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The high latitude ionospheric response to the major May 2024 geomagnetic storm

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The high latitude ionospheric evolution of the May 10-11, 2024, geomagnetic storm is investigated in terms of Total Electron Content (TEC) and contextualized with Incoherent Scatter Radar and ionosonde observations. Substantial plasma lifting is observed within the initial Storm Enhanced Density (SED) plume with ionospheric peak heights increasing by 150km to 300km periodically until sunset, reaching levels of up to 630km. Scintillation is observed within the cusp during the initial expansion phase of the storm, spreading across the auroral oval thereafter. Patch transport into the polar cap produces broad regions of scintillation that are rapidly cleared from the region after a strong Interplanetary Magnetic Field reversal at 2230UT. Strong heating and composition changes result in the complete absence of the F2-layer (G-Condition) on the 11th, suffocating high latitude convection from dense plasma necessary for Tongue of Ionization and patch formation, ultimately resulting in a suppression of polar cap scintillation on the 11th. The F2-region remains absent in the morning sector within the polar cap and auroral oval regions until May 14th.

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Keyword-2

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Keyword-3

Radio Propagation

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