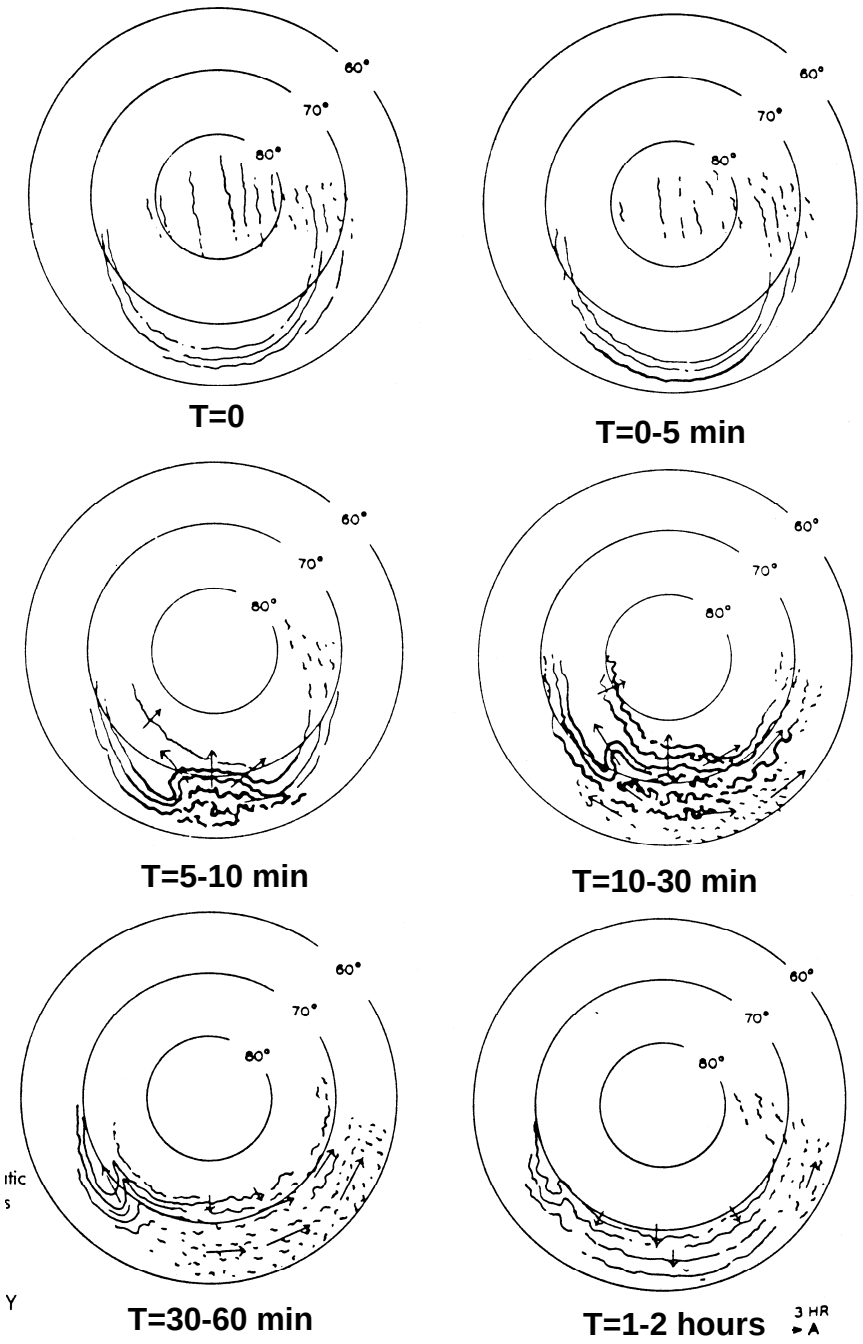
Substorm phases



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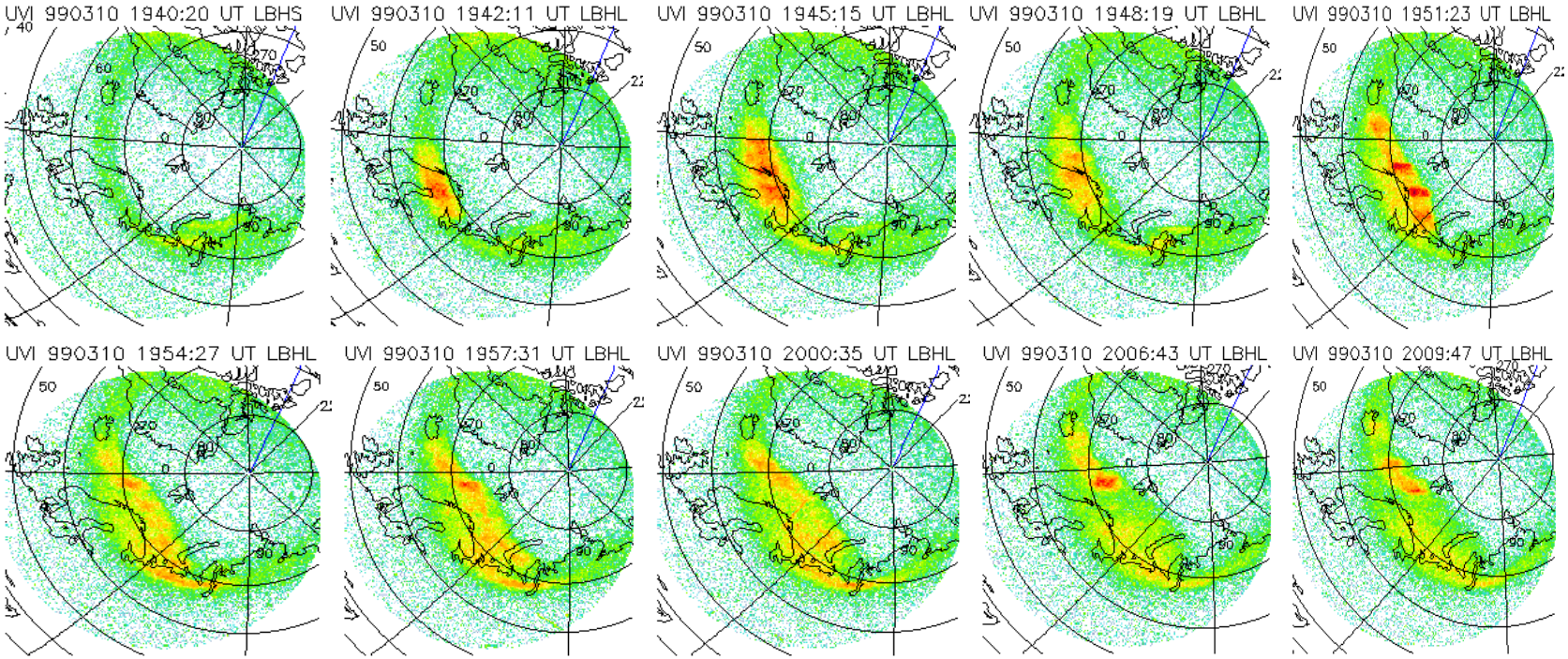
Dynamics of the substorm expansion phase



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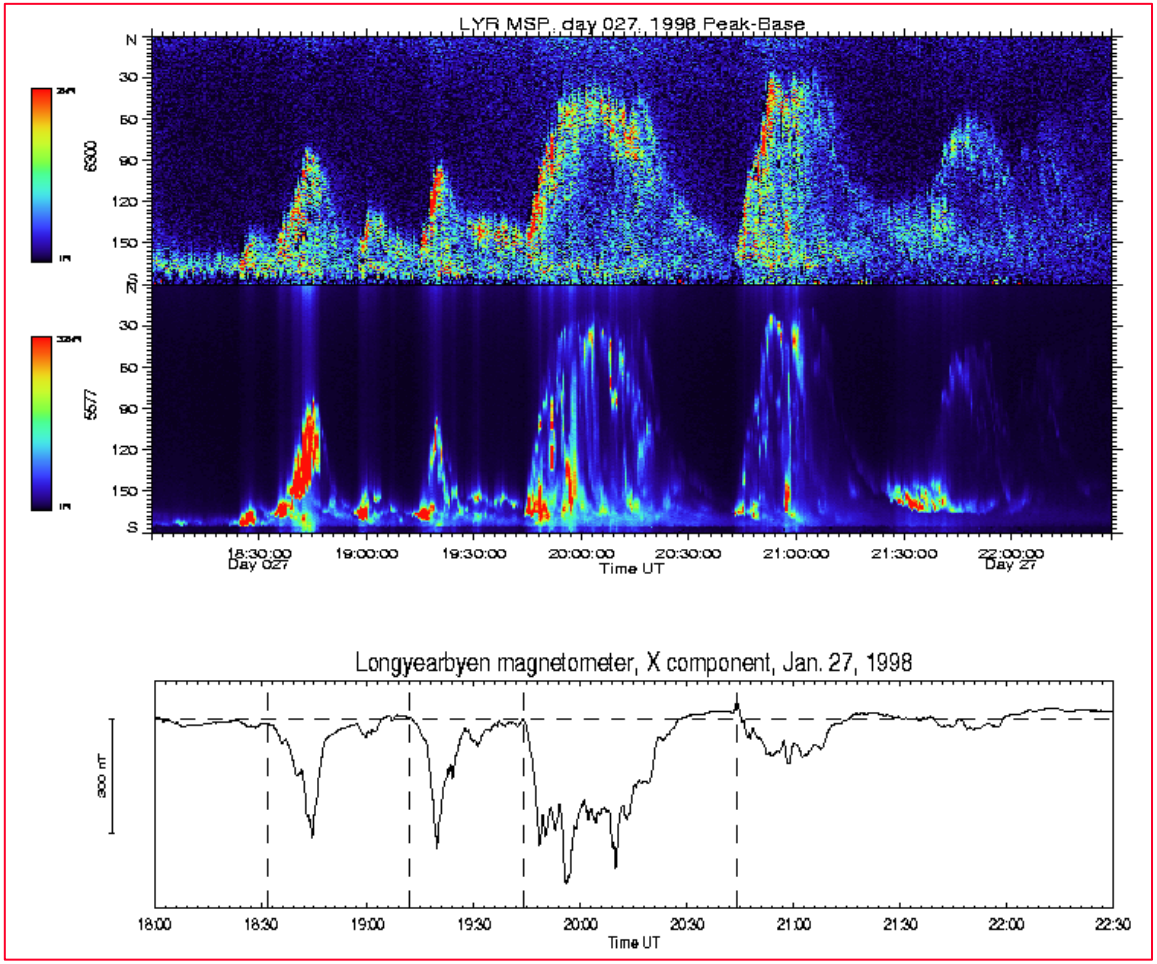
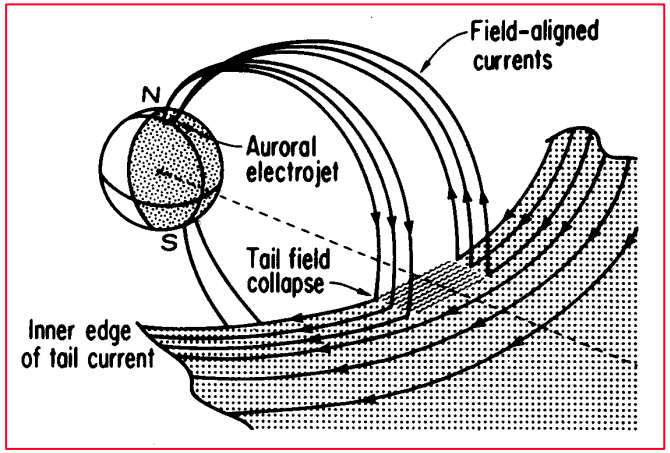
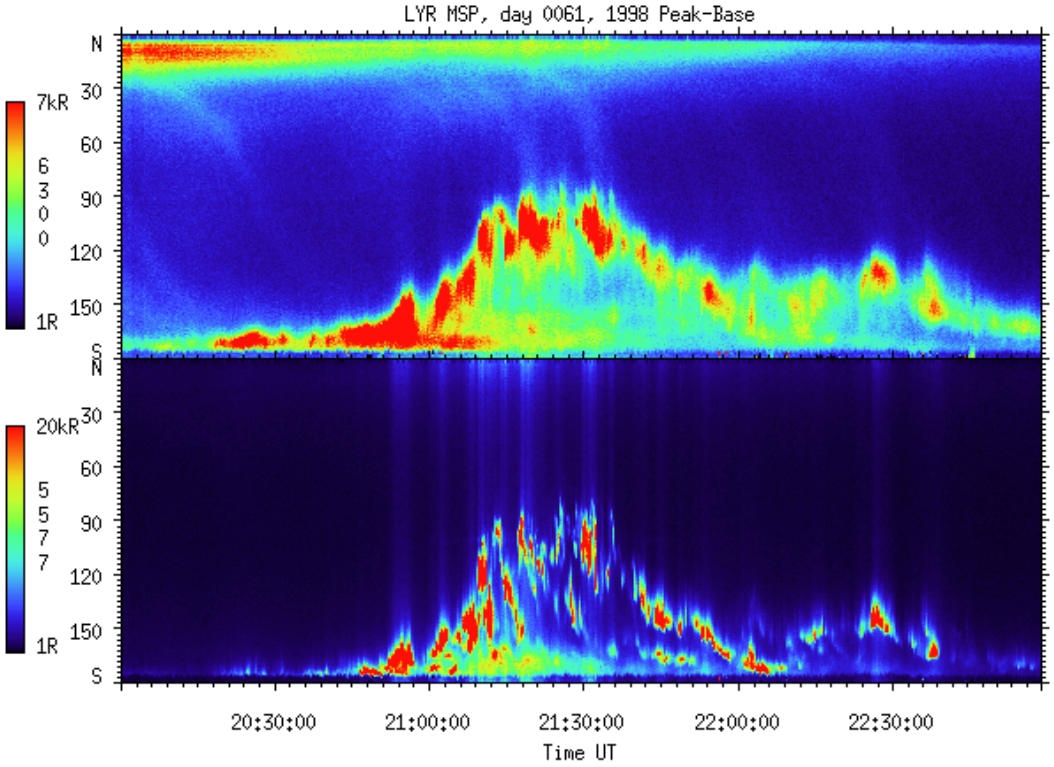
Auroral and Magnetic Signatures associated with substorm onset







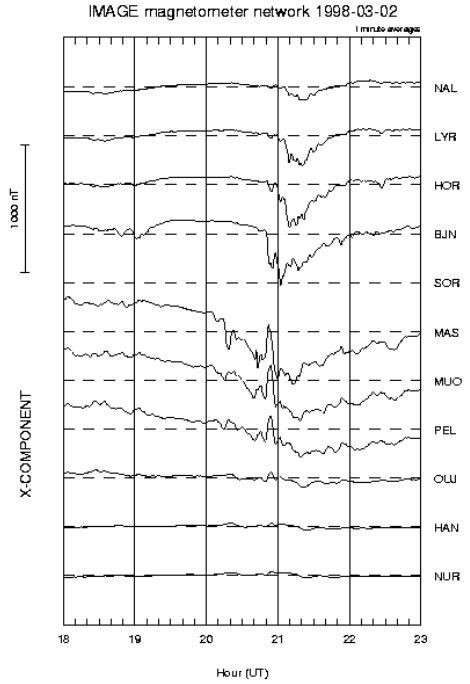
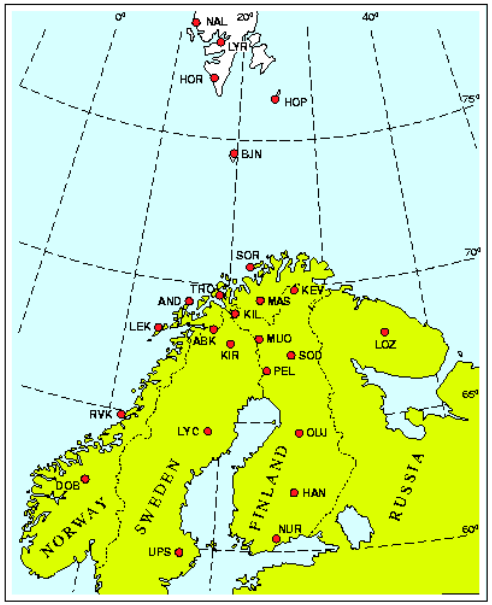
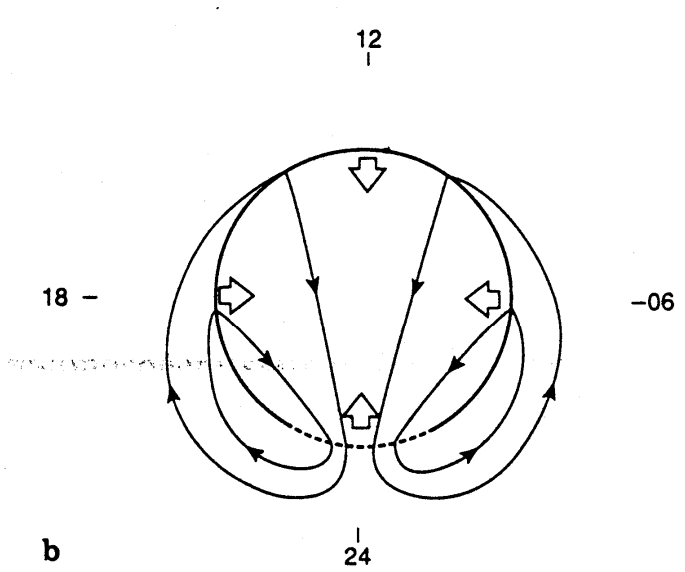


IMAGE Magnetometer Network



Tail reconnection



Polar Cap Boundary or (PCB)

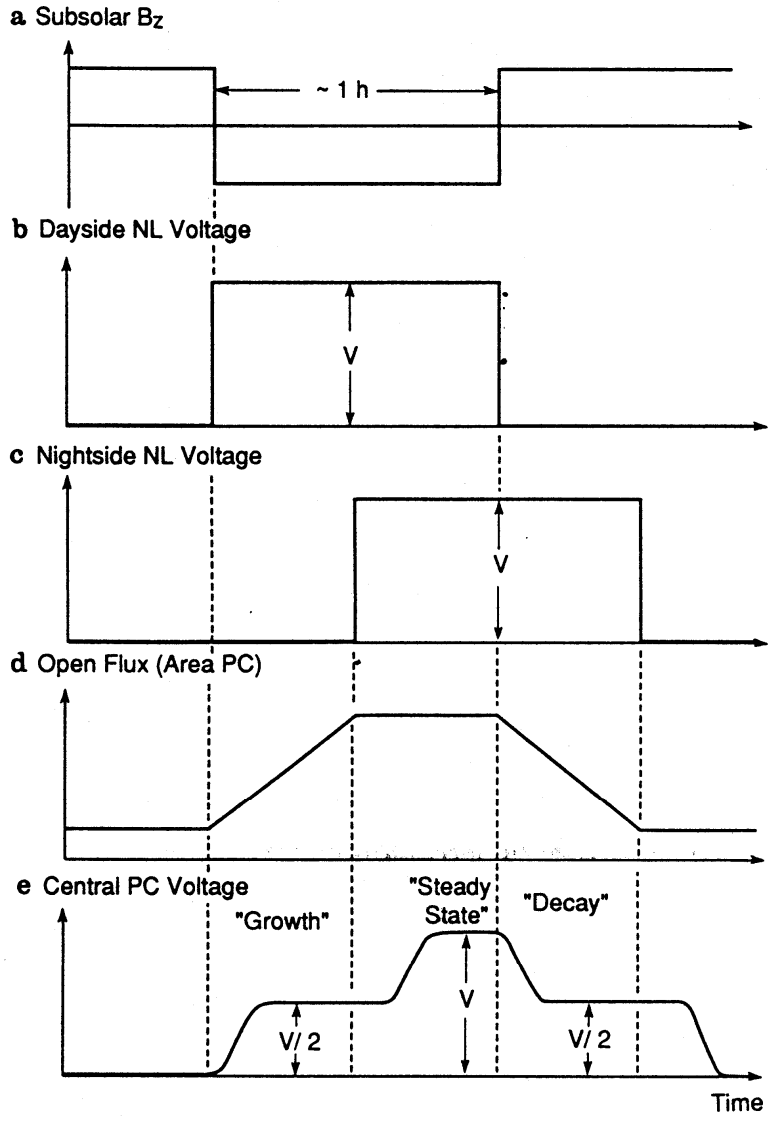
Open-Closed-Boundary (OCB):

Dashed line = reconnection boundary – plasma flow across this boundary during episodes of reconnection

Full line = adiaroic boundary – this boundary is frozen into the plasma movement

From Cowley and Lockwood, 1992

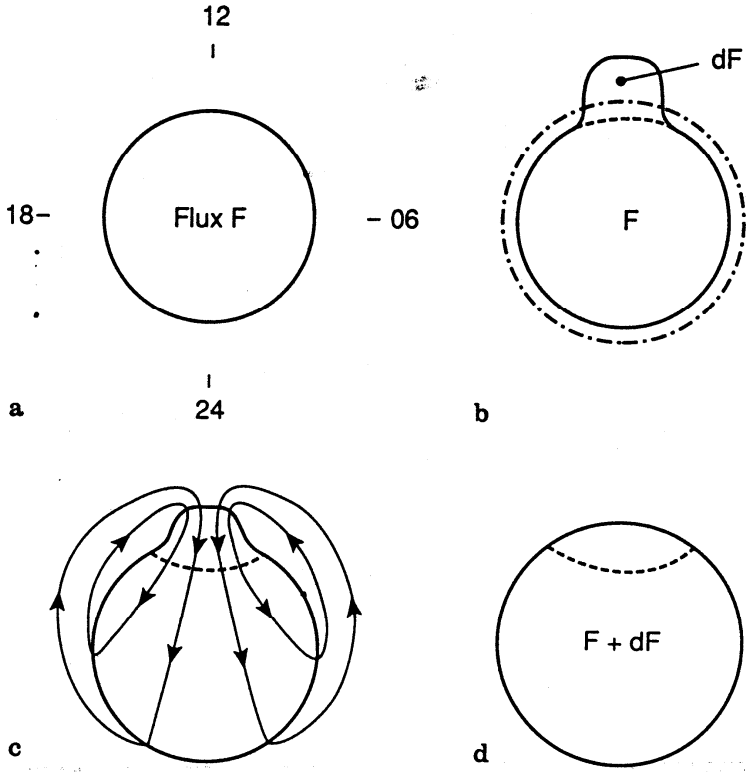
Magnetosphere response to a 1 hour interval of southward IMF



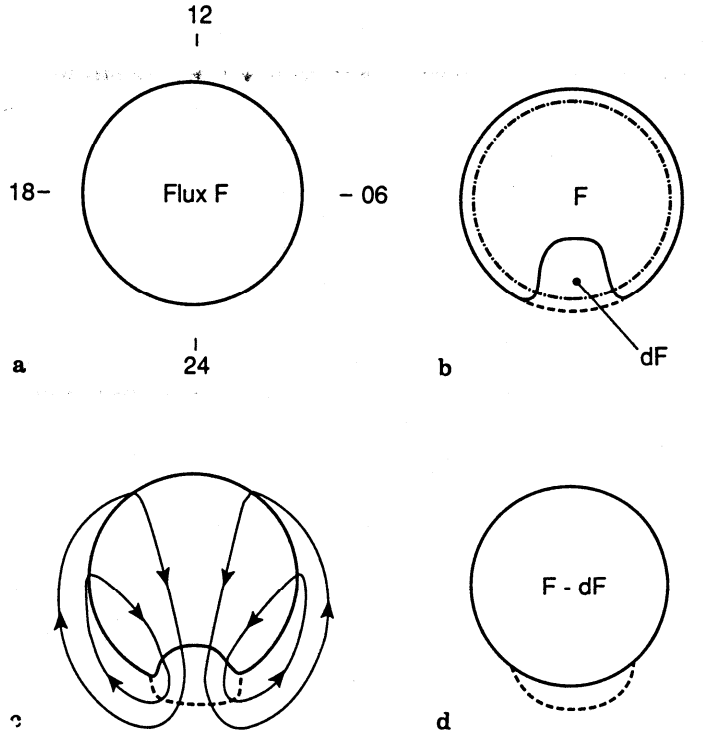
- A simple case when the nightside reconnection voltage follows the dayside reconnection voltage but with a 30-min time delay.
- Note that the open flux area is constant during balanced magnetopause and tail reconnection.
- e) shows the central polar cap voltage assuming a circular expanding or contracting polar cap.

From Cowley and Lockwood, 1992

The principle of flow-free equilibrium



The ionospheric response to an impulse of magnetopause reconnection



The ionospheric response to an impulse of tail reconnection

From Cowley and Lockwood, 1992