R006-03
Zoom meeting B ：11/1 AM1 (9:00-10:30)
09:30-09:45

## 3D-current structure associated with auroral electrojet

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We developed a simplified Hall-MHD simulation to understand the magnetosphere-ionosphere coupling in the polar region during the auroral substorm. The governing equations were derived from the law of conservation of momentum of ions and electrons, the equation of continuity of plasma, the law of Ohm, the law of Ampere, and the law of Faraday. The Hall effect is included because it retains the Hall term in the governing equations. The advection in the governing equations were solved by using the implicit scheme and the Lax-Wendroff scheme and the Superbee limiter function. We imposed a flow shear on the topside boundary to excite Alfven wave. First, we ran the simulation under the condition that the ionospheric plasma density is uniform in the horizontal space. It was confirmed that the Alfven wave propagated downward and the FACs were closed by the Pedersen current in the lower ionosphere. Secondly, we introduced a high-density channel. The secondary electric field is confirmed to appear due to the blockage of the Hall current (polarization), which intensifies the ionospheric current. This is similar to the auroral electrojet. In addition, we found the additional FAC confined at limited altitude and this current may connect the Pedersen current and the Hall current.