



Journal of Geophysical Research Planets

Supporting Information for

Diverse Lithologies and Alteration Events on the Rim of Noachian-Aged Endeavour Crater, Meridiani Planum, Mars: *In-Situ* Compositional Evidence

David W. Mittlefehldt¹, Ralf Gellert², Scott vanBommel², Douglas W. Ming³, Albert S. Yen⁴, Benton C. Clark⁵, Richard V. Morris¹, Christian Schröder⁶, Larry S. Crumpler⁷, John A. Grant⁸, Bradley L. Jolliff⁹, Raymond E. Arvidson⁹, William H. Farrand⁵, Kenneth E. Herkenhoff¹⁰, James F. Bell III¹¹, Barbara A. Cohen¹², Göstar Klingelhöfer¹³, Christian M. Schrader¹⁴, James W. Rice¹⁵

¹Mail code XI3, Astromaterials Research Office, NASA/Johnson Space Center, Houston, TX 77058, USA, ²Department of Physics, University of Guelph, Guelph, ON N1G2W1, Canada, ³Mail code XI1, Astromaterials Research and Exploration Science Division, NASA/Johnson Space Center, Houston, TX 77058, USA, ⁴Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91125, USA, ⁵Space Science Institute, 4750 Walnut St., number 205, Boulder, Colorado 80301, USA, ⁶Biological and Environmental Sciences, Faculty of Natural Sciences, University of Stirling, Stirling FK9 4LA, Scotland, UK, ⁷New Mexico Museum of Natural History and Science, 1801 Mountain Rd NW, Albuquerque, New Mexico 87104, USA, ⁸Smithsonian Institution, NASM CEPS, 6th at Independence Ave. SW, Washington, DC 20560, USA, ⁹Department of Earth and Planetary Sciences, Washington University in Saint Louis, Saint Louis, MO 63130, USA, ¹⁰U. S. Geological Survey Astrogeology Science Center, Flagstaff, AZ 86001, USA, ¹¹School of Earth and Space Exploration, Arizona State University, Tempe, AZ 85287, USA, ¹²NASA/Goddard Space Flight Center, Greenbelt, MD 20771, USA, ¹³Institute of Inorganic & Analytical Chemistry, Johannes Gutenberg-University Mainz, 55099 Mainz, Germany, ¹⁴Geology Department, SUNY-Potsdam, Potsdam, NY 13676, USA, ¹⁵Planetary Science Institute, 1700 East Fort Lowell Rd., Suite 106, Tucson, AZ 85719, USA

Contents of this file

Tables S1 to S5

Additional Supporting Information (Files uploaded separately)

Tables S2, S4 and S5 (large tables, uploaded as separate files)

Introduction

This supporting information includes details on measurement uncertainties, a listing of targets analyzed, images used in the text, and comparative soil data used to evaluate possible contamination issues for the rock target analyses.

	accuracy ¹ %	precision ² %
Na ₂ O	11	5.6
MgO	14	1.1
Al ₂ O ₃	7	1.3
SiO ₂	3	0.5
P ₂ O ₅	15	4.8
SO ₃	15	0.9
Cl	30*	1.5
K ₂ O	15	6.1
CaO	7	0.5
TiO ₂	20	3.6
Cr ₂ O ₃	19	7.1
MnO	8	2.4
FeO	7	0.6
Ni	16	5.7
Zn	16	3.9
Br	20*	7.6

¹from Gellert et al. (2006), Table 1.

²This work, based on Transvaal target measured on Sol 2787; see text.

*Larger uncertainty because of inhomogeneous matrix in calibration samples; see Gellert et al. (2006).

Table S1. Measurement accuracy and typical precision (1σ).

Table S2. APXS targets discussed and their measurement, lithologic and location details (separate file).

Figure	Sol	Sequence ID (*)	Local True Solar Time	Filters	Band Centers (nm)
3b	3609	p2404 (4)	14:24:59	L2, L5, L7	753, 535, 432
3c	3750	p2373 (2)	13:24:03	L2, L5, L7	753, 535, 432
4a	3000	p2143	12:32:13	L4, L5, L6	601, 535, 482
4b	3734	p2561	13:56:19	L2, L5, L7	753, 535, 432
4c	3425	p2562	13:45:52	L2, L5, L7	753, 535, 432
4d	2769	p2574	12:47:18	L2, L5, L7	753, 535, 432
4e	3426	p2433 (2)	14:18:53	L2, L5, L7	753, 535, 432
6a	3203	p2554	11:51:37	L2, L5, L7	753, 535, 432
6b	3062	p2407 (5)	11:52:37	L2, L5, L7	753, 535, 432
8a	3156	p2437	11:58:53	L2, L5, L7	753, 535, 432
8b	2786	p2582	12:30:23	L2, L4, L6	753, 601, 482
8c	3466	p2578	12:25:49	L2, L5, L7	753, 535, 432
8d, 22a	3669	p2587	13:20:29	L2, L5, L7	753, 535, 432
8e	3676	p2589	14:45:02	L2, L5, L7	753, 535, 432
8f	3868	p2554	13:42:30	L2, L5, L7	753, 535, 432
10a	3391	p2548	13:15:50	L2, L5, L7	753, 535, 432
10b	3601	p2548	12:43:10	L2, L5, L7	753, 535, 432
10c	3793	p2586	14:00:11	L2, L5, L7	753, 535, 432
10d	3814	p2532	15:18:59	L2, L5, L7	753, 535, 432
20b	2803	p2590 (3)	14:03:33	L2, L5, L7	753, 535, 432

(*) If the observation is part of a mosaic, the number of frames taken is indicated.

Table S3. List of Panoramic Camera images used and details of the observations.

Table S4. Measurement uncertainties (2σ precision; see text) on APXS analyses of Endeavour Crater rim rocks (separate file).

Table S5. Compositions of dark-sand and bright-soil targets used for comparisons (separate file).