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Author: Mr. Sarath Raj Nadarajan Syamala
Amity University, Dubai, United Arab Emirates

Ms. Nour Alaa Elsonbaty
Amity University, Dubai, United Arab Emirates
Ms. Sathiyagayathiri Subramanian
Amity University, Dubai, United Arab Emirates

CHARACTERIZING THE DIRECTIONAL INTENSITIES OF ION IMPACTS ON THE MOON AND THEIR IMPACT ON SPACE WEATHER

Abstract

Lunar atmospheric studies have been a major focus in the analysis of space weather. To gather data about the moon's atmosphere, NASA initiated the lunar data project through the Apollo 12, 15, and 17 missions. The solar wind spectrometer (SWS) instrument was developed to specifically measure the protons and electrons present at the lunar surface and determine the solar wind plasma rate on the moon using circular grids and collectors facing the lunar sky. Studies have revealed that the composition of the lunar atmosphere, also known as the lunar exosphere, is impacted by an increase in solar wind plasma caused by ion collisions, which is further exacerbated by the absence of air in the lunar environment. The primary objective of this study is to utilize the SWS instrument data to identify and analyze the directional intensities of ion impacts on the moon and the pressure gradient forces arising from an increase in ion impact. Furthermore, information on the solar wind plasma flow and the lunar optical characteristics affected by the solar wind flow will be included in the analysis to forecast the potential impact on space weather. The analysis will require determining the rate of change in wind plasma ion rate over time, and specialized spectroscopy software will be utilized to analyze the data obtained by SWS.