Reduction of Electron Temperature in the Afternoon Overshoot at 600km –Possible earthquake effect -

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Abstract

Ionospheric electron temperature (Te) observed with HINOTORI satellite orbits are compared with Te model constructed by using the whole HINOTORI Te data.

It was found that Te observed in each satellite pass deviates from the model values especially in the afternoon overshoot in some occasions. One of the causes of the deviation might be ionospheric storm. Another possible factor for the deviation might be the influence of earthquake.

Introduction

To study the effect of the earthquake on the ionosphere, we need to take 3 stages. We first need to grab general features of Te/Ne, such as on local time, season, solar flux, latitude and longitude（Su et al.,1997,1997,1998）. We then tried to understand the various features in more detail, such as Te in the plasma bubble (Oyama et al.,1988), effect of the electric field on the morning overshoot (Oyama et al.,1999), Te behavior of equatorial ionization anomaly (Oyama et al,1999), annual behavior of Ne/Te(Su et al.,1999), and effect of neutral wind upon Te/Ne(Watanabe and Oyama ,1996). After we understood features above, we have constructed Te/Ne model. Te behavior during geomagnetic disturbance has been studied by applying the models.. We found that both Te/Ne models are quite reasonable. Especially Te model shows that deviation of 50 degrees K at night has geophysical meaning (Oyama et al.,2005). Finally the third step is to try to find deviation of Te from the model value associated with earthquake. So far we have studied three earthquakes; Those are: EQ1. which occurred on 22 November 1981 with magnitude of 6.6, depth of 37 km, and epicenter of 14.09E and 124.35 N , EQ2. which occurred on 11January,1982 with magnitude of 7.4, depth of 45 km ,and epicenter of 13.75E and 124.36N,and EQ3 which occurred on 24 January ,1982 with magnitude of 6.6, depth of 37 km, and epicenter of 14.09 E,124.35 N . We found that Te in the afternoon overshoot reduces prior to and after earthquake. To reach this present conclusion, we have checked magnetic disturbance and solar radio flux,F10.7. We cannot find any reason to cause the reduction of Te except earthquake. Ne observed is very close to the model value or takes slightly higher values than the model. The paper reports the results which have been observed so far.