Introduction to ENVI/IDL + CAT

CRISM Hyperspectral Data Analysis
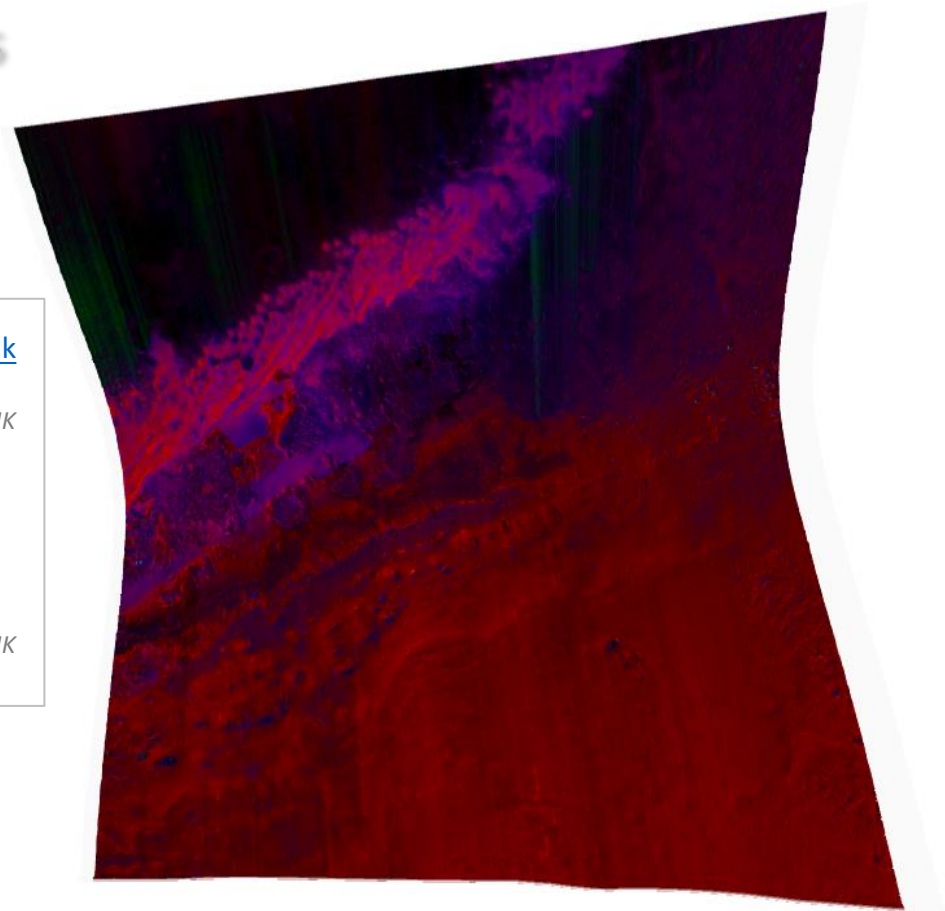
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Jennifer Harris
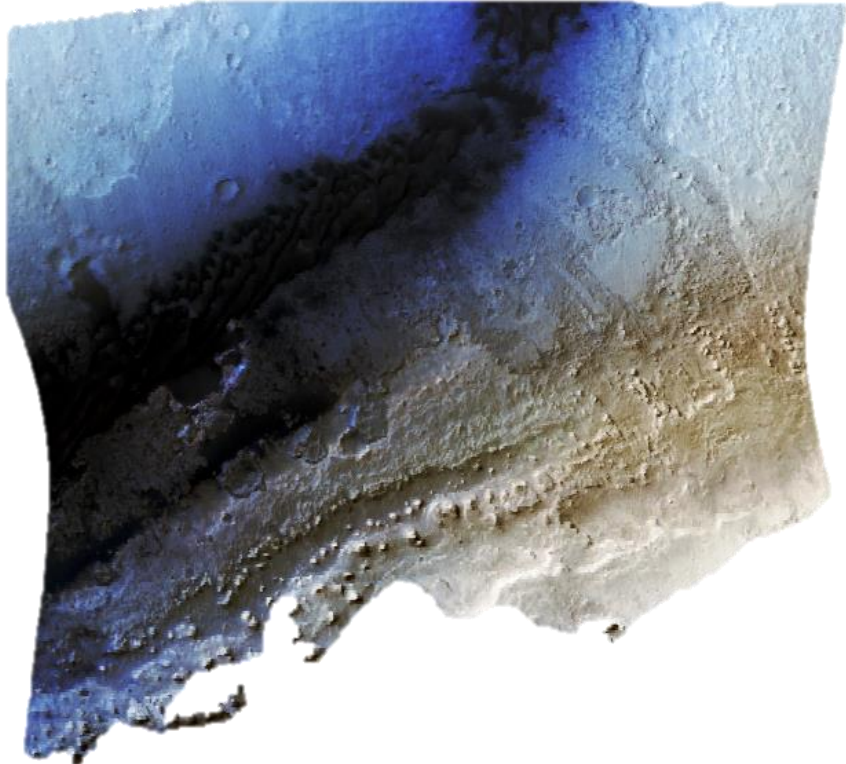
Department of Earth and Planetary Sciences, Birkbeck, University of London, UK
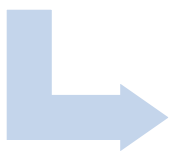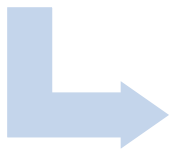*Centre for Planetary Sciences at UCL/Birkbeck, UK*

Outline of Session

Data Collection
- NASA Planetary Data System (PDS)
- Observation types

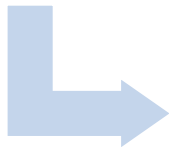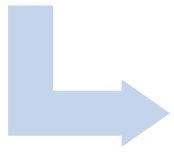**ENVI/IDL**
- PDS to CAT conversion

ENVI/IDL
- Photometric correction
- Atmospheric correction
- Clean cube (destripe, despike)

ENVI/IDL
- Summary parameters
- Spectral smile removal
- Map projection

ENVI/IDL
- Common analysis techniques

CRISM Analysis Toolkit (CAT) in ENVI/IDL

- ENVI is a commercial software suite
  - Most widely-used in spectral analysis, but also some GIS similarities
  - Need full ENVI/IDL licence to install and run CAT

- Main disadvantage is cost of software (and "Classic" version!)
  - No open source alternatives for CAT

- First port of call should be the PDS Geoscience CRISM site:
  http://pds-geosciences.wustl.edu/missions/mro/crism.htm

- Two CRISM workshops already been held:
  - 1st in March 2009, Houston (http://pds-geosciences.wustl.edu/workshops/CRISM_Workshop_Mar09.htm)
  - 2nd in March 2012, Houston (http://pds-geosciences.wustl.edu/workshops/CRISM_workshop_Mar12.htm)

- Workshop information is a fantastic resource, includes all presentations and data – we will follow their instructions!

- Walk-through exercise will cover one image in Gale Crater, but chance in practical to gather and process your own data in real-time.

Typical CRISM data flow

1. Identify data in region of interest
    *   Access the PDS   (Imaging, Geosciences)
    *   Or use CRISM map   (CRISM) – NOT ALWAYS UP TO DATE

2. Download data   (link)

3. CAT: PDS to CAT conversion

4. PHT: Photometric correction

5. ATM: Volcano Scan atmospheric correction

6. CLN: CIRRUS (CRISM Clean)
    *   Destripe (VNIR and IR)
    *   Despike (IR)

7. SUM: Summary parameter calculation
    *   Remove spectral smile

8. MAP: Map project cubes

9. Analyse data