A COORDINATED MULTI-LINE INVESTIGATION AIMED AT DERIVING HYDROGEN DENSITIES IN THE UPPER ATMOSPHERE

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The Global Ultraviolet Imager (GUVI) on-board the NASA TIMED satellite has been producing a continuous database of limb and disk hydrogen Lyman alpha airglow intensities since early 2002. GUVI data are often coincident with Balmer alpha and Balmer beta intensity measurements routinely made from the ground-based Wisconsin H-alpha Mapper (WHAM) and Pine Bluff Observatory (PBO) Fabry-Perot Spectrometers. The intrinsic value of the GUVI Lyman alpha data, and the retrieval of thermospheric + exospheric atomic hydrogen profiles from that data, is substantially enhanced by these concurrent WHAM/PBO ground-based observations.

The approach we are developing is the coupled analysis of existing TIMED/GUVI and ground-based data sets by forward radiative transport (RT) modeling of these multi-line observations. We will utilize the differing transport properties of hydrogen Lyman alpha, Lyman beta (primarily responsible for Balmer alpha), and Lyman gamma (primarily responsible for Balmer beta) in the terrestrial atmosphere, and the forward-model/data comparisons of the variation of these emissions with solar depression angle and viewing geometry, to constrain forward-model retrieved hydrogen density profiles. In this poster we will discuss these data sets, our parametric data-model comparison search procedures, and recent results.