Auxiliary Material for

Mars Photoelectron Energy and Pitch Angle Dependence on Intense Lower-Atmospheric Dust Storms

Shaosui Xu,[1] Michael W. Liemohn,[1] David L. Mitchell,[2] Michael D.Smith[3]
[1]Department of Atmospheric, Oceanic, and Space Sciences, University of Michigan, Ann Ann Arbor, Michigan, USA
[2]Space Sciences Laboratory, University of California, Berkeley, California, USA
[3]NASA Goddard Spaceflight Center, Greenbelt, Maryland, USA

Journal of Geophysical Research, Planetary, 2014

Introduction

Included are four sets of pdf files. "fs01_fism0-10nm.pdf", "fs02_fism0-50nm.pdf", and"fs03_fism50-100nm.pdf" are the results of Flare Irradiance Spectral Model (FISM) [Chamberlin et al., 2007, 2008] based EUV proxy. The EUV fluxes are obtained by integrating irradiance of 0-10 nm, 0-50 nm and 50-100 nm for "fs01_fism0-10nm.pdf", "fs02_fism0-50nm.pdf", and"fs03_fism50-100nm.pdf", respectively. "fs04.pdf" shows the results with all energy channels being filtered by excluding all the anode sectors facing the spacecraft.

1 "fs01_fism0-10nm.pdf" includes the results of FISM based EUV proxy, which integrates irradiance over 0-10 nm. There are 9 panels with Modified pitch angle as x-axis and Energy as y-axis.

1.1 The 1st panel shows the window lengths of the transition points for each pitch angle and energy bin with using maximum-value time-history dust opacities.

1.2 The 2nd panel shows the window lengths of the transition points for each pitch angle and energy bin with using running-average time-history dust opacities.

1.3 The 3rd panel shows the correlation coefficients of the photoelectron fluxes versus this FISM based local EUV proxy of all the energy and pitch angle bins.

1.4 The 4th panel shows the correlation coefficients of the photoelectron fluxes versus a new controlling function, this local EUV proxy multiplied by the maximum-value time-history dust opacities, of all energy and pitch angle bins.

1.5 The 5th panel shows the absolute correlation difference of the 3rd and 4th panels.

1.6 The 6th panel shows the relative correlation difference of the 3rd and 4th panels.

1.7 The 7th panel shows the correlation coefficients of the photoelectron fluxes versus a new controlling function, this local EUV proxy multiplied by the running-average time-history dust opacities, of all energy and pitch angle bins.

1.8 The 8th panel shows the absolute correlation difference of the 3rd and 7th panels.

1.9 The 9th panel shows the relative correlation difference of the 3rd and 7th panels.

2 "fs02_fism0-50nm.pdf" includes the results of FISM based EUV proxy, which integrates irradiance over 0-50 nm. The 9 panels included in this pdf file follow the exact style of "fs01_fism0-10nm.pdf", hence we do not elaborate more.

3 "fs03_fism50-100nm.pdf" includes the results of FISM based EUV proxy, which integrates irradiance over 50-100 nm. The 9 panels included in this pdf file follow the exact style of "fs01_fism0-10nm.pdf", hence we do not elaborate more.

4 "fs04.pdf" includes the results with all energy channel being filtered (see more details in the paper). Also, the local EUV proxy is based on F10.7. The 9 panels included in this pdf file follow the exact style of "fs01_fism0-10nm.pdf", hence we do not elaborate more.

Reference:

Chamberlin, P. C., T. N. Woods, and F. G. Eparvier, Flare Irradiance Spectral Model (FISM): Flare component algorithms and results, Space Weather, 6, S05001, doi:10.1029/2007SW000372, 2008.

Chamberlin, P. C., T. N. Woods, and F. G. Eparvier, Flare Irradiance Spectral Model (FISM): Daily component algorithms and results, Space Weather, 5, S07005, doi:10.1029/2007SW000316, 2007.