

Polar aeronomy with EISCAT_3D and GCM simulations

Hitoshi Fujiwara^{1*}, Satonori Nozawa², Yasunobu Ogawa³, Yasunobu Miyoshi⁴, Hidekatsu Jin⁵, Hiroyuki Shinagawa⁵

¹Faculty of Science and Technology, Seikei University, ²Solar Terrestrial Environment Laboratory, Nagoya University, ³National Institute of Polar Research, ⁴Department of Earth and Planetary Sciences, Faculty of Sciences, Kyushu University, ⁵National Institute of Information and Communications Technology

The EISCAT radar system has had great contributions to probing the polar upper atmosphere in collaboration with observations from optical and radar instruments, magnetometers, rockets, and satellites more than 30 years. For the next stage, the EISCAT radar system seems to be still expected to undertake a role of the research center for the auroral atmosphere. The global warming and the resultant cooling in the upper atmosphere are one of the most important issues for aeronomy in the 21st century. In order to understand the long-term variations of the upper atmosphere, continuity of observations is necessary and the EISCAT observations will have great contributions to the topics. Challenges to unknown phenomena are also important for the new EISCAT radar system (EISCAT_3D). For example, the EISCAT_3D system and some instruments installed around the site will capture the turbulence which would be generated by breaking of atmospheric waves. This comprehensive monitoring of the atmospheric phenomena and space weather will enable us to predict the weather in the upper atmosphere with GCM simulations. In this presentation, we will show our research activity to date and future research plans with EISCAT_3D and GCM simulations.

Keywords: polar region, upper atmosphere, radar, GCM