

Development of unmanned auroral observation system: Operation at Amundsen Bay

*Akira Kadokura^{1,2,3,4}, Hisao Yamagishi¹, Masaki Okada^{1,4}, Yasunobu Ogawa^{1,4}, Yoshimasa Tanaka^{1,2,3,4}, Yuichi Otsuka⁵

1. National Institute of Polar Research, 2. Research Organization of Information and Systems, 3. Joint Support-Center for Data Science Research, 4. SOKENDAI, 5. Nagoya University

Space and upper atmospheric sciences group in the National Institute of Polar Research (NIPR) is now developing a new Unmanned Auroral Observation system (UAO), which is equipped with a 3-axis fluxgate magnetometer, all-sky auroral imager, and GNSS/TEC receiver, in the current 9th term Japanese Antarctic Research Expedition (JARE) programme. Electric power of the system is supplied by a hybrid natural energy electric generation system which consists of three sets of 192W wind generators and 8 sets of 62W solar panels. Observation data are stored in a memory card in the system box and also are transmitted via the Inmarsat satellite data communication system to a server in Japan by FTP.

One system of the UAO (UAO-1) was installed at Syowa Station by the 57th JARE in January, 2016, and had been operated until November in 2016 to do a system check before deployment. All the instruments had been normally functioned all through the period without any interruption even during the polar night period. The UAO-1 had been deployed at Amundsen Bay area, which is located about 500 km eastward from Syowa Station, in February, 2017 in the summer operation of the 58th JARE (attached Figure), and started its continuous operation. Due to an insufficient wind speed at the Amundsen Bay site, the system stopped its normal operation and moved into a standby mode from 17 May until 22 August including the polar night period. The UAO-1 re-started its normal operation after that period after the electric power supply by the solar generator increased enough. In our presentation, we will talk about a brief summary of the UAO and the operation results at Amundsen Bay.

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