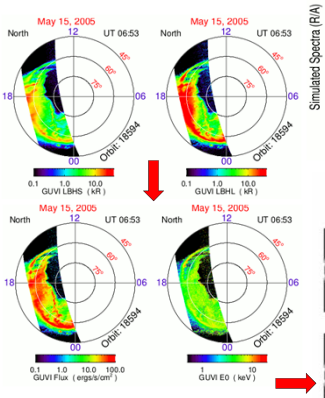
FUV Observations of Aurora, Thermosphere and Ionosphere

Yongliang Zhang, Larry J. Paxton, Robert Schaefer
The Johns Hopkins University Applied Physics Laboratory

Abstract Far ultraviolet (~100-200nm) spectrographic (FUV) imagers create maps in spatial and spectral domains. These sensors enable us to record spatial information at many wavelengths at the same time. Because the 'images' are obtained at many wavelengths simultaneously we can create maps of O/N_2 in the thermosphere or Eo and Q in the aurora, for example. We can trace transport of NO and changes in temperature, as well. **This is a cost-effective technique** for monitoring many space weather phenomena, such as the aurora, thermosphere and ionosphere in the regions where in situ sampling is not practical. Examples and related physical processes are provided below.

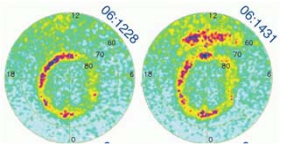
(1) Aurora

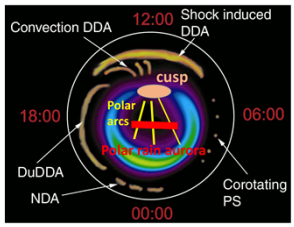
1.1 Auroras products and model

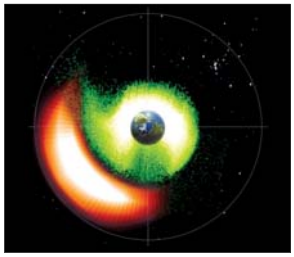


Aurora model

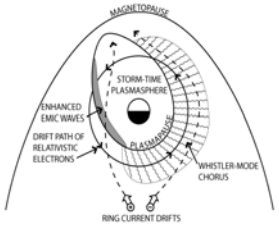
1.2 Ring current aurora





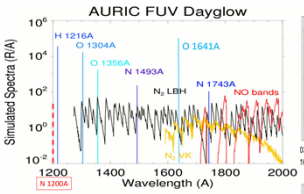


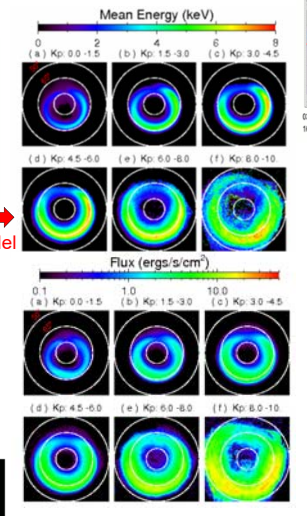
Ring Current and plasmasphere interaction (*courtesy of J. Goldstein*)



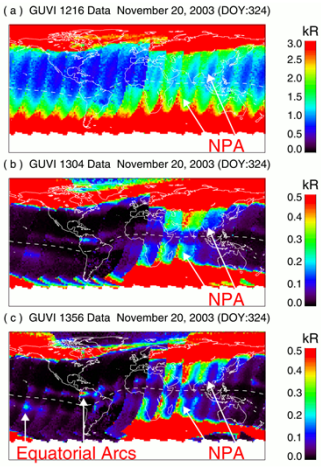
A sketch of ion drift path and enhanced EMIC waves (courtesy of D. Summer)

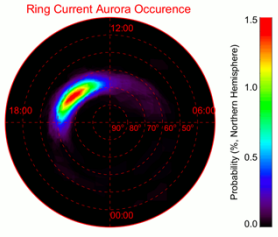
(2) Simulated FUV Spectra



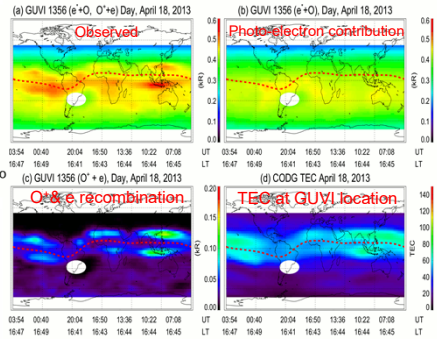


1.3 Neutral particle aurora (NPA)

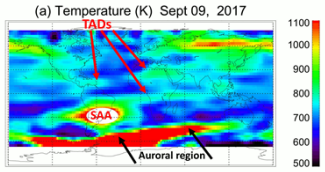


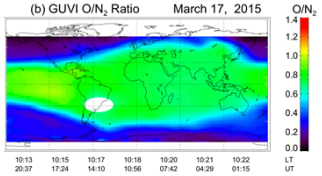


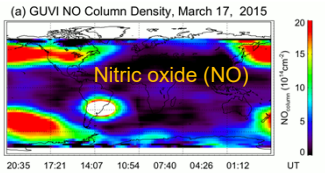
(3) O 135.6nm and TEC

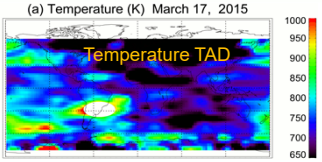


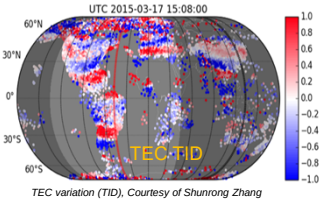
(4) Thermeosphere (O/N_2, NO, T, TAD/TID)



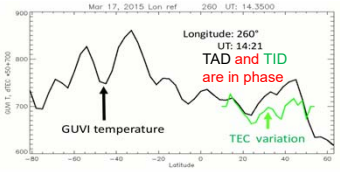








TEC variation (TID), Courtesy of Shunrong Zhang



1.4 Polar rain aurora (PRA) and polar arcs