

New Views of Magnetosphere-Ionosphere Dynamics From SuperDARN Radars at Middle Latitudes

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In recent years, capabilities for monitoring ionospheric processes in the subauroral region have been significantly improved by expansion of the Super Dual Auroral Radar Network (SuperDARN) into middle latitudes. At the present time, 13 SuperDARN radars are operational at magnetic latitudes equatorward of 55 degrees. The collective coverage area of these radars in the northern hemisphere alone spans more than 12 hours of magnetic local time. Such measurements are valuable for monitoring coupled magnetosphere-ionosphere dynamics over hemispheric spatial scales, particularly when combined with other distributed datasets, such as ground magnetometers and imagers, AMPERE Field-Aligned Currents, and GPS Total Electron Content (TEC). In this presentation, the history of SuperDARN will be briefly reviewed with a particular emphasis on the new science investigations enabled by the radars at middle latitudes. Topics covered include storm-time expansion of auroral flows, large-scale structure of the Sub-Auroral Polarization Stream (SAPS), quiet-time subauroral convection, Traveling Ionospheric Disturbances (TIDs), and mid-latitude ULF pulsations.

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