

Pi 1 and Pi 2 oscillations in auroral luminosity and magnetic field observed at Syowa in Antarctica and Tjornes in Iceland

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Simultaneous Pi 1 and Pi 2 period oscillations in auroral luminosity and magnetic field are clearly identified at a conjugate-pair station, Syowa in Antarctica and Tjornes in Iceland. Pi 2 period oscillations were first observed, following with Pi 1 period oscillations. These showed quite similar at both conjugate stations. The auroral luminosity data used in this study are averaged at every 1 sec at Syowa and Tjornes over the field of view (FOV) of all sky images for the elevation above 20 deg using a high time resolution TV camera. The examination has been done for one hour interval from 23:00 UT to 24:00UT on September 30, 2011, when excellent similar auroras were observed in both hemispheres, with successive enhancements of three auroral activities associated with a pseudo-substorm, full expansion substorm and PBI N-S aurora. The results, 1) Pi 1 and Pi 2 period range oscillations are clearly identified in every auroral activity similarly in both the auroral luminosity and the magnetic field variations, and 2) these Pi oscillations occur coherently in both hemispheres. These results suggest an important implication for substorm generation processes in the magnetosphere, i.e., Pi 1 and Pi 2 period range oscillations may play an important role for auroral particle acceleration during a substorm process.