Coupling of the meso-scale aurora into the magnetotail processes

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We present ground-based optical, riometer and magnetometer data together with Polar UVI and GOES magnetic field observations of a substorm that occurred over Canada on 24 November, 1997. This event involved a clear optical onset (brightening of the aurora) followed by poleward motion of the aurora as a signature of an expanding auroral bulge. During the expansion phase, equatorward moving auroral arcs were observed inside the bulge. Polar UVI observations of the polar cap location indicate that these southward drifting arcs were associated with magnetospheric activity within closed field lines. The major dipolarisation of the magnetic field at the geosynchronous orbit occurred about 7 minutes after the brightening of the aurora in the middle of the auroral expansion. At the same time the displays of drifting arcs were observed to turn into tilted, faster propagating structures. About 12 minutes after the substorm onset, the expanding bulge reached the open-closed field line boundary suggesting the mid-tail reconnection of the open field lines to begin. At that time, a north-south aligned auroral streamer was launched ostensibly indicating bursty bulk flow type transient flows taking place in the central plasma sheet. Throughout this substorm activity the riometer data imply the highest precipitation energies in the vicinity of the the poleward moving edge of the auroral bulge. We examine this sequence of auroral structures and the corresponding magnetospheric processes to understand their meaning in the substorm dynamics.