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Poster
Mars possesses only a thin atmosphere with a few tens of g/cm^2 of vertical column depth. Thus high-energy particles (for example, protons with energies > 150 – 170 MeV) can penetrate deep into the atmosphere and ground. Thus, the radiation environment on the surface of Mars consists mainly of Galactic Cosmic Radiation (GCR) and their secondary particles created by interactions in the atmosphere or soil. Additionally, spontaneous Solar Energetic Particles (SEPs), emitted from the Sun during solar storms, can dominate the Martian surface radiation field on short time scales of hours to days. Protecting future human astronauts from exposure to this radiation remains one of the major challenges for the exploration of Mars.

To understand this radiation environment and how it changes over time, the Radiation Assessment Detector (RAD) has been measuring the radiation environment on the Martian surface aboard the Curiosity rover since landing in August 2012. The RAD measurements, thereby, provide vital information on the radiation exposure and potential health risks for future human explorers of Mars. As a space weather monitor on Mars at 1.5 AU, RAD measurements also provide valuable information for the space weather and heliophysics communities. For example, they provide insight into the intensity and timing of the arrival of SEPs, in particular their high-energy component.

Here, we present updated measurements of the evolution of the Martian surface radiation environment over the last few years during the rising phase of the current solar maximum. Thereby, we mainly focus on measurements of the absorbed radiation dose, and calculations of the dose equivalent based on the quality factor derived from RAD LET (Linear Energy Transfer) measurements. Furthermore, we present updated measurements of SEP events and other relevant solar features, such as Forbush decreases, that RAD was able to detect.

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