechanisms of global high-correlation Pi 2 events were investigated by *Uozumi et al.* [2009, 2011]. They proposed that three possible wave elements exist in these events: (1) fast-mode waves (dB_{FW}) propagating from the Pi 2 source region in the nightside magnetosphere and observed in the low-latitude *H* components of Pi 2 pulsations, (2) SCW oscillations (dB_{SCW}) observed mainly in the low- to high-latitude *D* components of Pi 2 pulsations, and (3) directly driven Alfvénic waves (dB_{DA}) [*Kepko et al.*, 2001; *Uozumi et al.*, 2000, 2007, 2009] generated by dB_{FW} through the mode conversion process and observed as the main oscillations of the middle- and high-latitude *H* components of Pi2 pulsations with some group delay.
The middle- and high-latitude Pi 2 pulsations in the *H* component consist dB_{DA} and dB_{SCW} (dB_{DA} is dominant element in the *H* component Pi 2 pulsations). According to the report by *Uozumi et al.* [2016], it can be assumed that the ionospheric footprint of the upward FAC of the SCW was approximately located at the auroral onset position in each event. Thus, if we can specify the location of the auroral breakup position by using global auroral image, we can estimate dB_{SCW} in the H component from dB_{SCW} in the *D* component. Then one of the wave elements of dB_{DA} must be decomposed from total Pi 2 oscillations in the *H* component. In this study, we examined the possibility of decomposition of the wave elements of the global high-correlation Pi 2 with some typical Pi 2 events. We will present some typical cases of the decomposition. Those cases evidently demonstrate that the wave elements of the global high-correlation Pi 2 can be decomposed properly.

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