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

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What is the Ionosphere?
The E-region is important because...
Time Dependent Ionospheric Model

- Photoionization
- Composition of the Neutral Atmosphere
- Chemical Reactions
- Solar Radiation

Diagram showing the process of photoionization with an atom transitioning from uncharged to charged state due to 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

Band 2
EVE compared to S2000 and EUVAC

**S2000**

**EUVAC**
Old Model Data vs. ISR

- EVE
- S2000
- EUVAC

Graphs showing the comparison of Old Model Data vs. ISR for EVE, S2000, and EUVAC.