Geophysical Research Abstracts
Vol. 21, EGU2019-11438, 2019
EGU General Assembly 2019

Sources of Downgoing Electron Energy Flux in Jupiter's Polar Auroral Region

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Juno has provided the first opportunity to make in situ measurements of the electrons that produce Jupiter's ultraviolet (UV) auroral emissions. These emissions, which include main, diffuse, polar, and satellite-related aurora, are produced by electrons that precipitate into Jupiter's atmosphere and interact with hydrogen molecules. The brightness of the emissions is related to the magnitude of the downgoing electron energy flux. In Jupiter's polar auroral region, the region poleward of the main aurora, a primary source of downgoing electrons reside in bi-directional, magnetic field-aligned beams having broad energy distributions with characteristic energies of a few to a few tens of kilo-electron volts (keV). The downgoing energy flux associated with these bi-directional beams tends to be rather weak at Juno's altitude (< 5 mW/m^2), while the energy flux from upgoing electrons is much larger. This has led to the suggestion that further acceleration of these downgoing electrons may be occurring below Juno's altitude. In this presentation, we survey 0.1 – 100 keV electron observations from the Jovian Auroral Distributions Experiment (JADE; McComas et al. 2017) on Juno during several polar auroral region passes to characterize the intensity, energy and energy flux of downgoing electrons in this region as a function of altitude. The goal of this work is to identify and characterize the sources of downgoing electrons over Jupiter's polar auroral region and the mechanisms that lead to variations in their energy flux.