Preliminary Results of Tomography Analysis of Westward Traveling Surge

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We present the preliminary results of tomography analysis of a westward traveling surge observed on February 16, 2018. The campaign of ground-based network observation using multiple monochromatic imagers and the EISCAT-UHF radar was carried out in the northern Europe during February 14-17, 2018, in order to derive three dimensional (3D) current system of various mesoscale auroral vortex structures (e.g., spirals, westward traveling surges, eastward expanding auroral vortices, and omega bands) and quantitatively estimate the ionospheric effect on the formation of them. The auroral activity was high during this period, so we could observe various types of auroras, such as auroral breakups, poleward expansions, westward traveling surges, and omega bands, simultaneously at many stations. In particular, we focus on the westward traveling surge observed around 22:45 UT on February 16. The flow of this research is summarized as follows. (1) We reconstruct 3D structure of the auroral emission by using the auroral computed tomography (ACT) method and derive the height-integrated ionospheric conductivity from the 3D aurora. (2) We derive the ionospheric equivalent current from the ground-based magnetometer network data. (3) We combine the conductivity with the ionospheric equivalent current to estimate the 3D current system (i.e., horizontal ionospheric current and field-aligned current) and horizontal distribution of the electric field. (4) We estimate the Cowling effect on the WTS.