

Water Cycle at Gale Crater Through MSL REMS Observations

Ari-Matti Harri (1), Maria Genzer (1), Osku Kemppinen (1), Javier Gomez-Elvira (2), Timothy McConnochie (3), Hannu Savijarvi (1), Jouni Polkko (4), Manuel de la Torre-Juarez (5), Claire Newman (6), German Martinez (7), Mark Paton (1), Javier Martin-Torres (8), Robert Haberle (9), Luis Vazquez (10), Nilton Renno (7), Terhi Makinen (1), Walter Schmidt (1), and Tero Siili (1)

(1) Finnish Meteorological Institute, Space Research Division, Helsinki, Finland (ari-matti.harri@fmi.fi), (2) Centro de Astrobiología, Madrid, Spain, (3) University of Maryland, US, (4) University of Helsinki, Finland, (5) Jet Propulsion Laboratory, NASA, (6) Ashima Research Inc., (7) University of Michigan, US, (8) NASA Ames Research Center, US, (9) Instituto Andaluz de Ciencias de la Tierra (CSIC-UGR), Granada, Spain, (10) Universidad Complutense de Madrid, Spain

The Mars Science laboratory (MSL) has been successfully operating at the Gale crater since early August 2012 and provided a wealth of extremely valuable data. That includes atmospheric observations by the REMS (Rover Environmental Monitoring Station) comprising instrumentation for the observation of atmospheric pressure, temperature of the air, ground temperature, wind speed and direction, relative humidity (REMS-H), and UV measurements. The REMS-H device is based on polymeric capacitive humidity sensors developed by Vaisala Inc. and it makes use of transducer electronics section placed in the vicinity of the three (3) humidity sensor heads. The humidity device is mounted on the REMS boom providing ventilation with the ambient atmosphere through a filter protecting the device from airborne dust. We focus on describing the first annual water cycle at the Martian surface using the improved REMS-H calibration for the period of almost two Martian years. The characteristics of the Martian water cycle with the relative humidity, mixing ratio and partial water pressure will be discussed. The results will be constrained through comparison with independent indirect observations and through modeling efforts.