Lunar and Planetary Science Conference, March 16th, 2014

COMMUNITY USER WORKSHOP ON PLANETARY LIBS (CHEMCAM) DATA

Currently available ChemCam data

(and how to find it)

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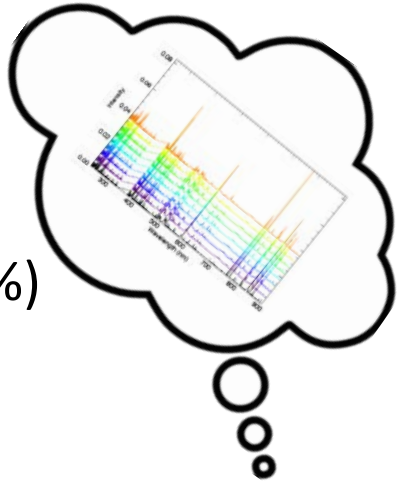
NASA/JPL-Caltech/MSSS

Main ChemCam data products

Up to sol 804 on March 16



- **LIBS**
  - Spectral data (raw and processed)
    - Includes passive spectra (darks)
  - Element quantification (PLS oxide weight %)
  - Coming soon: Spectral similarity (ICA)

- **RMI**
  - Image data (raw and processed)
    - Standalone RMIs
    - Z-stack (3D info)
  - Coming soon: RMI mosaics

- **LIBS calibration data**
  - Laboratory spectral data

Raster types

msl-chemcam.com → Results (2nd tab) → ChemCam - Results

- Single location
- Line
  - Horizontal, vertical, diagonal
  - 5x1, 1x10, etc.
- Square
  - 3x3, 5x5, etc.
- Right → Left
  Down → Up
  - File name order (sclock)
- Typically 30 LIBS shots per location
  - 30 individual spectra
  - Depth profile (>50 shots)

Richmond Gulf, sol 194

Raster types

msl-chemcam.com → Results (2nd tab) → ChemCam - Results

- Single location
- Line
  - Horizontal, vertical, diagonal
  - 5x1, 1x10, etc.
- Square
  - 3x3, 5x5, etc.
- Right → Left
  Down → Up
  - File name order (sclock)
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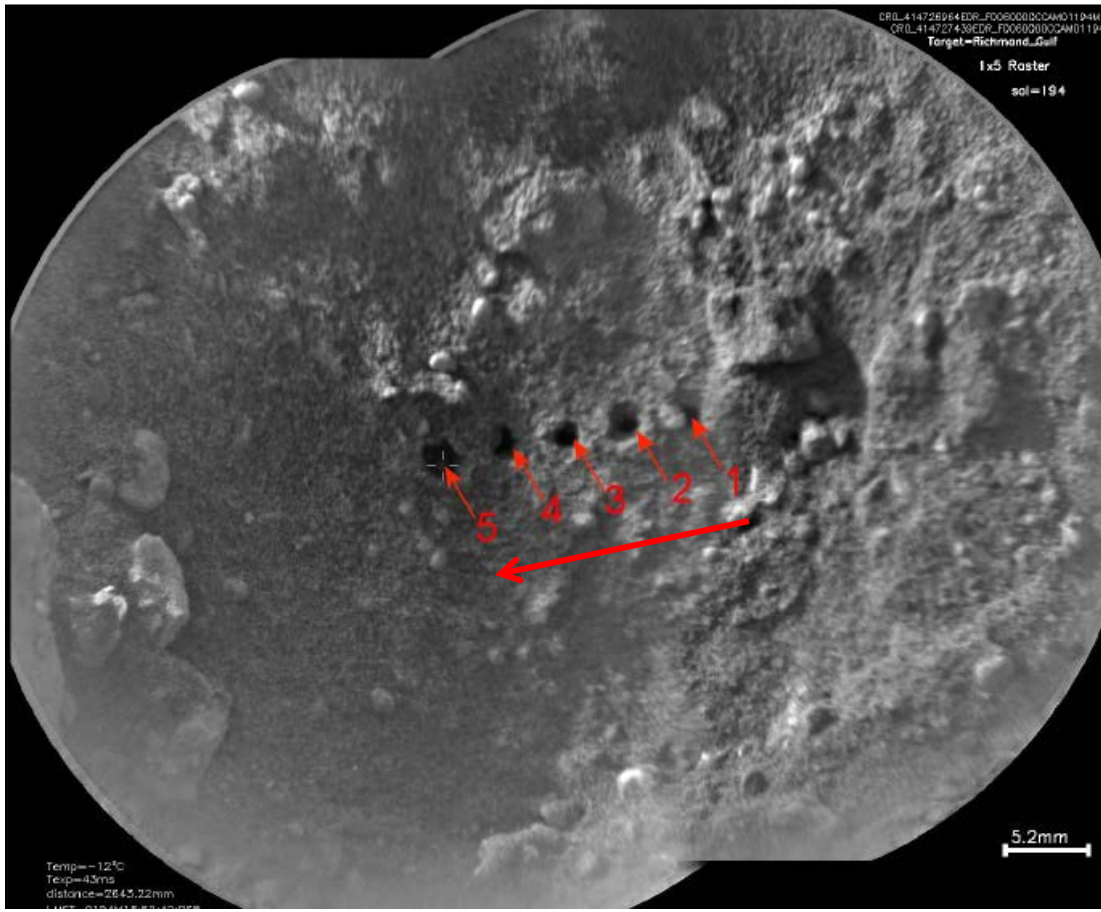
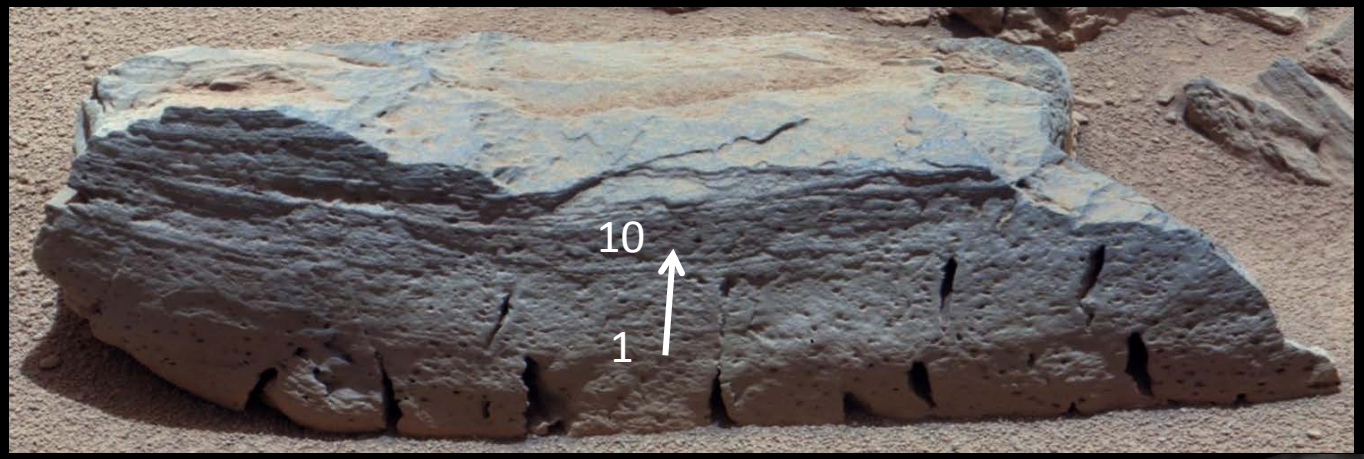


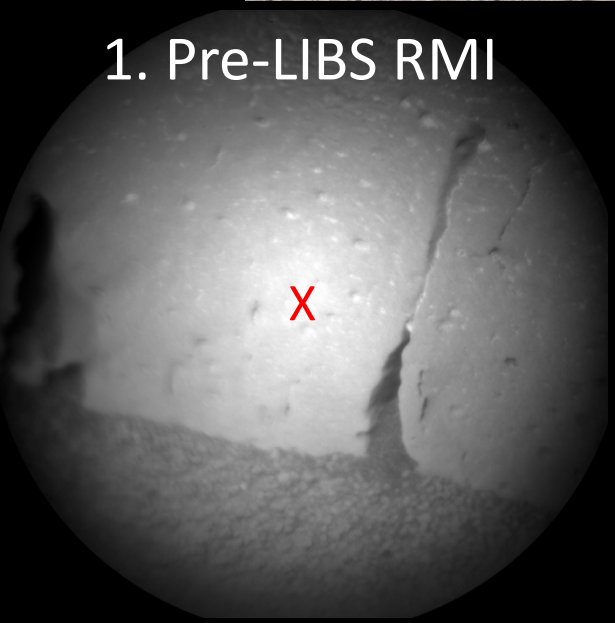
Richmond Gulf, sol 194

A typical CCAM sequence

Ex: Rocknest3 1x10 (sol 83)



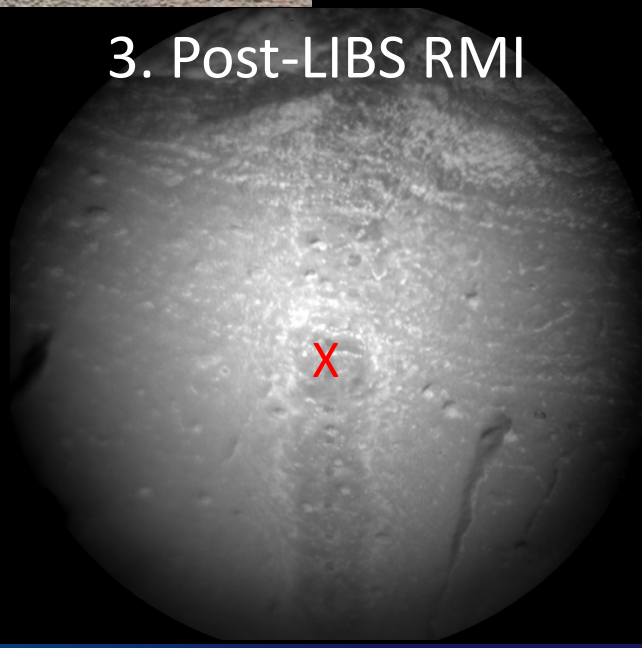
1. Pre-LIBS RMI



2. (LIBS, dark) x 10

30 shots ● 10
⋮
30 shots ● 3
30 shots ● 2
30 shots ● 1

3. Post-LIBS RMI



<u>Data products:</u>

10 LIBS, 10 darks, 2 RMIs

Data labeling

CL5_414268531CCS_F0060000CCAM01189P3.csv

1 2 3 4 5 6 7

1. Data type: CL5 = LIBS, CL9 = dark, CR0 = RMI, CL0 = passive (avg)

2. Spacecraft clock (sclock) → Time order that file was obtained

3. Processing level
   EDR = raw, RDR = Level 1a, CCS = Level 1b, MOC = Level 2, PRC = processed RMI

4. Flight software version

5. Sequence ID: CCAM01189 = Instrument + sequence order (01) + sol (189)

6. Version: Always use P3 when available → latest (P1 = auto, P2 = PDL analysis)

7. File type

Getting data from PDS

http://pds-geosciences.wustl.edu/missions/msl/chemcam.htm

-geosciences.wustl.edu/missions/msl/chemcam.htm

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Homepage
+ NASA en Español
+ Contact NASA

PDS Geosciences Node
Washington University in St. Louis

HOME | DATA AND SERVICES | TOOLS | ABOUT US | CONTACT US | SITE MAP

Services
- Analyst's Notebooks
- Virtual Astronaut
- Orbital Data Explorers
- Spectral Library
- FTP Access
- Workshops

Geosciences Node Data
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  - Mars Exploration
  - MSL
    - About MSL
    - APXS
    - **ChemCam**
    - CheMin
    - DAN
    - SAM
  - Phoenix
  - MRO
  - MER
  - Mars Express
  - Odyssey
  - MGS
  - Pathfinder
  - Prototype Rovers
  - Viking Orbiter
  - Viking Lander
  - Earth Based Data
- Venus
- Mercury
- Moon
- Earth
- Asteroids
- Gravity Models
- All Geosciences Data Holdings

MSL: ChemCam

December 13, 2013. MSL Release 4 includes new ChemCam raw (EDR) and derived (RDR) data from sols 270 through 359, along with revised versions of ChemCam LIBS MOC derived products for sols 13 through 234. Browse images for sols 13 through 176 and 192 have been updated. See ERRATA.TXT for details.

ChemCam combines the LIBS (Laser Induced Breakdown Spectrometer) and the RMI (Remote Micro-Imager) to analyze the elemental composition of laser-vaporized materials from the surface of Martian rocks and soils. ChemCam data sets are produced by the ChemCam team at Los Alamos National Laboratory and the Centre National D'Etudes Spatiales (CESR), Toulouse, France.

ChemCam Data Sets

Raw Data Products

ChemCam LIBS, RMI, and State-of-Health EDR (Experiment Data Records)

Derived Data Products

ChemCam LIBS and RMI RDR (Reduced Data Records)

Online Tools

MSL Analyst's Notebook - This PDS Geosciences Node tool provides access to MSL data in the context of mission operations -- by sol, location, instrument, and other criteria.

Related Information

PDS Catalog Files

ChemCam LIBS EDR (Raw) Data Set Description

ChemCam RMI EDR (Raw) Data Set Description

Most people will just want the **processed data**

But **raw data** are also available

Main menu for processed data

ChemCam LIBS and RMI RDR → mslccm_1xxx

pds-geosciences.wustl.edu/msl/msl-m-chemcam-libs-4_5-rdr-v1/mslccm_1xxx/

pds-geosciences.wustl.edu - /msl/msl-m-chemcam-libs-4_5-r

[To Parent Directory]

6/6/2013	11:24 AM	7556	aareadme.txt
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4/10/2013	10:00 AM	<dir>	extras
11/15/2013	2:48 PM	<dir>	index
3/27/2013	10:27 AM	1827	voldesc.cat

aareadme: File structure

browse: Quicklooks for Mars data

calib: Processed lab calibration data

data: Processed Mars data (Level 1, 2, RMI)

document: Master data list

extras: Master composition table

Master list

	A	B	C	D	E	F	G	H
1	Sol	EDR Type	Spacecraf	EDR Filename	Type o	Target	Sequence	Autof
2	10	CL1	3.98E+08	CL1_398380569EDR_F0030000CCAM04010M1.	1-D Dar	Cal Target 10	ccam04010	No
3	10	CL1	3.98E+08	CL1_398380596EDR_F0030000CCAM04010M1.	1-D Dar	Cal Target 10	ccam04010	No
4	10	CL1	3.98E+08	CL1_398380611EDR_F0030000CCAM04010M1.	1-D Dar	Cal Target 10	ccam04010	No
5	10	CR0	3.98E+08	CR0_398380645EDR_F0030000CCAM04010M1.	Image	Cal Target 10	ccam04010	No
6	10	CL1	3.98E+08	CL1_398380719EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 9	ccam05010	No
7	10	CL1	3.98E+08	CL1_398380732EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 9	ccam05010	No
8	10	CL1	3.98E+08	CL1_398380747EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 9	ccam05010	No
9	10	CR0	3.98E+08	CR0_398380781EDR_F0030000CCAM05010M1.	Image	Cal Target 9	ccam05010	No
10	10	CL1	3.98E+08	CL1_398380829EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 8	ccam05010	No
11	10	CL1	3.98E+08	CL1_398380841EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 8	ccam05010	No
12	10	CL1	3.98E+08	CL1_398380856EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 8	ccam05010	No
13	10	CR0	3.98E+08	CR0_398380890EDR_F0030000CCAM05010M1.	Image	Cal Target 8	ccam05010	No
14	10	CL1	3.98E+08	CL1_398380938EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 7	ccam05010	No
15	10	CL1	3.98E+08	CL1_398380950EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 7	ccam05010	No
16	10	CL1	3.98E+08	CL1_398380965EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 7	ccam05010	No
17	10	CR0	3.98E+08	CR0_398380999EDR_F0030000CCAM05010M1.	Image	Cal Target 7	ccam05010	No
18	10	CL1	3.98E+08	CL1_398381047EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 6	ccam05010	No
19	10	CL1	3.98E+08	CL1_398381060EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 6	ccam05010	No
20	10	CL1	3.98E+08	CL1_398381075EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 6	ccam05010	No
21	10	CR0	3.98E+08	CR0_398381109EDR_F0030000CCAM05010M1.	Image	Cal Target 6	ccam05010	No
22	10	CL1	3.98E+08	CL1_398381188EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 5	ccam05010	No
23	10	CL1	3.98E+08	CL1_398381201EDR_F0030000CCAM05010M1.	1-D Dar	Cal Target 5	ccam05010	No

Master list

mslccm_1xxx → document → msl_ccam_obs.csv

	V	W	X	Y		AC	AD	AE	AF
Site	RMC Drive	RMC POSE	Type of Obse	Comment	sp	r Heteroger	PDS?	Target Type	
4	2644	8	Single obs					Calibration Target	
4	2644	8	Single obs					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster				No	Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Calibration Target	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	2778	4	3x3 Raster					Rock	
4	3232	6	1x5 Raster					Rock	

Raster type can sometimes be wrong—check number of files

Not all data are in PDS

1. **Saturation**
2. **Low signal**
3. **Oxide totals >110%**

Getting Mars Level 1+2 data

When you know what you want

ChemCam LIBS and RMI RDR → mslccm_1xxx → data

pds-geosciences.wustl.edu/msl/msl-m

pds-geosciences.wustl.edu -

[To Parent Directory]

6/6/2013	11:24 AM	7556	aareadme.txt
12/12/2013	10:56 AM	<dir>	browse
6/7/2013	1:53 PM	<dir>	calib
11/15/2013	2:48 PM	<dir>	catalog
12/12/2013	11:01 AM	<dir>	data
12/9/2013	3:00 PM	<dir>	document
11/15/2013	4:06 PM	8425	errata.txt
4/10/2013	10:00 AM	<dir>	extras
11/15/2013	2:48 PM	<dir>	index
3/27/2013	10:27 AM	1827	voldesc.cat

pds-geosciences.wustl.edu - /
v1/mslccm_1xxx/data/

[To Parent Directory]

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11/15/2013	2:53 PM	<dir>	sol00027
6/7/2013	1:53 PM	<dir>	sol00030
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Getting Mars Level 1+2 data

When you know what you want

pds-geosciences.wustl.edu - /msl/msl-m-chemc v1/mslccm_1xxx/data/sol00050/

[To Parent Directory]

CCS = Level 1b (spectra)

MOC = Level 2 (composition)

5/17/2013	9:05 AM	3007106	cl5_401928245ccs_f0042778ccam01050p3.csv
7/31/2013	9:26 AM	27968	cl5_401928245ccs_f0042778ccam01050p3.lbl
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7/31/2013	9:34 AM	28160	cl5_401928245rdr_f0042778ccam01050p3.lbl
5/17/2013	9:05 AM	3006883	cl5_401928321ccs_f0042778ccam01050p3.csv
7/31/2013	9:26 AM	28005	cl5_401928321ccs_f0042778ccam01050p3.lbl
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5/17/2013	9:05 AM	3007278	cl5_401928397ccs_f0042778ccam01050p3.csv
7/31/2013	9:26 AM	28003	cl5_401928397ccs_f0042778ccam01050p3.lbl
11/6/2013	4:47 PM	1505	cl5_401928397moc_f0042778ccam01050p3.csv
11/6/2013	4:47 PM	22876	cl5_401928397moc_f0042778ccam01050p3.lbl
5/17/2013	9:05 AM	2241783	cl5_401928397rdr_f0042778ccam01050p3.csv
7/31/2013	9:34 AM	28195	cl5_401928397rdr_f0042778ccam01050p3.lbl
5/17/2013	9:05 AM	3007045	cl5_401928508ccs_f0042778ccam01050p3.csv

Getting all Mars Level 2 data

Concatenated PLS compositions

ChemCam LIBS and RMI RDR → mslccm_1xxx → extras

pds-geosciences.wustl.edu/msl/msl-m

pds-geosciences.wustl.edu -

[To Parent Directory]

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12/9/2013	3:00 PM	<dir>	document
11/15/2013	4:06 PM	8425	errata.txt
4/10/2013	10:00 AM	<dir>	extras
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3/27/2013	10:27 AM	1827	voldesc.cat

pds-geosciences.wustl.edu - /msl v1/mslccm_1xxx/extras/

[To Parent Directory]

4/10/2013	1:54 PM	754771	dn2engunits_lut.pdf
3/27/2013	10:27 AM	520	extrinfo.txt

Currently **NOT** in there! In the future, will include:

1. Location-averaged PLS compositions
2. Single-shot PLS compositions

In the meantime, email us to get the table.

Getting Mars quicklooks

When you DON'T know what you want

ChemCam LIBS and RMI RDR → mslccm_1xxx → browse

pds-geosciences.wustl.edu/msl/msl-m

pds-geosciences.wustl.edu -

[To Parent Directory]

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4/10/2013	10:00 AM	<dir>	extras
11/15/2013	2:48 PM	<dir>	index
3/27/2013	10:27 AM	1827	voldesc.cat

pds-geosciences.wustl.edu - v1/mslccm_1xxx/browse/

[To Parent Directory]

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11/15/2013	2:49 PM	<dir>	sol00055
11/15/2013	2:48 PM	<dir>	sol00056

Getting Mars quicklooks

When you DON'T know what you want

pds-geosciences.wustl.edu - /msl/msl-m-chemcam-v1/mslccm_1xxx/browse/sol00050/

libs1 = averaged spectrum

libs2 = line density plot

rmi = image quicklook

[To Parent Directory]

11/6/2013	4:18 PM	236131	gchemcam_00050_libs1_401928245.jpg
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11/6/2013	4:18 PM	236676	gchemcam_00050_libs1_401928321.jpg
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11/6/2013	4:18 PM	235776	gchemcam_00050_libs1_401928761.jpg
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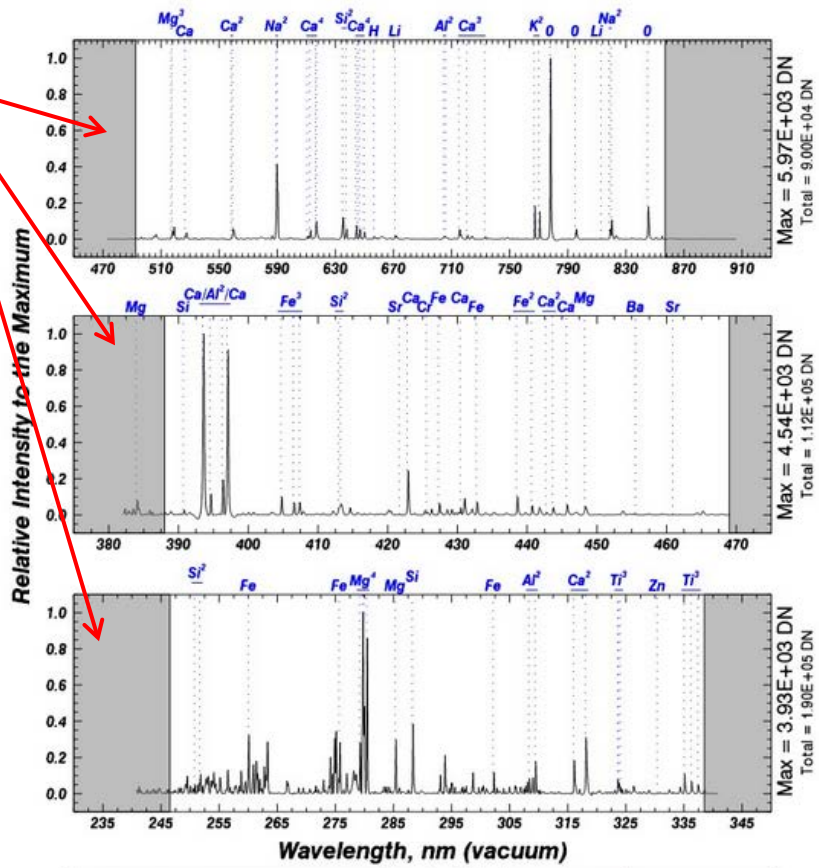
11/6/2013	4:18 PM	353423	gchemcam_00050_libs2_401928245.jpg
11/6/2013	4:18 PM	1858	gchemcam_00050_libs2_401928245.lbl
11/6/2013	4:18 PM	344743	gchemcam_00050_libs2_401928321.jpg

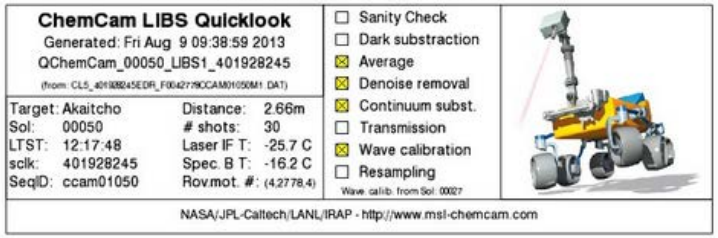
LIBS1 quicklook

Averaged spectrum

Average spectrum of all shots (1 location)



Information about target, sol, number of shots, processing

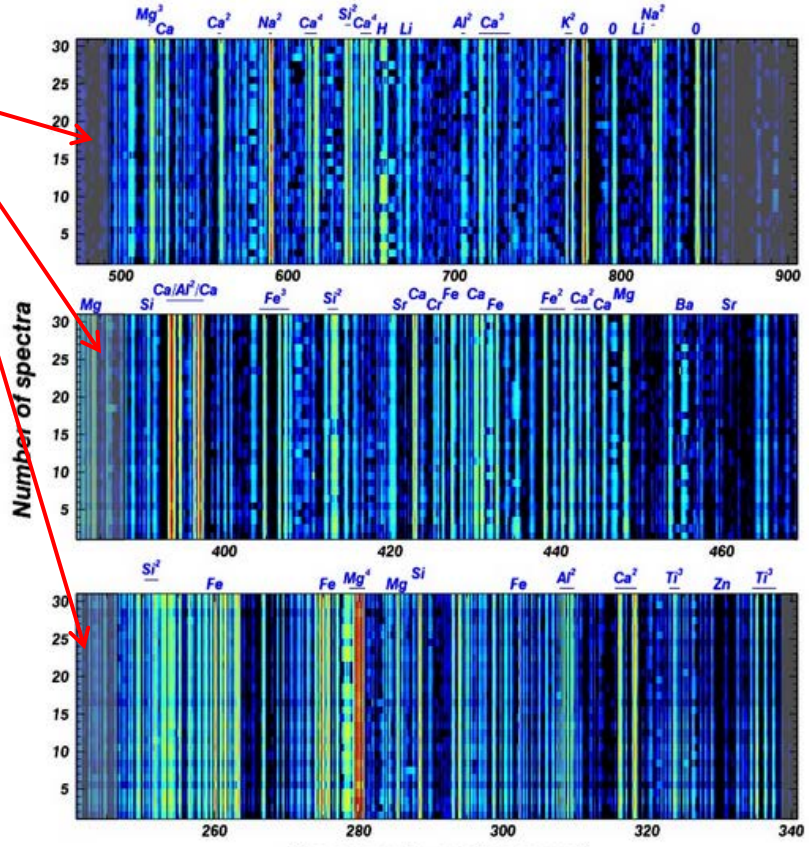


LIBS2 quicklook

Line density plot

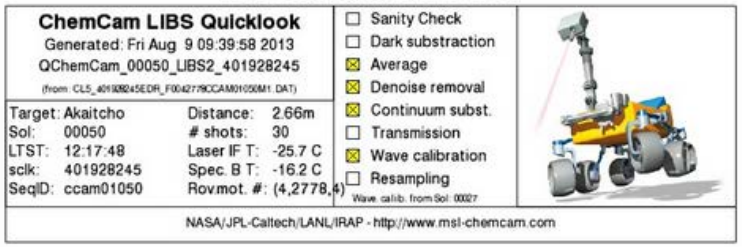
Change in line throughout all shots (1 location)

Warm = Strong signal
Cool = Weak signal

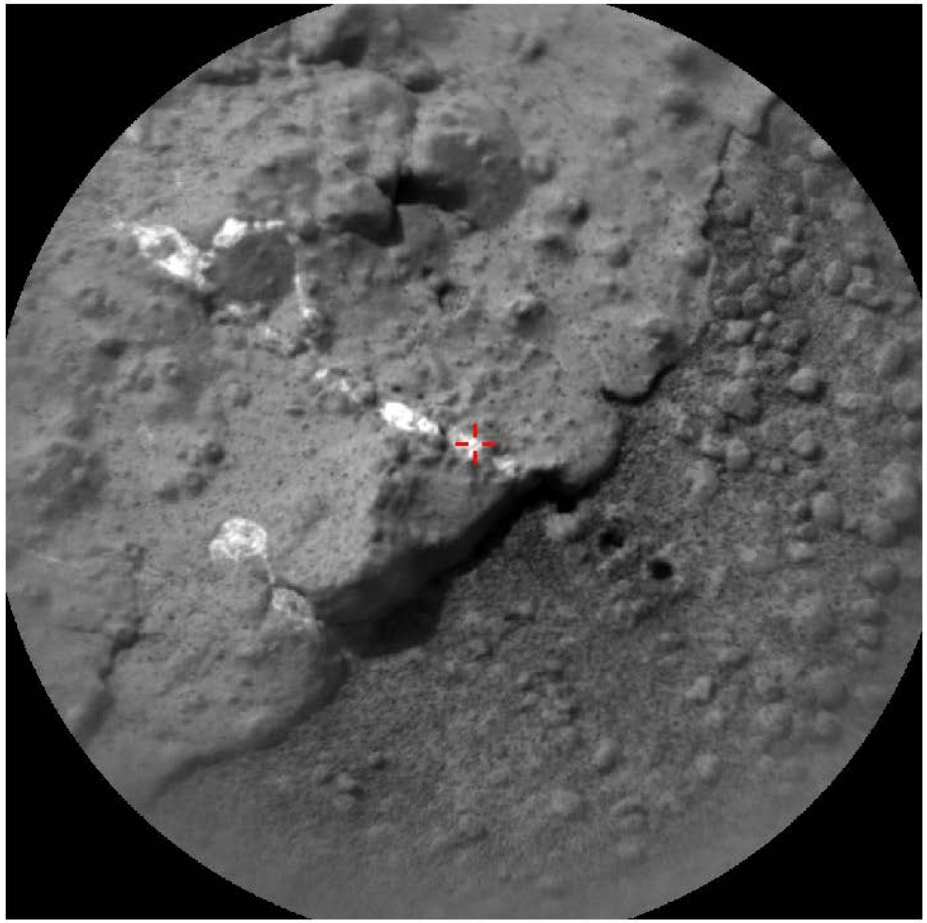


Shot number

Information about target, sol, number of shots, processing



RMI quicklook



Scale (image width, cm): 4.7
+ co-aligned LIBS laser position

ChemCam RMI Quicklook
Generated: Wed Jun 26 05:09:16 2013
QChemCam_00187_RMI_414093565
(from: CR0_414093565EDR_F0080000CCAM02187M1.IMG)

Target: seward_1	Distance, m: 2.311
Sol: 187	Tel. temp, °C: -20.7
LTST: 12:24:02	Exposure, ms: 13
sclk: 414093565	
SeqID: ccam02187	Rov.mot. #: (602)

- [x] Linearity correction
- [x] Dark substraction
- [x] Smearing correction
- [x] Ghost removal
- [x] Flat field correction (FLIGHT32)
- [x] Bad pixels process.
- [x] Mask applied
- [x] Contrast enhancement

NASA/JPL-Caltech/LANL/IRAP/IAS - http://www.msl-chemcam.com

Information about target, sol, exposure, processing

Getting LIBS lab calibration data

ChemCam LIBS and RMI RDR → mslccm_1xxx → calib

pds-geosciences.wustl.edu/msl/msl-m

pds-geosciences.wustl.edu -

[To Parent Directory]

6/6/2013	11:24 AM	7556	aareadme.txt
12/12/2013	10:56 AM	<dir>	browse
6/7/2013	1:53 PM	<dir>	calib
11/15/2013	2:48 PM	<dir>	catalog
12/12/2013	11:01 AM	<dir>	data
12/9/2013	3:00 PM	<dir>	document
11/15/2013	4:06 PM	8425	errata.txt
4/10/2013	10:00 AM	<dir>	extras
11/15/2013	2:48 PM	<dir>	index
3/27/2013	10:27 AM	1827	voldesc.cat

pds-geosciences.wustl.edu - /msl/m
v1/mslccm_1xxx/calib/

[To Parent Directory]

5/16/2013	2:43 PM	2191	calinfo.txt
6/7/2013	1:53 PM	<dir>	cleanroom
3/27/2013	10:25 AM	14655054	msl_ccam_libs_calib.csv
4/11/2013	9:00 AM	2952	msl_ccam_libs_calib.lbl

1. *msl_ccam_libs_calib.csv:* Averaged and concatenated calibration standards data (all).
2. *Cleanroom (folder):* Single-shot calibration standards data (all). See Wiens et al. (2013) for details on standards.

Bulk data downloads

- Can download one file at a time by hand
- For bulk downloads, must use script or software
  - **Wget**: https://www.gnu.org/software/wget/

https://www.gnu.org/software/wget/

Skip to main text | Accessibility

GNU Operating System

Join the FSF!
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A monthly email newsletter about GNU and Free Software
Enter your email address (e.g. address@hidden)
Ok

About GNU | Philosophy | Licenses | Education | Software | Documentation | Help GNU

Why GNU/Linux? Search

GNU Wget

Introduction to GNU Wget

GNU Wget is a free software package for retrieving files using HTTP, HTTPS and FTP, the most widely-used Internet protocols. It is a non-interactive commandline tool, so it may easily be called from scripts, `cron` jobs, terminals without X-Windows support, etc.

GNU Wget has many features to make retrieving large files or mirroring entire web or FTP sites easy, including:

- Can resume aborted downloads, using `REST` and `RANGE`

Questions? Ask us!

ChemCam team members are happy to help

Additional information

Getting and using raw ChemCam data

Getting and using **raw** data from PDS

http://pds-geosciences.wustl.edu/missions/msl/chemcam.htm

-geosciences.wustl.edu/missions/msl/chemcam.htm

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

+ NASA Homepage
+ NASA en Español
+ Contact NASA

PDS Geosciences Node
Washington University in St. Louis

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Services
- Analyst's Notebooks
- Virtual Astronaut
- Orbital Data Explorers
- Spectral Library
- FTP Access
- Workshops

Geosciences Node Data
- Mars
  - Mars Exploration
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    - **ChemCam**
    - CheMin
    - DAN
    - SAM
  - Phoenix
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  - Mars Express
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  - Viking Lander
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- Asteroids
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- All Geosciences Data Holdings

MSL: ChemCam

December 13, 2013. MSL Release 4 includes new ChemCam raw (EDR) and derived (RDR) data from sols 270 through 359, along with revised versions of ChemCam LIBS MOC derived products for sols 13 through 234. Browse images for sols 13 through 176 and 192 have been updated. See ERRATA.TXT for details.

ChemCam combines the LIBS (Laser Induced Breakdown Spectrometer) and the RMI (Remote Micro-Imager) to analyze the elemental composition of laser-vaporized materials from the surface of Martian rocks and soils. ChemCam data sets are produced by the ChemCam team at Los Alamos National Laboratory and the Centre National D'Etudes Spatiales (CESR), Toulouse, France.

ChemCam Data Sets

Raw Data Products

ChemCam LIBS, RMI, and State-of-Health EDR (Experiment Data Records)

Derived Data Products

ChemCam LIBS and RMI RDR (Reduced Data Records)

Online Tools

MSL Analyst's Notebook - This PDS Geosciences Node tool provides access to MSL data in the context of mission operations -- by sol, location, instrument, and other criteria.

Related Information

PDS Catalog Files

ChemCam LIBS EDR (Raw) Data Set Description

ChemCam RMI EDR (Raw) Data Set Description

R**aw data** available here

Main menu for raw data

ChemCam LIBS, RMI, and State of Health EDR → mslccm_0xxx

pds-geosciences.wustl.edu/msl/msl-m-chemcam-libs-2-edr-v1/mslccm_0xxx/

pds-geosciences.wustl.edu - /msl/msl-m-chemcam-lil

[To Parent Directory]

5/15/2013	10:04 AM	10324	aareadme.txt
6/7/2013	2:23 PM	<dir>	calib
8/28/2013	2:00 PM	<dir>	catalog
12/12/2013	11:29 AM	<dir>	data
12/2/2013	5:05 PM	<dir>	document
12/5/2013	12:24 PM	8814	errata.txt
12/9/2013	11:46 AM	<dir>	extras
12/2/2013	4:34 PM	<dir>	index
11/25/2013	2:45 PM	<dir>	label
2/13/2013	10:00 AM	2488	voldesc.cat

aareadme: File structure

calib: Raw lab calibration data

data: Raw Mars data

Getting Mars raw data

When you know what you want

pds-geosciences.wustl.edu/msl/msl-m-che

pds-geosciences.wustl.edu - /m

[To Parent Directory]

5/15/2013	10:04 AM	10324	aareadme.txt
6/7/2013	2:23 PM	<dir>	calib
8/28/2013	2:00 PM	<dir>	catalog
12/12/2013	11:29 AM	<dir>	data
12/2/2013	5:05 PM	<dir>	document
12/5/2013	12:24 PM	8814	errata.txt
12/9/2013	11:46 AM	<dir>	extras
12/2/2013	4:34 PM	<dir>	index
11/25/2013	2:45 PM	<dir>	label
2/13/2013	10:00 AM	2488	voldesc.cat

pds-geosciences.wustl.edu - /m
v1/mslccm_0xxx/data/

[To Parent Directory]

6/7/2013	2:24 PM	<dir>	sol00000
6/7/2013	2:24 PM	<dir>	sol00010
6/7/2013	2:24 PM	<dir>	sol00012
8/28/2013	2:00 PM	<dir>	sol00013
8/28/2013	2:00 PM	<dir>	sol00014
8/28/2013	2:00 PM	<dir>	sol00015
8/28/2013	2:00 PM	<dir>	sol00019
8/28/2013	2:00 PM	<dir>	sol00022
8/28/2013	2:00 PM	<dir>	sol00027
6/7/2013	2:24 PM	<dir>	sol00030
8/28/2013	2:00 PM	<dir>	sol00032
8/28/2013	2:00 PM	<dir>	sol00033
6/7/2013	2:24 PM	<dir>	sol00034
6/7/2013	2:24 PM	<dir>	sol00036
8/28/2013	2:00 PM	<dir>	sol00040
8/28/2013	2:00 PM	<dir>	sol00043
8/28/2013	2:00 PM	<dir>	sol00045
6/7/2013	2:24 PM	<dir>	sol00046
6/7/2013	2:24 PM	<dir>	sol00047
8/28/2013	2:00 PM	<dir>	sol00048
8/28/2013	2:00 PM	<dir>	sol00049
8/28/2013	2:00 PM	<dir>	sol00050
8/28/2013	2:00 PM	<dir>	sol00055
8/28/2013	2:00 PM	<dir>	sol00056
8/28/2013	2:00 PM	<dir>	sol00057
8/28/2013	2:00 PM	<dir>	sol00059
8/28/2013	2:00 PM	<dir>	sol00061

Getting Mars raw data

pds-geosciences.wustl.edu - /msl/msl-m-chemcam-libs v1/mslccm_0xxx/data/sol00033/

[To Parent Directory]

edr = experiment data record

5/15/2013	10:15 AM	12336	cc0_400420271epw_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	10304	cc0_400420271epw_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	20560	cc0_400420273edr_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	17229	cc0_400420273edr_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	12336	cc0_400420278ewu_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	10302	cc0_400420278ewu_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	20560	cc0_400420280edr_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	17230	cc0_400420280edr_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	12336	cc0_400420706ewu_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	10299	cc0_400420706ewu_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	20560	cc0_400420708edr_f0040000ccam00033m1.dat
5/15/2013	10:15 AM	17226	cc0_400420708edr_f0040000ccam00033m1.lbl
5/15/2013	10:15 AM	30840	cc0_400422892epo_f0040000ccam15003m1.dat
5/15/2013	10:15 AM	28837	cc0_400422892epo_f0040000ccam15003m1.lbl
5/15/2013	10:15 AM	39064	cl1_400420738edr_f0040000ccam01033m1.dat
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5/15/2013	10:15 AM	90464	cl1_400421450edr_f0040000ccam02033m1.dat
5/15/2013	10:15 AM	24450	cl1_400421450edr_f0040000ccam02033m1.lbl
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5/15/2013	10:15 AM	39064	cl1_400421927edr_f0040000ccam03033m1.dat
5/15/2013	10:15 AM	24450	cl1_400421927edr_f0040000ccam03033m1.lbl
5/15/2013	10:15 AM	90464	cl1_400421951edr_f0040000ccam03033m1.dat
5/15/2013	10:15 AM	24532	cl1_400421951edr_f0040000ccam03033m1.lbl
5/15/2013	10:15 AM	39064	cl1_400422031edr_f0040000ccam04033m1.dat
5/15/2013	10:15 AM	24440	cl1_400422031edr_f0040000ccam04033m1.lbl
7/26/2013	7:25 AM	674368	cl5_400422236edr_f0040000ccam04033m1.dat
7/26/2013	7:25 AM	26633	cl5_400422236edr_f0040000ccam04033m1.lbl
7/26/2013	7:25 AM	674368	cl5_400422333edr_f0040000ccam04033m1.dat
7/26/2013	7:25 AM	26666	cl5_400422333edr_f0040000ccam04033m1.lbl
7/26/2013	7:25 AM	674368	cl5_400422430edr_f0040000ccam04033m1.dat
7/26/2013	7:25 AM	26668	cl5_400422430edr_f0040000ccam04033m1.lbl
7/26/2013	7:25 AM	674368	cl5_400422527edr_f0040000ccam04033m1.dat
7/26/2013	7:25 AM	26633	cl5_400422527edr_f0040000ccam04033m1.lbl
7/26/2013	7:25 AM	674368	cl5_400422624edr_f0040000ccam04033m1.dat
7/26/2013	7:25 AM	26672	cl5_400422624edr_f0040000ccam04033m1.lbl
5/15/2013	10:15 AM	117192	cl9_400421231edr_f0040000ccam02033m1.dat
5/15/2013	10:15 AM	24828	cl9_400421231edr_f0040000ccam02033m1.lbl

.dat files (binary file)

.lbl file of same name describes .dat file

pds-geo

pds-geoscien

[To Parent Directory]

5/15/2013	10:04	AM
6/7/2013	2:23	PM
8/28/2013	2:00	PM
12/12/2013	11:29	AM
12/2/2013	5:05	PM
12/5/2013	12:24	PM
12/9/2013	11:46	AM
12/2/2013	4:34	PM
11/25/2013	2:45	PM
2/13/2013	10:00	AM

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WARNING

Things to keep in mind when using raw data

VNIR	VIO	UV
474.0-906.5 nm	382.1-469.3 nm	240.1-342.2 nm

- Spectrometer order for raw LIBS data (CL5) is VNIR, VIO, UV → must be **reordered**
- Spectral data is pixel-ordered → **NOT** in wavelength
- 50 blind pixels on either side of each spectrometer range → must be removed
- Header info:
  - Motor position, spectrometer temperature data available
  - Description of header info (format files) found in Label directory in main menu (see slide 24)