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Understanding the Structure and Energetics of Titan's Upper Atmosphere DARCI SNOWDEN, MIKE SMITH, THEODORE JIMSON, Central Washington University — Over the past 10 years, Cassini has directly observed the very upper regions of Titan's atmosphere with a suite of instruments. One of the most surprising discoveries is that the production of the complex organic haze appears to begin at the high altitudes observed by Cassini. This part of the atmosphere is not well understood on any planet and significant questions remain about the competing influences of the Sun, the charged particles and electrodynamic fields in Titan's space environment, and atmospheric waves. Previous work (e.g. Snowden et al. (2014)) showed that energy deposition rates in Titan's atmosphere due to the precipitation of magnetospheric electrons and ions are small compared to the energy flux due to solar EUV. However, some of these results relied on energy flux rates at Titan's exobase calculated from Voyager 1 data or data from a small number of Cassini flybys. Cassini has shown that the plasma environment around Titan is extremely variable and that the Voyager 1 conditions are not characteristic of an average plasma environment. Therefore, we further investigate the issue using particle tracing simulations for ions and a two-stream model for electrons in combination with a 3D model of Titan's induced magnetosphere.

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