R005-24
B 会場 ：11/5　AM2 （10:45-12:30）
11:30〜11:45

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Study of nighttime midlatitude E-F coupling in geomagnetic conjugate regions using multi-source data

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Nighttime midlatitude medium-scale traveling ionospheric disturbances (MSTIDs) are frequently observed in geomagnetic conjugate regions simultaneously. Previous observation results and theoretical analysis have underscored the importance of E-F coupling in MSTID generation and the postulation of hemisphere couple ionosphere. In this paper, the conjugate MSTIDs are studied to elucidate the causes and effects of E-F coupling in the interhemispheric coupled ionosphere. The hemisphere-coupled electrodynamics over Japan and Australia are observed and analyzed by using total electron content (TEC) measurements, supplemented with multi-source observations in ionogram, electron density, ion drift, neutral wind, and magnetic field. For the first time, observation results support the evidence that F-region geomagnetic conjugate irregularities in both hemispheres are mainly driven by the Es layers in the summer hemisphere. The Es layer is only observed in the summer hemisphere, subsequently triggers local E-F coupling and interhemispheric coupling. In the winter hemisphere, Es layers show dissipation during the interhemispheric coupling process. The thermospheric winds play an important role in the generation and development of MSTIDs, and the amplitude of MSTIDs is observed to vary with the meridional wind direction in respective hemisphere. Further, the observed interhemispheric field-aligned currents suggest non-equipotential magnetic field line, which may lead to the amplitude asymmetries in the conjugate MSTIDs. The magnitude of interhemispheric field-aligned currents, related with the Es-layer intensity, may explain the later formation of conjugate irregularities in the winter hemisphere.