Two-dimensional magnetospheric mass-density estimation from FLR events simultaneously observed by two SuperDARN radars

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The field-line resonance (FLR) is a mechanism which causes geomagnetic field-line eigen-oscillations. The FLR frequency depends on the plasma density along the field line, and thus it is possible to estimate the magnetospheric plasma density from the FLR frequency. Spacecraft observations in the magnetosphere have shown that the FLR frequency changes sharply across the plasmapause, because the density changes sharply there. Since the FLR also oscillates the ionospheric plasma, there can be cases in which SuperDARN radars monitor the two-dimensional (2D) distribution of the FLR frequency, from which we can estimate 2D plasma-density distribution on the magnetospheric equatorial plane, including the 2D location of the plasmapause. We have been looking for such cases near the occurrence times of Sudden Commencements (SCs), which are known to frequently cause pulsations at wide ranges of latitudes and longitudes. In this paper we analyze cases simultaneously observed by two SuperDARN radars, which could provide wider 2D density distribution than by one radar; the area where the fields-of-view (FOVs) of the two radars overlap is of particular interest. In an event, the FOVs of two radars, parts of which are overlapped, include areas where oscillations caused by the FLR are dominant and areas where different kind(s) of oscillations are dominant. More details will be presented at the meeting.

