

Cooperative roles of dynamics and topology in generating the magnetosphere-ionosphere disturbances: case of the theta aurora

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Interaction between the solar wind and the magnetosphere occurs on the boundary surface separating them. This surface is called the separatrix. On the separatrix, there are multiple nulls and the separators connect nulls. Energy inflow occurs from the solar wind to the magnetosphere due to the separator reconnection. The inflowing energy excites dynamo to drive convection. The fluctuation of the solar wind magnetic field causes a change in the separator reconnection to result in the development of convection and resulting changes in null configuration. To understand the magnetosphere-ionospheric disturbance, it is necessary to know the change in the null structure along with the development of convection. The case of the theta aurora is shown for example. In this case, two new nulls on the day side coexist with old two nulls moving toward the night. Two sets of open-closed boundaries are generated from both sets of nulls. Boundaries generated by different sets partially become side by side. The theta aurora is generated at the position corresponding to the low-latitude side with respect to both of two boundaries.

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