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Search for subsurface water in Gale crater using data from DAN/MSL and HEND/Odyssey instruments

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Abstract

In August of 2012 NASA's Mars Science Laboratory (MSL) will land on Mars at the Gale crater. MSL science payload includes Dynamic Albedo of Neutrons (DAN) instrument selected for the monitoring of water abundance along the path of the MSL rover (see 1-2). To estimate average content of water and its depth distribution we plan to use both passive measurements of natural martian neutron flux (due to bombardment of Galactic Cosmic Rays) and methods the neutron-neutron activation analysis (irradiation of the surface by a pulsing neutron source).
The main purpose of this work is a study of Gale crater area with analysis of the first surface measurements (search for subsurface water) accomplished by DAN and comparison DAN data with the orbital neutron measurements from High Energy Neutron Detector (HEND) onboard Mars Odyssey mission. We plan to test various models of the distribution of bound water in the Martian subsurface, which includes a H-poor regolith on the top and H-rich regolith at the bottom layer.

References

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