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Session 10B Paper 2

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### **Analysis of Ionospheric Patches Based on Swarm Langmuir Probe and TEC Data**

Dense, fast-moving regions of ionization called patches are known to occur in the high-latitude ionosphere. This investigation uses Swarm Langmuir probe and upward-looking GPS data to detect patches in both hemispheres. Statistical occurrence rates are produced from analysis of all the data from 2016.

Patch formation theories characterize the phenomenon as occurring during winter or equinox, with plasma from the sunlit ionosphere drawn across a dark polar cap by magnetospheric convection. However, a recent statistical study using CHAMP upward-looking GPS data indicates that this is not the case in the southern hemisphere, with detections peaking in summer in the southern hemisphere.

This investigation applies the same patch filter methodology to Swarm's upward-looking GPS data in order to validate the CHAMP findings, and addresses potential limitations of that dataset using in situ Langmuir probe electron density measurements. Results are validated using independent, ground-based GPS tomographic images of the ionosphere from the MIDAS algorithm.