Studies of the thermosphere and ionosphere with the EISCAT radar and whole atmosphere/ionosphere model: GAIA

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The thermosphere/ionosphere is the region that shows both the features of the atmosphere and space. For example, the behaviors of the neutral and ionized gases characterize the region through some collision and radiative processes. In addition, interactions between neutral and ionized gases cause various phenomena in the thermosphere/ionosphere. The thermosphere/ionosphere is also important for radio wave propagation and operation of artificial satellites due to the atmospheric drag force. The accuracy of navigation systems and life time of the satellites depend strongly on the thermospheric/ionospheric conditions. In order to investigate the thermosphere/ionosphere, we have developed a numerical model which includes all the atmospheric regions and ionosphere named GAIA. GAIA has reproduced some thermospheric/ionospheric phenomena and revealed physical mechanisms in association with the phenomena. In this study, we present a brief description of GAIA and show some recent results. The collaboration with radar observations enables the GAIA simulations to be more productive. We will show some European incoherent scatter (EISCAT) radar observations in cooperation with GAIA simulations. The future plans of the EISCAT observations and GAIA simulations will be also shown here.

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