Numerical modeling of the lower thermosphere and ionosphere behavior observed over Millstone Hill during the March 31, 2001 magnetic storm

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The features of the lower ionosphere and thermosphere observed by the Millstone Hill IS radar during the major magnetic storm of March 31, 2001 were presented by *Goncharenko et al.* (2001). The measurements showed that during the most disturbed time the radar was located within the auroral oval and observed an increase in the E-region electron and ion temperature and electron density. The electric field was of the order of 50 mV/m producing horizontal ion drifts of the order of 300-800 m/s. A comparison of these data have been made with simulations from the global upper atmosphere model (UAM) which calculates electric fields, Tn,i,e, Nn,i,e, ion drift and neutral wind velocity vectors. We have obtained a good agreement between observed and calculated electric fields and ion drifts, as well as for Ti,e and Ne. The differences between observed and modeled data have been found in horizontal neutral winds results. To find the sources of such differences we performed additional calculations using two last empirical atmospheric models to obtain the neutral densities and pressure gradients. The results were compared with the fully theoretically calculated data. No large differences between these three sets of model data were found. At the same time the global disturbed E-region wind pattern obtained from UAM is very similar to that observed by the WINDII aboard the UARS during the April 4-5th, 1993 storm (*Zhang and Shepherd*, 2000).

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References

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