

## **Ionospheric plasma transport across polar cap**

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### **Abstract**

Large-scale ionospheric plasma anomalies appear at high latitudes, extending across the polar cap as a tongue of ionisation and polar patches. Physical mechanisms responsible for the plasma uplifts and transport are investigated using global ionospheric circulation models driven by parameterised high-latitude plasma convection models. Various convection models are considered, including the models based on satellite data, radar data, and data assimilation models. Contributions from electrodynamic plasma transport and neutral wind forcing are assessed. Mechanisms responsible for the energy dissipation, including frictional heating and Joule dissipation, are investigated. The numerical simulations are compared with plasma density measurements by positioning GNSS satellites and ground radar observations. The results are discussed in the context of space weather modelling and GNSS signal scintillation modelling at polar latitudes.