# Elucidation of seasonal dependence of the response of the low-latitude ionosphere to geomagnetic disturbances

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It has been known that the response of the low-latitude ionosphere to geomagnetic disturbances can appear in a great variety of ways, depending on geomagnetic activity, local-time, latitude, longitude and season since it has been ascribed to the global changes in electric fields, neutral winds, compositions and temperature. A numerical model of the low-latitude ionosphere including the effect of longitudinal differences of the geomagnetic fields and disturbance electric fields was used to address the seasonal dependence of the response of the low-latitude ionosphere to geomagnetic disturbances. It is implied that both the electric field disturbances and longitudinal-dependent neutral winds are important in determining the seasonal dependence of the ionospheric response.

It has been known that the response of the low-latitude ionosphere to geomagnetic disturbances can appear in a great variety of ways, depending on geomagnetic activity, local-time, latitude, longitude and season since it has been ascribed to the global changes in electric fields, neutral winds, compositions and temperature. At low latitudes, the zonal electric field has a significant effect on the ionospheric plasma distributions, leading to modification of plasma densities and temperatures. On the other hand, plasmas are transported by the neutral winds, along the geomagnetic field lines with the longitudinal variations, resulting in the asymmetric structures in the plasma distribution between summer and winter hemispheres.

A numerical model of the middle-/low-latitude ionosphere including the effect of longitudinal differences of the geomagnetic fields as well as the disturbance electric fields was used to address the seasonal dependence of the response of the low-latitude ionosphere to geomagnetic disturbances. In addition, comparison of the simulations with observations were carried out, using the observations from the Hinotori satellite, DE-2 satellite and ionosondes.

It is implied that both the electric field disturbances and longitudinal-dependent neutral winds are important in determining the seasonal dependence of the changes in the plasma densities and temperatures in the low-latitude ionosphere, associated with geomagnetic activities.