Japan Geoscience Union Meeting 2010
(May 23-28 2010 at Makuhari, Chiba, Japan)

PEM025-P03 Room: Convention Hall Time: May 26 17:15-18:45

Ionospheric long-term variation analysis applying neural network to Japanese observation

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Ionospheric variation is governed by the solar EUV (extreme ultraviolet) flux and energetic events on the solar surface. Neural networks with solar activity and geomagnetic activity inputs are known as a successful case for modeling the ionosphere expect some special ionospheric disturbances. By analyzing the difference between the reproduced ionospheric variations and the observations, we are able to find other factors having no relation to the solar activity but being responsible for the ionospheric variations.
We compare the differences between the neural network outputs and observations for high latitude (Syowa station), mid-latitude (Tokyo) and low-latitude (Okinawa) ionosphere. These data were obtained for several decades, and allow not only studies of day-to-day variability but also long-term changes of the ionosphere.

Keywords: Ionosphere, Neural network, long-term variation, solar activity, geomagnetic activity, day-to-day variability