Electromagnetic ion cyclotron (EMIC) waves excited at equatorial region in the magnetosphere by the ion cyclotron instability propagate along the magnetic field lines to the ionosphere and are observed as Pc1 geomagnetic pulsations with frequencies at 0.2-5Hz on the ground. These Pc1 waves propagate horizontally through the ionospheric duct. Magnetospheric ions are scattered by the resonance with EMIC waves and precipitate to the ionosphere to cause isolated proton aurora at subauroral latitudes.

We investigated Pc1 waves observed by induction magnetometers at four ground-based stations (Athabasca, Paratunka, Moshiri, and Sata, L=1.2–4.2). A detailed polarization analysis showed that Pc1 polarization parameters depend on frequency at all four stations, suggesting spatial distribution of Pc1 ionospheric source at high latitudes. Then we investigated the relation of these Pc1 polarization characteristics with the position and size of isolated proton aurora observed by all-sky camera at Athabasca as a proxy of high-latitude Pc1 source distribution. We show the change of polarization characteristics associated with the relative distance from the isolated aurora. We compare these results with the model calculation by Fujita and Tamao [1988]. We also investigate characteristics of isolated auroras associated with the intervals of pulsations of diminishing periods (IPDP) observed at ATH.