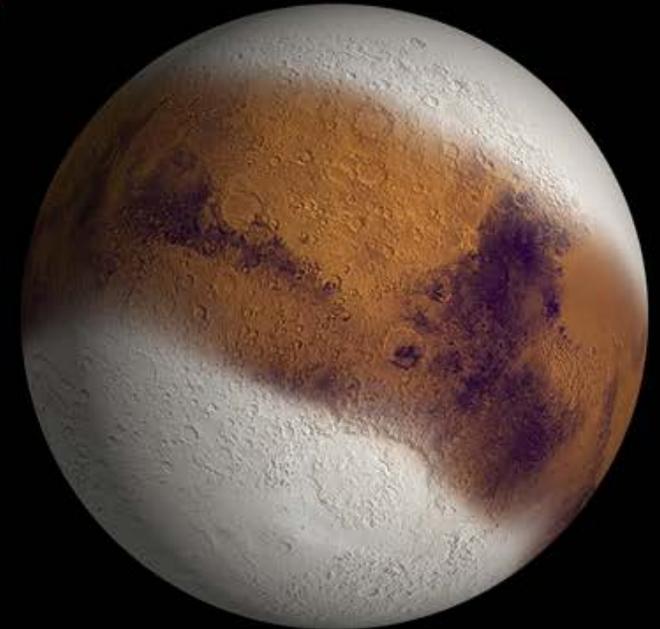
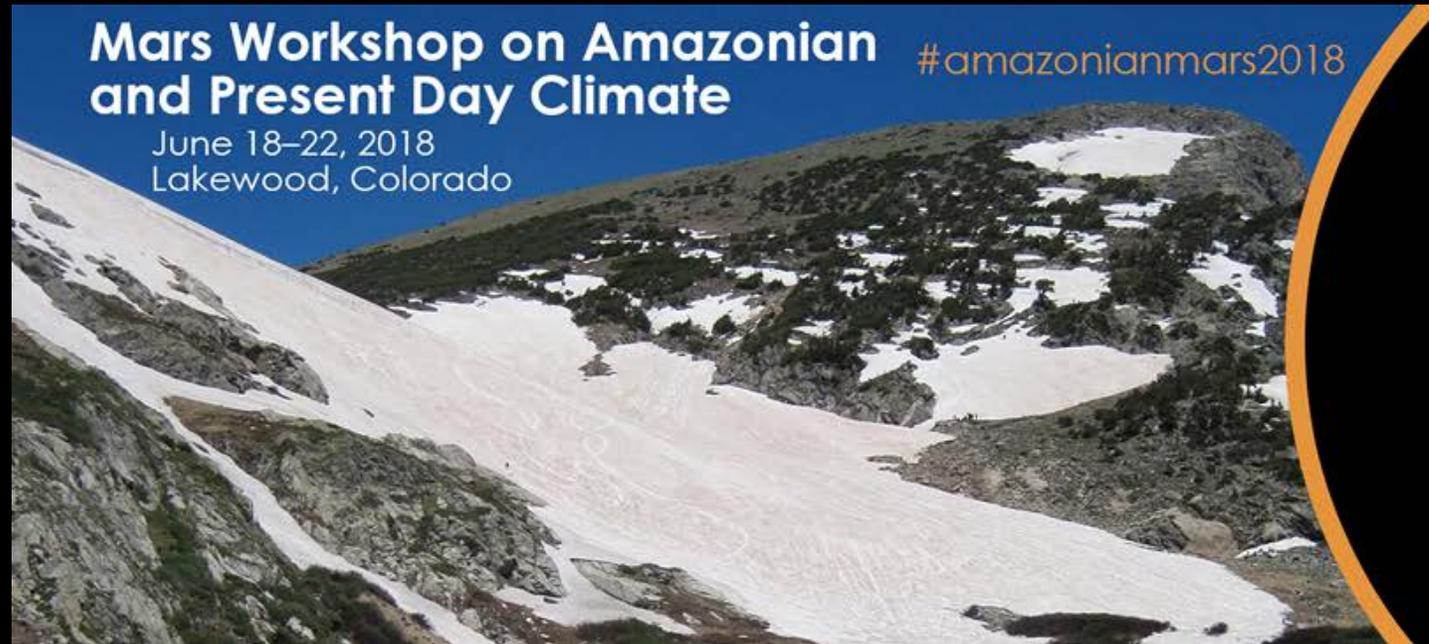


Preliminary workshop report



@MEPAG VM2

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Motivation for workshop

<https://www.hou.usra.edu/meetings/amazonian2018/>

This workshop was:

- Intended to promote the exchange of knowledge and ideas regarding the last 3 Ga of martian polar and climate history, including its environment and processes
- Designed to assess the current state of research for Mars' recent and current environment and surface processes, including studies in glaciology, geomorphology, geochemistry, and atmospheric and climate sciences
- Included studies connecting the physical landscape and surface composition with environmental conditions, climate, and/or processes over a range of timescales from diurnal to orbital cycles
- Supplemented between the *International Conference on Mars Polar Science and Exploration* series (last: 2016; next: 2020).
- ~50 participants (incl. 17 students) included those studying the current and past climates via modeling and observations, glaciology features on Earth and Mars, present-day surface and atmospheric changes, subsurface structures, geochemists, etc.

Program

- Started with an overview of Polar Science series and workshops, as well as MEP/MEPAG efforts
- 3 days of Science talks + Poster session (~40 presentations), with long discussion:
 - *Reading the Leaves: Modeling and Interpreting the Martian Climate*
 - *Heat and Ice: Mars' Polar Energy Balance*
 - *Everything was Swept Under the Rug: Mars' Polar Cap Structure & Age*
 - *Mars Plays Favorites: Differences Between the Caps*
 - *Things are Moving and Changing: Present-Day Surface Activity*
 - *"Polar" Extends Equatorward: Records of Ice Beyond the Poles*
 - *Signs of Wet and/or Icy Conditions: Surface-Volatile Interactions*
 - Also got a dust storm update
- Mid-week fieldtrip: glacial terrain
- Keynote presentation by Bruce Jakosky on *Mars water and history*
- Last day focused on needed measurements and potential future mission concepts



Mid-week field trip

- @ Rocky Mountain National Park
- Guided by Brian Hynek (U Colorado)
- Saw glacial features from above, and alpine terrain and a recently reworked (1982/2013) alluvial fan in situ



Friday group discussion

- focused on identifying high-priority science objectives → needed measurements → how those might be addressable via current assets/work or how those fit into concepts for future missions.
- Included presentations by Ball and JPL engineers on technology developments that address key challenges for recent Mars climate investigations:
 - Such as power during polar night, how to measure near-surface winds from orbit, and how to get small spacecraft to Mars.

Some preliminary outputs

Group consensus: A top science objective for Mars Amazonian Climate studies is to identify, measure, and interpret the surface record of Mars' recent climate history. In particular, establishing if the PLDs or other surface materials record climate variations over yearly-decadal, orbital (e.g., obliquity cycles), and longer timescales.

PRELIMINARY list of key open science questions:

- What is timescale, completeness, and temporal resolution recorded in PLD?
 - How to identify and interpret geologic and atmospheric “records” that volatiles leave outside the polar regions?
 - What are the present and past fluxes of volatiles, particulates, and energy across the globe?
 - How much material is contained within dust/sand/ice reservoirs, how are they formed, preserved, or depleted, and when?
 - What is the mass/energy balance at the poles?
- *We note that the Revised MEPAG Goals Document is a much better reflection of important science with regards to studies of the Amazonian and present-day Mars climate.*

To get more information ...

- There will be a record of the workshop (i.e., Summary report):
 - Identifying current high-priority science questions and needed measurements
 - Aiming to create a useful reference for the community.
- Ali Bramson has an invited talk about the Amazonian Climate at *COSPAR*.
- *“Unlocking the climate record stored in Mars polar caps” KISS workshop report is expected ~end of August.*
- Come join us! at the *7th International Mars Conference on Polar Science and Exploration*
 - January 13-17, 2020 @ Patagonia (Argentina)
 - <https://www.hou.usra.edu/meetings/marspolar2020/>