Modeling of thermospheric variations caused by EUV spectral changes depending on solar activity

Miyo Suzuki[1], Hitoshi Fujiwara[2], Hiroshi Fukunishi[3]

[1] Geophys,Sci,Tohoku Univ, [2] Graduate School of Science, Tohoku University, [3] Department of Geophysics, Tohoku Univ.

http://pat.geophys.tohoku.ac.jp

Energy budget in the thermosphere is constructed by various processes of heating, cooling and heat transport. Because the energy of the EUV radiation is the largest in the thermosphere and the EUV spectrum changes remarkably with various time scales, it is important to consider the changes of EUV spectrum in various cases exactly. In this study, we investigated the thermospheric response to changes of solar EUV spectrum by using a 1D thermosphere model. In our calculation, the exospheric temperature is estimated to be 730K for solar minimum, and 1174K for solar maximum. The top side of the thermosphere is estimated to be 410km for solar minimum, and 560km for solar maximum. Hence, this model shows successfully the dynamical response of the thermosphere due to the changes of EUV radiations.

Energy budget in the thermosphere is constructed by various processes of heating, cooling and heat transport. Because the energy of the EUV radiation is the largest in the thermosphere and the EUV spectrum changes remarkably with various time scales, it is important to consider the changes of EUV spectrum in various cases exactly. In this study, we investigated the thermospheric response to changes of solar EUV spectrum by using a 1D thermosphere model. In our calculation, the exospheric temperature is estimated to be 730K for solar minimum, and 1174K for solar maximum. The top side of the thermosphere is estimated to be 410km for solar minimum, and 560km for solar maximum. Hence, this model shows successfully the dynamical response of the thermosphere due to the changes of EUV radiations.