

An active ionosphere: a new perspective of field line dipolarization

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Transient westward electric fields from the magnetosphere generate equatorward plasma drifts of the order of kilometers per second in the auroral ionosphere. This flow channel extends in north-south directions and is produced in the initial pulse of Pi2 pulsations associated with the field line dipolarization. Drifts in the ionosphere of the order of kilometers per second that accumulated plasmas at the low latitude end of the flow channel are of such large degree that possible vertical transport effects (including precipitation) along the field lines may be ignored. We suggest that plasma compression in the ionosphere implemented the ionosphere to be active. Active ionosphere generates field-aligned currents to satisfy the quasi-neutrality of the ionosphere, ion acoustic wave for ion outflows and the inverted-V type electron precipitations in the topside ionosphere, and poleward expansion of auroras due to a nonlinear evolution of the ionosphere. We will study auroral expansion in this acoustic regime.

Keywords: Substorm, Auroral substorm, Ionosphere