Dynamics of proton implantation and the H_2 exosphere at the Moon: Variations in the dayside OH surface concentration during passage through the magnetotail O. J. Tucker[1] and W. M. Farrell [1]NASA Goddard Space Flight Center (orenthal.j.tucker@nasa.gov)

Introduction: Precipitating solar wind ions can implant in regolith grains on the lunar surface and contribute to the inventory of degassed hydrogenated molecules (e.g., H_2) of the exosphere. Recent models of this process demonstrate the global distribution of OH/H_2O observed by the Chandrayaan -1 Moon Mineralogy Mapper and H_2 exosphere observed by the Lunar Reconnaissance Orbiter Lyman-Alpha Mapping Project (LAMP) can be explained by the diffusion of H atoms in regolith grains and degassing of H_2 into the exosphere. Recent analyses of the 3-micron absorption feature in M^3 data reveal diurnal trends that allow for comparisons of the variation of OH/H_2O surface content as the Moon traverses Earth's magnetotail. Previous model work suggested that as the Moon traversed the magnetotail the most dominant feature was a decrease in surface OH in surface regions that rotated to the nightside as the Moon exits the magnetotail [1]. To this end, we revisit the model calculations of H atom diffusion and the H_2 exosphere during the Moon's traversal of the magnetotail for comparisons to M3 data of the dayside OH content.

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References: [1] Tucker O. J., Farrell W. M. and Poppe A. R. 2021 JGRE 126 e2020JE006552

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