

Modelling the radiation on the Martian surface

D. Matthiä (1), T. Berger (1)

(1) German Aerospace Center (DLR), Institute of Aerospace Medicine, Linder Höhe, 51147 Cologne, Germany
(Daniel.Matthiae@dlr.de/ Fax: +49 2203 61970)

Abstract

Just as on Earth the radiation environment in the Martian atmosphere caused by cosmic radiation is most of the time dominated by galactic cosmic rays (GCR) and secondary particles created in interactions with constituents of the atmosphere. Due to the lack of magnetic shielding and a significantly lower atmospheric shielding, the radiation exposure on the Martian surface, however, is much higher than on Earth. The increased radiation level can be harmful to electronics and is of interest for the evaluation of the health risks of astronauts on future manned missions. A parameterized model calculating the radiation exposure from GCR on the Martian surface is developed within the “Planetary Space Weather Services” (PSWS) of the Europlanet 2020 Research Infrastructure (EPN2020-RI, <http://www.europlanet-2020-ri.eu>). The model is based on transport calculations of the primary GCR nuclei through the Martian atmosphere performed with GEANT4 and includes the backscattering of albedo particles from the regolith. Model results for the period between August 2012 and July 2016 are presented and compared to measurements of the Radiation Assessment Detector (RAD) onboard the Curiosity rover of the Mars Science Laboratory (MSL).