一般化オーロラトモグラフィの適用実験

田中 良昌 [1]; 門倉 昭 [1]; 小川 泰信 [1]; 山岸 久雄 [2]; 宮岡 宏 [1]; 麻生 武彦 [3]; 上野 玄太 [4]; 才田 聡子 [5]
[1] 極地研; [2] 極地研; [3] 総研大; [4] 統数研; [5] ROIS

Application experiments of Generalized Auroral Computed Tomography

Yoshimasa Tanaka[1]; Akira Kadokura[1]; Yasunobu Ogawa[1]; Hisao Yamagishi[2]; Hiroshi Miyaoka[1]; Takehiko Aso[3]; Genta Ueno[4]; Satoko Saita[5]
[1] NIPR; [2] National Inst. Polar Res.; [3] Sokendai; [4] ISM; [5] ROIS

Generalized - Aurora Computed Tomography (G-ACT) is a method to reconstruct energy and spatial distributions of auroral precipitating electrons from multi-instrument data, such as ionospheric electron density from the EISCAT radar, cosmic noise absorption (CNA) from imaging riometer, as well as the auroral images. In order to show how powerful the G-ACT method is, we conducted (1) numerical simulation of the application of the G-ACT to the EISCAT_3D project, (2) simultaneous observation of aurora by multi-point monochromatic imagers and the EISCAT radar.

Regarding (1), it was assumed that two discrete auroral arcs were observed by multiple stations of ALIS (Aurora Large Imaging System) and the EISCAT_3D radar installed at Skibotn, Norway. It was demonstrated that the G-ACT method is capable of interpolating the electron density distribution observed with the EISCAT_3D radar at a higher spatial resolution. On the other hand, the 3-D aurora distribution reconstructed from only optical images was significantly improved by a use of the EISCAT 3-D data.

As for (2), we conducted the aurora tomography observations using the ALIS imagers, FMI (Finnish Meteorological Institute) all-sky imagers, some NIPR optical instruments, and the EISCAT UHF radar in March, 2013. Three similar auroral surge events were simultaneously observed by three all-sky EMCCD imagers with a monochromatic filter of 427.8nm at Tromso, Abisko, and Kilpisjarvi at 10 sec resolution during 00:00-00:40 UT on March 9. We will present the preliminary results of the G-ACT analysis of these surge events.