

Title: Comparisons of UV Emissions in Mars' Dawn and Dusk Twilight Glow Using MAVEN's IUVS Instrument

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Abstract:

Mars is being continuously hit by the sun's radiation, thus resulting in the ionization of particles present in its upper atmosphere. Chemical changes in these particles cause a dim glow to appear all around Mars, also known as airglow. The dayglow and nightglow parts of Mars have been heavily researched when compared to its twilight glow data. Our aim is to study and compare the changes of specific UV emissions in the upper atmosphere of Mars (mainly CO Cameron and CO₂+ UVD bands) in the dawn and dusk parts of the twilight glow. We use periapsis scans data from the Imaging Ultraviolet Spectrograph (IUVS) instrument, which is aboard the Mars Atmosphere and Volatile Evolution (MAVEN) spacecraft in one season, which is at Martian Solar Longitude $L_s = 251^\circ - 261^\circ$. Using data mining and analysis, we examined one season where both dusk and dawn scans were present, and explored the differences in the peak intensities of the mentioned UV emissions in both periods. We found that the peak intensities of the CO Cam and CO₂+ UVD bands are highest during dusk than dawn, revealing the instability and variability that resides in the atmosphere in Mars' twilight glow.