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Resolving Ionospheric E-region Modeling Challenges: The Solar Photon Flux Dependence

Joseph B. Jensen  
*Utah State University*

Jan J. Sojka  
*Utah State University*

Michael David  
*Utah State University*

Kent Tobiska  
*Utah State University*

Robert W. Schunk  
*Utah State University*

Tom Woods  
*University of Colorado*

*See next page for additional authors*

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Authors
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Joseph B. Jensen, Jan J Sojka, Michael David, Kent Tobiska, Robert Schunk
Utah State University
Tom Woods, Frank Eparvier LASP University of Colorado Boulder
What is the Ionosphere?
The E-region is important because...
Time Dependent Ionospheric Model

- Photoionization
- Composition of the Neutral Atmosphere
- Chemical Reactions
- Solar Radiation
The NASA Solar Dynamics Observatory (SDO) Extreme Ultraviolet Variability Experiment (EVE)
A Typical EVE data set
Effects of Bands 1 and 2

Band 1 Increased

Band 2 Increased
Arecibo Incoherent Scatter Radar (ISR)
Model Data vs. ISR Data

- 18% at 116 km
- 24% at 108 km
- 137% at 96 km
Summary

-The E-region is important

-EVE has increased our knowledge of the solar radiation

-The two wavelength bands 0-15nm and 91-103nm are important for E-region generation

-ISR data important to model verification

References:
-“Introduction to HF Radio Propogation” IPS Radio and Space Services, Australian Government<http://www.ips.gov.au/Educational/5/2/2>
some extra slides just in case
EVE data compared with solar irradiance models

Band 1

- EUVAC
- S2000
- EVE

Band 2

Photon Flux (1E8)

Wavelength (nm)

Photon Flux (1E8)

Wavelength (nm)
EVE compared to S2000 and EUVAC

S2000

EUVAC
Old Model Data vs. ISR

EVE

S2000

EUVAC