

Sq-Current Simulation Including the Effect of Vertical Electric Current in the Equatorial Region

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http://denji102.geo.kyushu-u.ac.jp/home_e.html

In the ionosphere E region at altitude from 90 to 160km, there are electrogenic action of the tide wind and generation of large-scale current system with it as a peculiar electromagnetic phenomenon. The change of this current system causes the minute fluctuation of the geomagnetic field, which is called Sq.

It is usual to use the two-dimensional model called 'thin shell model' in order to simulate Sq current-system. This model reproduces well the ionospheric current, if the equator vicinity is excluded. However, large problem of showing the result which it does not agree with actual situation is held in the equator vicinity, since the vertical electric current which can not be expressed in 'thin shell model' exists.

Then, in this study, in order to solve this problem, numerical calculation program of the new conductivity model in which the conductivity distribution was made to add the effect of vertical electric current in the equatorial referring to Tsunomura[1999] was developed, and global ionospheric current was simulated. Then, the equatorial electrojet in which the reliance was deserved even in thin shell model was able to be reproduced by using the conductivity considering such three-dimensional structure.

However, many improved points of consideration of the existence of field aligned current and use of the more realistic wind model are desired the existing observation result as future problem in order to reappear at the higher accuracy.