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Tailward retreat of oscillatory flows

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On 23 March 2009 between 6:00 and 6:40 UT three THEMIS probes (P3-P5) were located at X=-11 Earth radii (Re), while P1, and P2 were at X=-14 Re downtail. Inner probes P3-P5 started to observe oscillatory flow braking with plasma sheet dipolarization at about 6:04 UT. About five minutes later the dipolarization expanded tailward and reached the outer probes P1, and P2. At this time P1, and P2 started to observe oscillatory braking, whereas at P3-P5 the oscillatory flows substantially decreased or almost ceased. The flow oscillation period was about 3.5 minutes at P3-P5, and about 5 minutes at P1, and P2. A similar period difference was detected in the Pi2 pulsations by the ground-based THEMIS magnetometer array. During the time when the dipolarization expanded tailward, the auroral activity gradually moved northward, as was observed by the all-sky camera at Rankin Inlet. We interpret these observations as tailward retreat of the oscillating flux tube during oscillatory flow braking due to tailward expansion of plasma sheet dipolarization.