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Influence of EUV flux variations on the precipitating ion flux from MAVEN observation

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At present epoch, the efficiency of Mars' atmosphere sputtering by heavy ion precipitation to induce atmospheric espace is expected to be negligible under actuel solar wind conditions. It is presently difficult to directly measure its current influence on Mars atmosphere. However, it is possible to better understand the potentiel importance of this process alonf Mars' history by further constraining the precipitating ion flux thanks to MAVEN instruments. We study the influence of the solar Extreme Ultra-Violet (EUV) flux intensity on the precipitating ion fluxes as seen by MAVEN/SWIA, an energy and angular ion spectrometer. We defined three periods with significantly different EUV flux intensity (1.6 and 3.2 times the lowest EUV intensity) and compare the precipitating ion flux measured by MAVEN/SWIA during each period. At low energy [30-650] eV, we find that the median (average) precipitating ion flux during the medium and low EUV periods are respectively 1.7 and 3 times more intense than the flux during the high EUV period. At high energy [650-25000] eV, a similar trend in the intensity of the precipitating ion flux is observed but with an increase by 50% and 70% respectively. A larger EUV flux does therefore not seem to favour heavy ion precipitation into Mars' atmosphere, contrary to modelling prediction and overall expectations.

Field

Planetology (incuding small bodies and exoplanets)

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