

SPACE STUDIES BOARD

Committee on Astrobiology and Planetary Science

CAPS Report to the Space Studies Board

*Fall Meeting
November 15th, 2022*

A personal view by
Martha S. Gilmore and Christopher H. House,
Co-Chairs

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Members in **blue** will have rotated off by the end of December.
New members and a new co-chair have been identified.



2022

Prepublication Copy – Subject to Further Editorial Correction

Independent Review of the Community
Report from the Biosignature Standards of
Evidence Workshop

Report Series – Committee on Astrobiology and
Planetary Sciences

Committee on Astrobiology and Planetary Sciences

Space Studies Board

Division on Engineering and Physical Sciences

National Academies of Sciences, Engineering, and Medicine

National Academies Press
Washington, DC

Consensus Study Report

PREPUBLICATION COPY – SUBJECT TO FURTHER EDITORIAL CORRECTION

Independent Review of the Community Report from the Biosignature Standards of Evidence Workshop: Report Series—Committee on Astrobiology and Planetary Sciences

At the request of NASA, the Committee on Astrobiology and Planetary Sciences of the National Academies of Sciences Engineering, and Medicine, in its role as an independent forum, conducted a review of the NASA report “Community Report from the Biosignatures Standards of Evidence Workshop”. The review addresses the accuracy, assumptions, and conclusions of the NASA report. This publication details the findings of the committee.

- Report released July 18th, 2022
- Briefed NASA on July 13th, 2022
- The National Academies DEPSCOM briefed on September 15th
- All positive receptions

Recap of CAPS September 28-29th Meeting

- Update from the NASA Planetary Science Division and NASA Astrobiology
- Presentation on plans for the New Frontiers 5 competition (Curt Niebur)
- Status update in NASA Europa Clipper Mission and Mars Sample Return Program
- Talk about recommendations regarding Mars Sample Return Facility
- Talks from chairs of SBAG, VEXAG, OPAG, and MEPAG NASA assessment groups



The propulsion module of NASA's Europa Clipper spacecraft. **NASA JPL/Caltech**

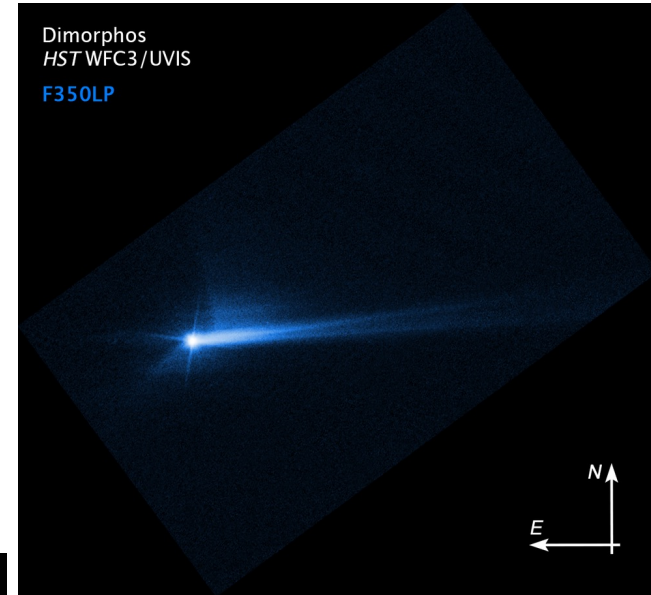
New Frontiers 5 Discussion

- Significant discussion of the fall New Frontiers 5 community announcement leading to the draft AO, including the following topics:
 - Draft target list did not include Venus *In Situ* Explorer (VISE) due to programmatic balance following NASA's selection of two Venus missions in Discovery program and ESA's selection of an M-class Venus mission
 - PSDS/OWL report did not discuss NF5 but assumed that VISE would remain on the list as it had been on prior NASA lists
 - Phase A-D cost cap was significantly lower than NF4
 - Phase E was capped
 - NASA has different decadal guidance to consider (and what a balance portfolio means)
- Draft AO expected in November 2022, followed by another community announcement in the spring
- AO for New Frontiers 5 is expected in November 2023



Astrobiology/Planetary Science Updates

- Perseverance has cached 14 samples and will establish its first cache of duplicates at “Three Forks” in Jezero Crater.
- NASA/ESA decision to use Perseverance as the primary means of delivering sample tubes to Sample Retrieval Lander (with twin Ingenuity-derived helicopters as backup) and thus deleting the need for an additional lander to deliver the proposed ESA Fetch Rover.
- DART impacted Asteroid Dimorphos on Sept. 26th altering its orbit by 32 minutes.
- After IRB review, Psyche is now scheduled to launch Oct. 10th, 2023.
- As a consequence, the VERITAS mission to Venus is directed to perform an “orderly stand down” with an additional launch delay of 3 years, NET 2031.
 - This occurred after the committee’s Autumn meeting and so CAPS has not yet had a chance to discuss ramifications.



This imagery from NASA’s Hubble Space Telescope from Oct. 8, 2022, shows the debris blasted from the surface of Dimorphos 285 hours after the asteroid was intentionally impacted by NASA’s DART spacecraft on Sept. 26. **Credits: NASA/ESA/STScI/Hubble**



Illustration of NASA’s VERITAS spacecraft. **Credits: NASA/JPL-Caltech**

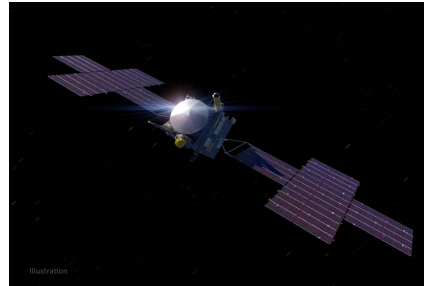
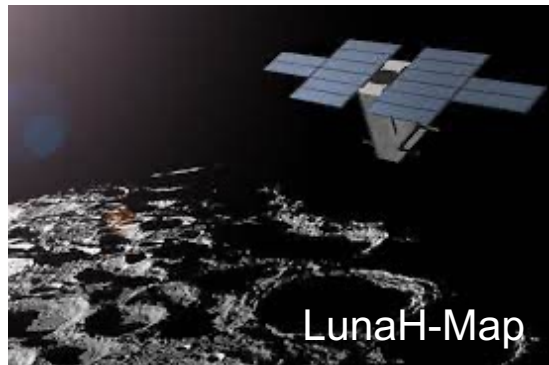


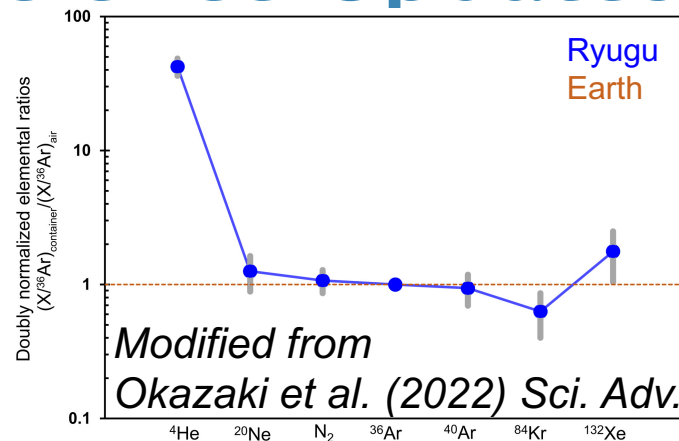
Illustration of NASA’s Psyche spacecraft. **Credits: NASA/JPL-Caltech/ASU**



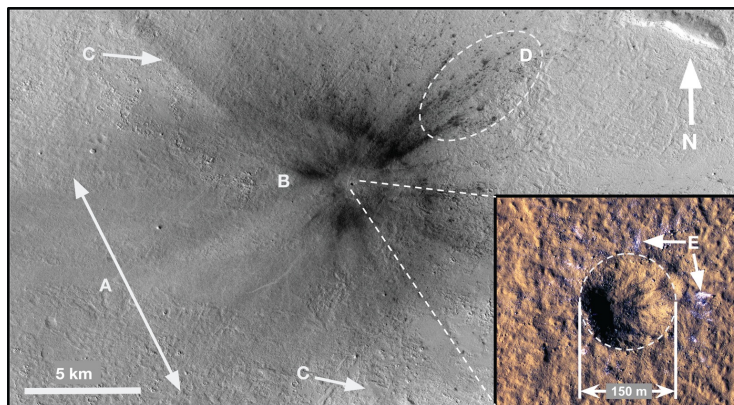
Astrobiology/Planetary Science Updates



LunaH-Map
among the ten
CubeSats
selected for
Artemis I



InSight detected
seismic event from
confirmed meteorite
impact.



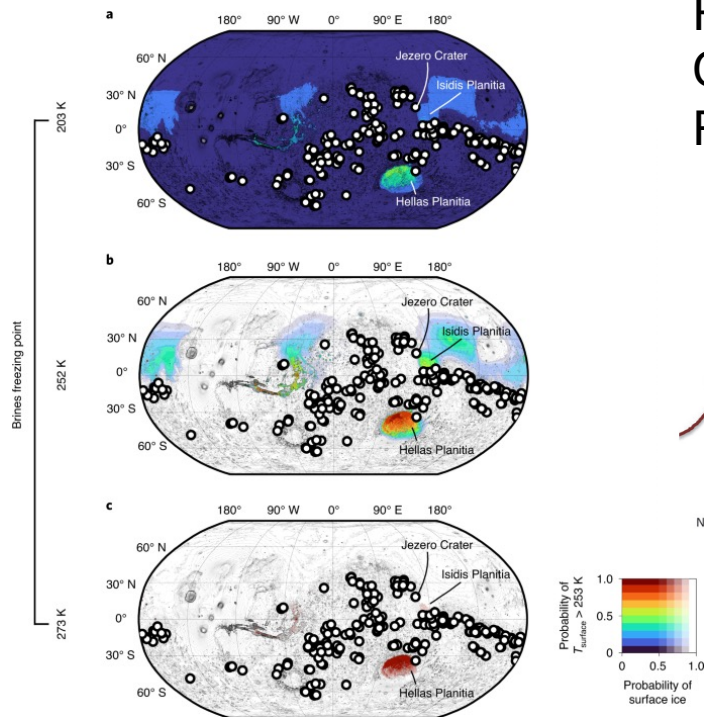
Posiolova et al. (2022) Science

Hayabusa 2 delivers first
successful return of gas
from a near Earth
asteroid



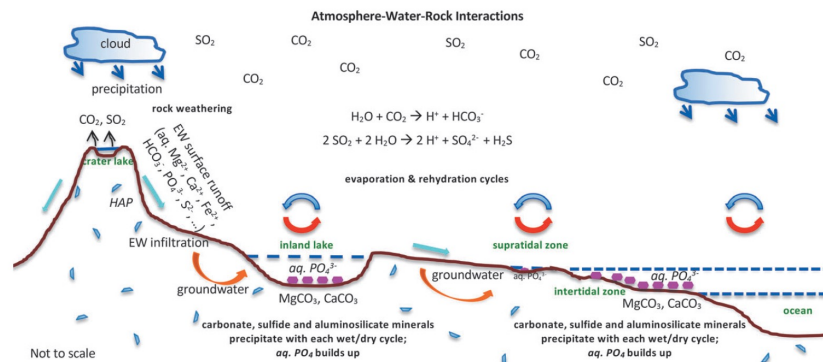
Astrobiology/Planetary Science Updates

Modeling of potential habitats and climate effects of H₂-based methanogens on early Mars



Sauterey et al. (2022) Nat. Astron.

Freshwater and Evaporite Brine Compositions on Hadean Earth: Priming the Origins of Life



Sahai et al. (2022) Astrobiology

Summary

- Planetary Science is healthy with lots of great missions in progress or development and plenty of new exciting results.
- New Frontiers 5 is on-track for a Fall 2023 AO.
- CAPS has completed its report reviewing the whitepaper on Standards of Evidence for Life Detection.
- CAPS membership will have a number of changes for Spring 2023.



Backup

