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Atmospheric UV opacity evolution and correlation with visible opacity and total atmospheric irradiance

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REMS (Rover Environmental Monitoring Station) is part of the MSL (Mars Science Laboratory) Curiosity rover. It consists of a wind sensor (WS), ground temperature sensor (GTS), air temperature sensor (ATS), a pressure sensor (PS), a relative humidity sensor (RHS), and a UV sensor (UVS).

In this paper we provide a complete picture of the radiative properties of the atmosphere over the Curiosity rover combining the information provided daily and simultaneously by the GTS, ATS, and UVS in order to provide values of the daily evolution of:
- infrared opacities, inferred after nighttime GTS measurements.

- UV opacities, inferred from UVS irradiance measurements

- visible opacities inferred from model extrapolation
Aditionally, as Martian atmospheric temperature is controlled primarily by solar heating and infrared cooling to the atmosphere and space, we have used the top of the atmosphere values of solar radiance inferred from solar observation satellite measurements, a simple atmospheric model and the data provided by the GTS, ATS and UVS measurements to estimate daily radiative balance temperature profiles over the rover site.
We present in this paper the daily evolution of atmospheric opacities from the UV to the IR based in the unique set of simultaneous measurements provided from Mars. Also a comparison of the daily radiative balance temperature profiles with satellite data will be shown.