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Session 10B Paper 5
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Comparative study of GNSS phase scintillation and high latitude electrodynamic ionospheric properties derived from AMPERE

Observations of phase scintillation and irregularity drifts determined from a multi-constellation GNSS receiver array at Poker Flat, Alaska, were compared with measurements of energy deposition, electric fields and currents derived from AMPERE field-aligned currents. The GNSS receiver array estimates the irregularity drifts from GNSS carrier phase measurements using cross-correlation based spaced-receiver technique. The AMPERE measurements of field-aligned currents were combined with a conductivity model to calculate electric fields, currents, Joule heating rates, and precipitating particle fluxes.

The velocities determined from irregularity drifts agree well with those calculated from the AMPERE-derived electric fields. This allows the AMPERE data to be used to establish the overall electrodynamic conditions associated with the observed scintillations. Generally, the most intense phase scintillation is well correlated with both the strength and latitudinal gradients of the electric fields. The AMPERE data were also used as input to the WBMOD scintillation model to assess the extent to which the electrodynamic parameters improve the model's ability to specify scintillation intensities.

Preliminary results suggest that AMPERE observations may help to establish the electrodynamic conditions conducive to irregularity formation and scintillation occurrence.