Abstract Submitted
for the 4CF14 Meeting of
The American Physical Society

Atomic Cross Sections and Photoelectron Secondary Ionization in the E- and F1-Layers of the Ionosphere MAGGIE LEWIS, JAN SOJKA, Utah State University - Center for Atmosphere and Space Science — The main driving force for the creation of the ionosphere is solar irradiance. High energy photons from the sun ionize neutral atoms in the atmosphere and create free photoelectrons. Not every photon-atom interaction will result in ionization. The likelihood of a photon ionizing an atom is described by the atomic cross sections. The rate of photoelectron production depends on the interaction cross section. The higher the energy of a photon, the greater the photoelectron energy will be. As such, high energy photons (UV and soft X-ray) emitted by the sun have a greater chance of ionizing and creating photoelectrons in the E-region and lower F1-region. If these free photoelectrons have a sufficient energy, they can cause additional ionizations. An energy of 35 eV is currently accepted to be the approximate value at which photoelectron secondary ionization can occur. The Time Dependent Ionospheric Model (TDIM) can simulate the ionosphere using solar irradiance data collected by NASA's Solar Dynamics Observatory (SDO) Extreme Ultraviolet Variability Experiment (EVE). By regarding the photoelectron secondary ionization energy as a free parameter, the accuracy of the 35 eV energy factor, along with other energy factors, can be examined at different altitudes.

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Date submitted: 12 Sep 2014 Electronic form version 1.4