

## Expectation of EISCAT\_3D observation for the sounding rocket campaign

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The Institute of Space and Astronautical Science (ISAS) of Japan Aerospace Exploration Agency (JAXA) has continued to launch the sounding rockets for a study of the upper atmospheric physics not only inside Japan but in Scandinavian country. The purpose of Japanese sounding rocket experiments in the high latitude region is mainly to investigate various polar upper atmospheric phenomena related to the auroral activity. In such experiments, simultaneous observations by the ground-based instruments are indispensable to make a comprehensive measurement of the science target, and have been conducted so far as the international collaboration. Among them, EISCAT radar plays a primary role and has provided essential support for the sounding rocket campaign. We strongly expect that further powerful support will be provided by EISCAT\_3D. In this presentation, our expectation for significant contribution of EISCAT\_3D to the sounding rocket campaign in Scandinavian countries will be given.

One of the noticeable performances of EISCAT\_3D is three-dimensional measurement capability of the upper atmosphere, by which essential information on the upper atmosphere near the rocket trajectory can be provided with a sufficiently small spatial resolution. In particular, two-dimensional information on the observation is expected to be available in the vicinity of the rocket position, while it was basically one-dimensional information until now. It will be possible to make a direct and essential comparison between the sounding rocket and radar observations.

We also expect the high spatial resolution data provided by EISCAT\_3D, which is essential for the detailed comparison between the sounding rocket observation and the ground-based measurement. In addition, it is very important to know the latest condition of the upper atmosphere for the rocket trajectory in advance, when we determine whether the launch condition is satisfied. This capability is particularly important when the science target is small scale phenomena. Furthermore, if space-time ambiguity is resolved due to simultaneous multiple beam capability of EISCAT\_3D, major obstacle for upper atmospheric research by the sounding rocket can be overcome.

Thus, when observations of the polar upper atmosphere by EISCAT\_3D are available, significance of the ground-based support for the sounding rocket experiment will be much increased.

Keywords: Sounding rocket, coordinated observation, ground-based support, ionosphere, lower thermosphere