

Intercomparision of SSUSI and AISstorm

Tuesday 17 September 2024 15:50 (20 minutes)

This study compares the electron ionization peak altitudes observed by the Special Sensor Ultraviolet Spectrographic Imager (SSUSI) and the Atmospheric Ionization during Substorm Model (AISstorm) over 70.2°N during 2010. SSUSI data predominantly shows ionization peaks at 100 km altitude, while AISstorm data indicates peaks primarily at 110 km. The discrepancy may partly be impacted by the energy coverage limitations of AISstorm, which relies on particle measurements from POES and Metop, creating an energy gap between 10 and 30 keV that imposes uncertainty to exactly these altitude levels. On the other hand SSUSI employs the energy deposition model by Fang et al. (2010), which differs from the Geant4-based algorithm used in AISstorm, resulting in lower altitude peaks. Statistical studies, such as those by Böisinger et al. (2004), support the occurrence of ionization peaks at 110 km but also indicate variability with local time and ionospheric conditions. The observed discrepancies suggest that energy deposition models and atmospheric conditions significantly influence the altitude of ionization peaks. Temporal and local time variations generally match well at 115km altitude but also highlight differences in the dynamic range and spatial processing between the two datasets, with SSUSI showing higher ionization rates, especially in polar regions.

Solicited or Contributed

Contributed

Author list and affiliations

Presenting author

Jan Maik Wissing

Primary authors: WISSING, Jan Maik (DLR Institute for Solar-Terrestrial Physics, Neustrelitz, Germany); SINNHUBER, Miriam (Institut für Meteorologie und Klimaforschung, Karlsruher Institut für Technologie)

Co-authors: NESSE, Hilde; BENDER, Stefan (IAA-CSIC, Granada, Spain)

Presenter: WISSING, Jan Maik (DLR Institute for Solar-Terrestrial Physics, Neustrelitz, Germany)

Session Classification: Solar Irradiance and Particle Variability

Track Classification: Solar Irradiance and Particle Variability