

1. BRINGING MER TO THE MASSES

Our goal is to make MER data fully accessible to:

- Experienced Mars, planetary science, and geoscience researchers
- Graduate students
- Undergraduate students
- School teachers
- Space enthusiasts
- Anyone who wants to find and/or use MER data

We will go beyond the requirements of the Americans with Disabilities Act (ADA) to enable people with a wide range of abilities, disabilities, and accessibility requirements to access and use the MER PORTAL.

2. OUR TOP PRIORITIES

The first stage of the MER PORTAL is funded by a PDART21 (Grant No. 80NSSC23K0022). Our initial website will include:

- Data Analysis User Guides**, based on interviews with our MER team Collaborators, akin to the guidance one would give one's grad students
- Guides** to the MER vehicle and **instruments**
- MER Image Interpretation** Training Materials, and college-level **Lesson Plans** based on them
- Datasets** generated by MER team members
- A list of **online tools and websites** relevant to MER data analysis and the MER mission

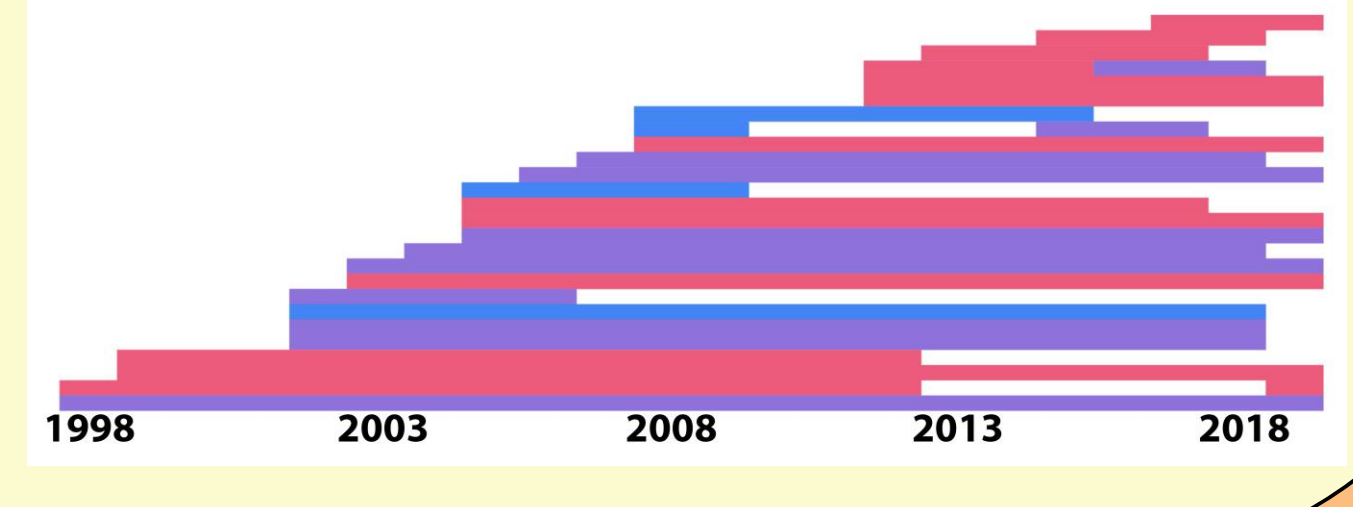
3. WHO WE ARE

Our team includes MER scientists and engineers; Mars scientists who were not on the MER team; a journalist chronicler; and experts in EDIA, spacecraft data catalog production by human catalogers and machine learning algorithms, website and software development, data archiving, education, and mentoring.

* indicates MER Team member; see Fig. 2.

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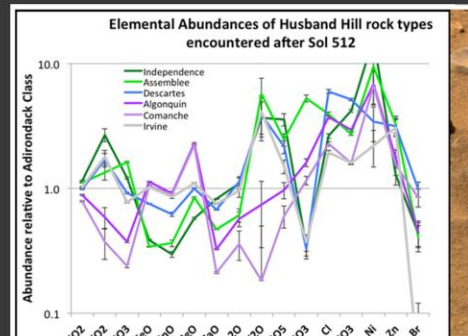
Fig. 2. Visualization of our team's timeline working in Science (blue), Operations red), or Combined (purple) positions on the MER mission. Each row represents one person.




Do you want to use Mars Exploration Rover (Spirit and Opportunity) data? The PORTAL is for you! (But our grant just started, so you might have to wait a couple of years)

Welcome to the MER PORTAL

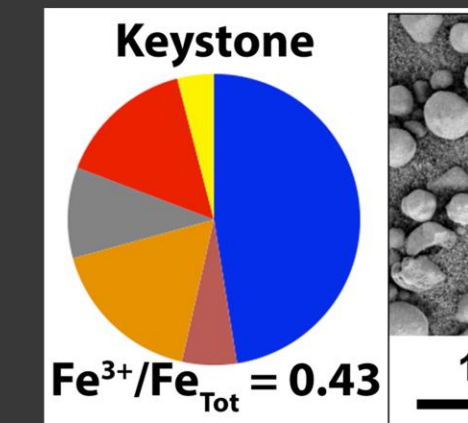
What would you like to do?




Find data



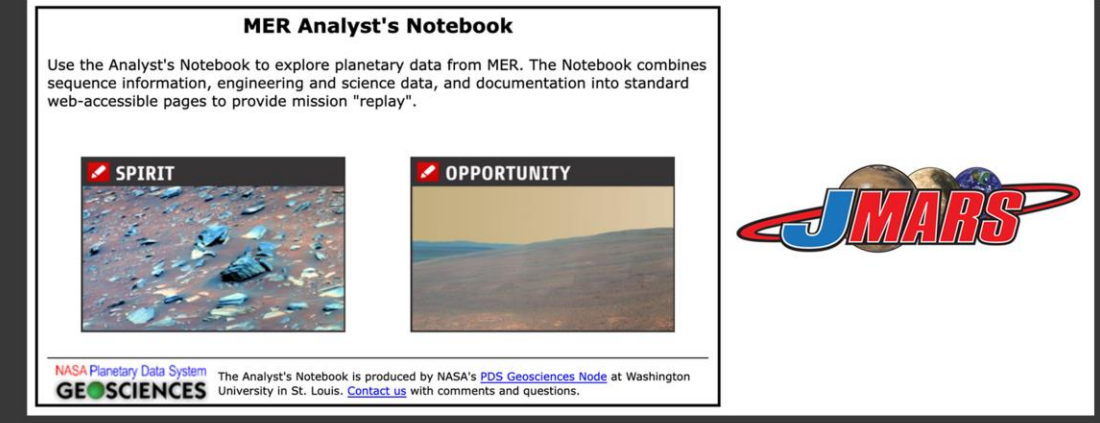
Find pretty pictures




Learn how to analyze MER data



Learn about the MER vehicle and instruments



Find tools and websites relevant to analyzing MER data



Find websites and publications relevant to the MER mission

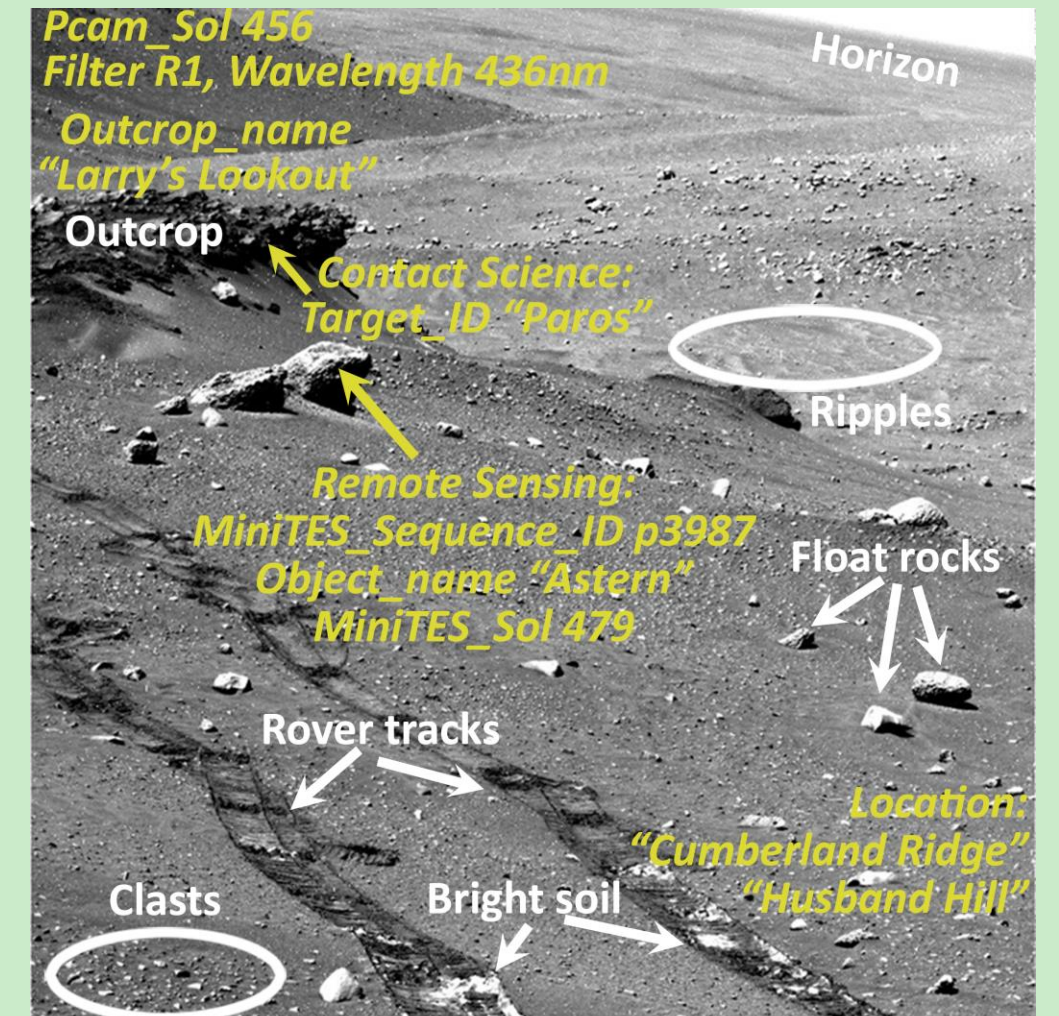
Fig. 1. A mockup of the future MER PORTAL launch page

The MER PORTAL will ensure that people without a connection to the mission have what they need to analyze MER data, including:

- User Guides** that enable data analysis
- An intuitive **science-based search** capable of downloading data products from the PDS
- Contextual information** and **data quality indicators**
- Visualization tools** and other tools requested by the user community¹
- Links** to existing MER-related tools and websites

4. FUTURE CAPABILITIES

Fig. 3. Do you want to search for named rocks and soils, meteorites, compositional classes, geographical locations, bright soils, dust devils, or other elements annotated on this image? Our user-friendly search will enable anyone from casual users to experienced Mars researchers to find what they're looking for. Pancam image 2P166850381RADA9DWP2279R1C1.



We plan to develop an intuitive, user-friendly, science-based search interface (see Fig. 3), that will include:

- Objects and phenomena in MER images
- Data quality indicators (e.g., spectrometer integration time, comments noted by the operations team)
- Dates and times in multiple formats (Sol, Earth date)
- Informal names

Members of our team have begun cataloging MER image content using Machine Learning^{2,3}; a preliminary science-based image search is available on the PDS Image Atlas⁴.

5. ALIGNMENT WITH THE PDE IRB

We directly address issues raised by the Planetary Data Ecosystem Independent Review Board (PDE IRB)⁵. The MER PORTAL will provide:

- A portal to data, documents, software tools, and supporting information, in a format suitable for the broadest range of users looking for planetary data, that will assist in the retrieval of NASA science data
- Focused educational and documentation materials that meet the highest-priority needs identified in our assessment of the community¹
- Metadata describing data quality, enabling users to assess suitability for their applications

6. EQUITY, DIVERSITY, INCLUSION, AND ACCESSIBILITY (EDIA)

EDIA is at the core of the MER PORTAL. Aspects of our organization relevant to EDIA include:

- A collaboration with the Southwestern Indian Polytechnic Institute (SIPI), based on long-standing relationships, to work with (and pay) a SIPI teacher to develop MER Image Interpretation Lesson Plans
- A paid Accessibility Consultant who identifies as a person with disabilities
- An Ombud to mediate any misunderstandings or interpersonal issues

Team diversity:

- 53% of team members are women and/or people with feminine gender expression, including 3/5 of our leadership
- At least 13% of team members identify as having a disability and/or chronic illness(es)
- 2/5 of our leadership are People of Color

7. GET INVOLVED!

If you

- Have any questions
- Would like to beta-test our materials
- Are a MER team member who'd like to contribute

Please contact us!

scole@spacescience.org

REFERENCES AND ACKNOWLEDGEMENTS

¹Cole et al. (2020), *LPSC LI*, Abstract #1709, <https://www.hou.usra.edu/meetings/lpsc2020/eposter/1709.pdf>. ²Lu et al. (2021), *LPSC LII*, Abstract #1779, <https://www.hou.usra.edu/meetings/lpsc2021/pdf/1779.pdf>. ³Zhao et al. (2020), MER Opportunity and Spirit Rovers Pancam Images Labeled Data Set (Version 1.1.0), <https://zenodo.org/record/4302760>. ⁴<https://pds-imaging.jpl.nasa.gov/search>. ⁵Planetary Data Ecosystem Independent Review Board (PDE IRB) (2021), Final Report, <https://science.nasa.gov/science-pink/s3fs-public/atoms/files/PDE%20IRB%20Final%20Report.pdf>.

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