

MULTI-POINT STUDY OF SUBSTORM ONSETS IN A SEQUENCE OF SMALL SUBSTORMS (PSEUDO-BREAKUPS)

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We present a case study of a sequence of three substorms on April 15, 1979 (05-09 UT) which were weak (amplitudes about 50-150 nT in the auroral zone and several nT at midlatitudes) and localized (about 2-3 hours MLT). Although two of them have been missed in AE index, all three had quite distinct classical signatures in all regions of interest (including magnetic bays in the auroral zone and at midlatitudes, Pi2 pulsations, sudden dipolarizations and particle injections at the geostationary orbit, strong Earthward plasma flows and other signatures in the midtail plasma sheet). All these signatures have been observed (in favourable observing conditions) within a minute from each other. The ISEE-1 and -2 spacecraft probed the plasma sheet near its center plane at midnight at 15-17 Re close to the central meridian of substorm activations.

A substantial new direct observation is that the reconnection signatures (thin current sheet formation, Bz-variation and plasma streaming) developed suddenly in the central part of the midtail plasma sheet several minutes prior to any other signature of substorm onset. Also, prior to all three substorm onsets, the weak positive Sudden Impulses (a few nT in amplitude) were identified which might be the triggers of these substorms.