

Interactive comment on “Martian sub-surface ionising radiation: biosignatures and geology” by L. R. Dartnell et al.

Anonymous Referee #1

Received and published: 25 April 2007

The authors present a calculation of the ionizing radiation field depths in Martian surface. The calculation is performed using GEANT4. Compared to previous calculations quoted in the manuscript, they did not use the equivalent dose (in Sv) but rather the physical dose (in Gy) to estimate the damage to macromolecules of biological significance. This reviewer agrees that this choice is essentially correct, and the paper is therefore adding interesting information to the scientific community, then deserving publication. The paper is well written albeit somewhat lengthy. Many times in the introduction to the different sections the authors include very basic information, which can be perhaps deleted in an advanced scientific publication. I only have few minor points outlined below.

- Title, abstract. Ionizing or ionising? The authors should make up their minds about US

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper

or UK spelling.

- Page 2, column 1, 1st paragraph, line 4. Reference is missing
- Page 2, column 2, 2nd paragraph: delete “one million”
- Page 3, section 1.3, line 16. The dose is uniform only if a large target is considered, e.g. a mammalian cell. On the micrometer or nanometer scale, the dose is non-uniform for sparsely ionizing radiation, too.
- Page 4, section 2, Method. As far as I know, GEANT4 has strong limitations in modeling ions heavier than protons. Do the authors know of any check on HZE simulations using GEANT4?
- Results. I think neutrons data should be presented separated by protons or recoil protons separated by galactic hydrogen ions. At increasing depth, the dose will be dominated by neutrons.

Interactive comment on Biogeosciences Discuss., 4, 455, 2007.

BGD

4, S368–S369, 2007

Interactive
Comment

Full Screen / Esc

Printer-friendly Version

Interactive Discussion

Discussion Paper