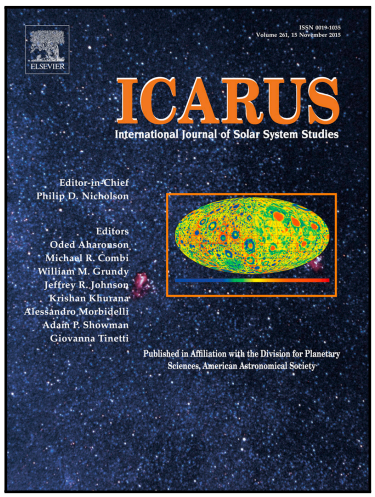

Adsorption driven regolith-atmospheric water vapor transfer on Mars: An analysis of Phoenix TECP data

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PII: S0019-1035(17)30042-8
DOI: 10.1016/j.icarus.2017.08.002
Reference: YICAR 12553

To appear in: *Icarus*

Received date: 17 January 2017
Revised date: 16 June 2017
Accepted date: 1 August 2017

Please cite this article as: Holly N. Farris , Miguel B. Conner , Vincent F. Chevrier , Edgard G. Rivera-Valentin , Adsorption driven regolith-atmospheric water vapor transfer on Mars: An analysis of Phoenix TECP data, *Icarus* (2017), doi: 10.1016/j.icarus.2017.08.002

Highlights

- Analysis of Phoenix Thermal and Electric Conductivity Probe (TECP) instrument data and previous experimental data to present constraints on the parameters for regolith-driven adsorption at the Phoenix landing site.
- Modeling Brunauer-Emmett-Teller (BET) adsorption of the data across Mars-relevant materials yielded fairly constant surface coverage and enthalpy values, θ = 0.336, corresponding to 2.96 x 10^{-7} kg of H_2O/m^2 and ΔH = 52.783 +/- 1.206 kJ/mol, respectively. With our modeled BET adsorption coefficient, C = 89.4, and ideal specific surface area, SSA = 1.7 x 10^4 m^2/kg.
- The regolith at the Phoenix landing site is most likely a mixture, which we bracket with a range of possible adsorption conditions.
- We explain adsorbed water content in the regolith at the Phoenix landing site and thus, adsorption being driven by localized, diurnal variations in the relative humidity.