

Life Sciences as Related to Space (F)

Space Radiation - Dosimetric Measurements and Related Models, Radiation Detector Developments and Ground-based Characterisation (F2.3)

THE SEPTEMBER 2017 SOLAR ENERGETIC PARTICLE EVENT OBSERVED BY MSL/RAD ON THE SURFACE OF MARS

Bent Ehresmann, ehresmann@boulder.swri.edu

Southwest Research Institute, Boulder, Colorado, United States

Donald M. Hassler, hassler@boulder.swri.edu

Southwest Research Institute, Boulder, Colorado, United States

Cary Zeitlin, cary.j.zeitlin@nasa.gov

Lockhead Martin Information Systems & Global Solutions, Houston, Texas, United States

Jingnan Guo, guo@physik.uni-kiel.de

University of Kiel, Kiel, Germany

Robert Wimmer-Schweingruber, wimmer@physik.uni-kiel.de

Christian-Albrechts-Universität zu Kiel, Kiel, Germany

Daniel Matthiä, daniel.matthiae@dlr.de

DLR - Inst. of Aerospace Medicine, Köln, Germany

Henning Lohf, loh@physik.uni-kiel.de

Christian-Albrechts-Universität zu Kiel, Kiel, Germany

Jan Kristoffer Appel, appel@physik.uni-kiel.de

University of Kiel, Kiel, Germany

Soenke Burmeister, burmeister@physik.uni-kiel.de

Christian-Albrechts-Universität zu Kiel, Kiel, Germany

Scot Rafkin, rafkin.swri@gmail.com

Southwest Research Institute, Boulder, Colorado, United States

Thomas Berger, thomas.berger@dlr.de

German Aerospace Center (DLR), Cologne, Germany

Guenther Reitz, guenther.reitz@dlr.de

German Aerospace Center (DLR), Koeln, Germany

The Radiation Assessment Detector (RAD) has been continuously monitoring the Martian surface radiation environment in Gale crater as part of NASA's Mars Science Laboratory (MSL) mission since August 2012. On September 11 2017, RAD detected the strongest SEP event on the Martian surface to date. This event led to the highest radiation levels since the beginning of the RAD operations in Gale crater. The SEPs associated with this solar storm increased the surface radiation dose by a factor of 3 over the course of a few hours, and the peak radiation dose was more than 50% higher than the previous maximum measured in October 2013.

Here, we give an overview of the heliospheric conditions during the September 2017 solar storm, and present measurements of charged particle spectra during and before the event. RAD saw significant increases in the surface proton and helium fluxes, as well as in the neutral particles (neutrons and gamma-rays) created by interactions of the SEPs with the atmosphere and soil.