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### NEW HORIZON OF ATMOSPHERIC AND GEOSPACE SCIENCES IN THE ARCTIC WITH EISCAT\_3D - JAPAN'S CONTRIBUTIONS -

Hiroshi Miyaoka (*National Institute of Polar Research, Japan*)

Satoru Nozawa (*Solar-Terrestrial Environment Laboratory, Nagoya University, Japan*)

Yasunobu Ogawa (*National Institute of Polar Research, Japan*)

Shin-ichiro Oyama (*Solar-Terrestrial Environment Laboratory, Nagoya University, Japan*)

Takuji Nakamura (*National Institute of Polar Research, Japan*)

Ryoichi Fujii (*Solar-Terrestrial Environment Laboratory, Nagoya University, Japan*)

miyaoka@nipr.ac.jp

The European Incoherent Scatter (EISCAT) radar system in northern Fennoscandia and Svalbard has been playing a pivotal role in advancing cutting edge sciences in various areas including atmospheric, ionospheric and geospace studies, space weather and global change. Affiliated in the EISCAT scientific association in 1996, the Japanese science community has jointly contributed to achieve further understanding of the magnetosphere-ionosphere-thermosphere coupling processes using the integrated ground-based instruments and rocket/satellite simultaneous observations with EISCAT radars.

EISCAT\_3D is the major upgrade of the existing EISCAT mainland radars, with a multi-static phased array system composed of one central active (transmit-receive) site and 4 receive sites to provide us 50-100 times higher temporal resolution than the present system. The core site will transmit signals at 233MHz with about 10MW power, and all five sites will have sensitive receivers to detect the returned signal using phased-array antenna with on the order of 10,000 elements.

The EISCAT\_3D program in Japan was applied to the call for Master Plan 2014 as a sub-program of 'Study of Coupling Processes in the Solar-Terrestrial System' (PI: Prof. Tsuda, Director of RISH, Kyoto Univ.). Granted as one of 27 high-priority programs of Master Plan 2014 and 10 new Roadmap 2014 programs, National Institute of Polar Research made a funding proposal to MEXT for EISCAT\_3D, collaborating with Solar-Terrestrial Environment Laboratory, Nagoya University.

In this paper, we will present the overview on the current status of Japan's contribution to EISCAT\_3D and the science cases expected to be challenged by the Japanese community with EISCAT\_3D.