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# Modeling the effects of solar flares on the ionosphere of Mars

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Increased fluxes of X-rays during solar flares have been observed to enhance electron densities in the lower ionosphere of Mars. The photochemical timescale at these altitudes is on the order of minutes, so these electron density enhancements do not persist for substantially longer than the flare duration. We present the results of photochemical model simulations of the Mars ionosphere driven by temporally-varying solar fluxes, concentrating on 15 and 26 April, 2001. The Mars Global Surveyor (MGS) Radio Science (RS) instrument observed flare-enhanced electron densities on these dates. Solar fluxes are derived from the Flare Irradiance Spectral Model, which outputs the solar spectrum at 1 nm intervals from 0.5 to 195.5 nm every 1 minute. This empirical model is based on TIMED SEE, UARS SOLSTICE, GOES, and other observations. For a short period at the peak of a large solar flare, X-ray photoionization rates exceed EUV photoionization rates and the electron density peak altitude decreases by tens of kilometres. Simulations will be compared to MGS RS measurements of electron density profiles.