

Planetary Science Subcommittee Report to NAC Science Committee

NAC SC Meeting
March 10-11, 2016

Janet Luhmann for PSS

Planetary Science Subcommittee Meeting

March 9 and 10, 2016

NASA Headquarters

Washington D.C.

Agenda items of interest in addition to usual PSD briefings:

NExSS (M. Voytek)

SMD Education CAN Selection..... ..(K. Erickson)

NEOO Program (L. Johnson, K. Fast, R. Landis)

Mars Exploration Program(J. Watzin)

R&A Update (M. New)

Planetary Science Division Update(J. Green)

PSS Findings Excerpts: March 9-10, 2016

Ocean Worlds

We applaud the public and legislative interest in Ocean Worlds spurred by recent discoveries related to the possibility of extant life in the oceans of Europa, Enceladus, and Titan. The increased resources made available to PSD significantly enhance future efforts to explore these intriguing environments.

To maximize the scientific return of the Ocean Worlds initiative, we support NASA's science community-based road-mapping activities, including the OPAG 'Roadmaps to Ocean Worlds' (ROW). The ROW report is expected by December 2016 and will provide input for the mid-term Decadal assessment.

PSS Findings Excerpts: March 9-10, 2016

Ocean Worlds - Continued

PSS encourages PSD to put in place as soon as possible a process to integrate the community input on science objectives and obtain subsequent confirmation that implementation concepts exist that can achieve those objectives within the New Frontiers cost cap.

The PSS encourages PSD to ask CAPS to consider whether inclusion of Ocean Worlds in NF-4 can be done via the processes and practices available, and to identify a path for taking advantage of similar exciting opportunities of this nature going forward.

PSS Findings Excerpts: March 9-10, 2016

Europa Lander

PSS applauds the strong backing for a Europa mission and supports the goal to launch no later than 2022 to enable arrival of a spacecraft at Europa as early as 2025. We applaud the progress made with instrument selection, accommodation, and mission formulation for the multiple flyby mission.

The PSS encourages the plan to carry the lander in a separate, independent spacecraft, which minimizes risk of delaying arrival at Europa, and for the Europa Lander Science Definition Team to report on how science goals in the decadal survey will be met by the Europa Lander.

PSS Findings Excerpts: March 9-10, 2016

R&A Reorganization

The PSS recognizes the amount of effort required to compile information on PSD program elements in the reorganized R&A program and appreciates the thorough summary on funding level by planetary body provided. We applaud the development of key word tools that will allow assessment of programmatic balance in future years.

We continue to be concerned is that the selection rates (average of ~21%) mean that an investigator can receive routinely high scores at Very Good (4.0) or Very Good/Excellent (4.5) and still not be selected for funding. The PSS encourages NASA to continue to work to increase the level of funding for R&A programs.

PSS Findings Excerpts: March 9-10, 2016
Laboratories, Facilities, Technical Support

Laboratory instruments and facilities are critical for Planetary Science. The community perceives that PSD R&A reorganization resulted in underfunding of a significant proportion of these resources to the point at which the science they support is put at risk.

PSD is concurrently assessing the need for facilities rather than individual PI labs and research teams. The PSS will obtain community input, through the AGs and other avenues as appropriate to inform discussions with PSD about the challenge and help formulate potential solutions.

PSS Findings Excerpts: March 9-10, 2016

Sample Return

The path to return of samples from Mars begins in earnest with launch of the Mars 2020 drilling caching rover. The international Mars community has prepared a study including design considerations for a clean-lab facility where the landed canister can be opened to interrogate the contents and, ultimately, to open sample tubes for scientific study. PSS recommends a comprehensive and dedicated study of design concepts for sample return and a return-sample facility in light of this report's recommendations.

PSS Findings Excerpts: March 9-10, 2016

DSN

The PSS is alarmed by reports of increasing data losses by active planetary missions, especially following a 10% funding cut to the DSN at the end of 2015. PSS supports aggressive efforts to address this issue.

In particular, current NASA science missions should be asked to inform NASA about DSN performance changes they have experienced.

PSS Findings Excerpts: March 9-10, 2016

Arecibo

Arecibo Observatory provides a unique capability for a range of cutting-edge science, including planetary science, as well as planetary defense and human and robotic exploration missions. However, there is concern about a potential NSF divestment in Arecibo facilities and maintenance. The PSS encourages NASA to continue its current support of Arecibo and urges discussions with NSF to preserve the nation's science and security interests and provides for the stability and productivity of this critical national asset.

PSS Findings Excerpts: March 9-10, 2016

Planetary Defense Coordination Office

The PSS welcomes the establishment of a Planetary Defense Coordination Office (PDCO) within the Planetary Science Division. We feel that this is an important step for NASA, as it responds to the need for detection of Near Earth Objects, and the necessary planning and coordination needed to address planetary defense. Notably, the creation of the PDCO was a top recommendation by the 2010 NASA Advisory Council Planetary Defense Task Force.

PSS Findings Excerpts: March 9-10, 2016

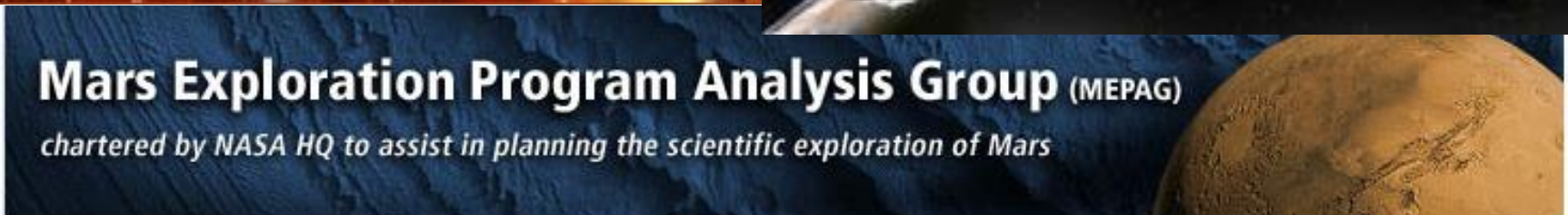
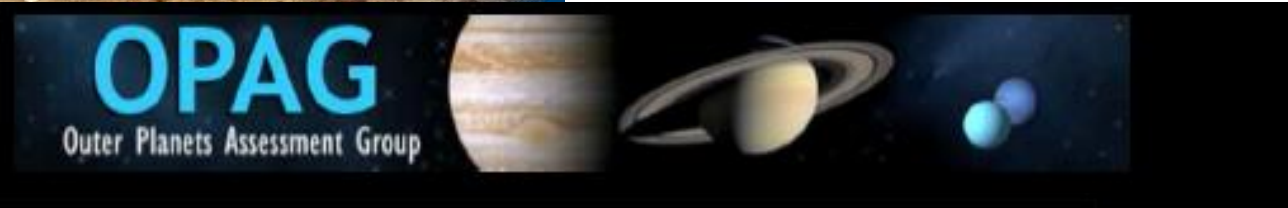
Foreign Mission Participation

Other nations are continuing to develop planetary science exploration capabilities and data that NASA can take advantage of to achieve Decadal Survey science goals.

PSS urges PSD to evaluate US opportunities in foreign missions to various planetary destinations, given current State Department restrictions.

AGs (Assessment Groups): PSD Community Contributions

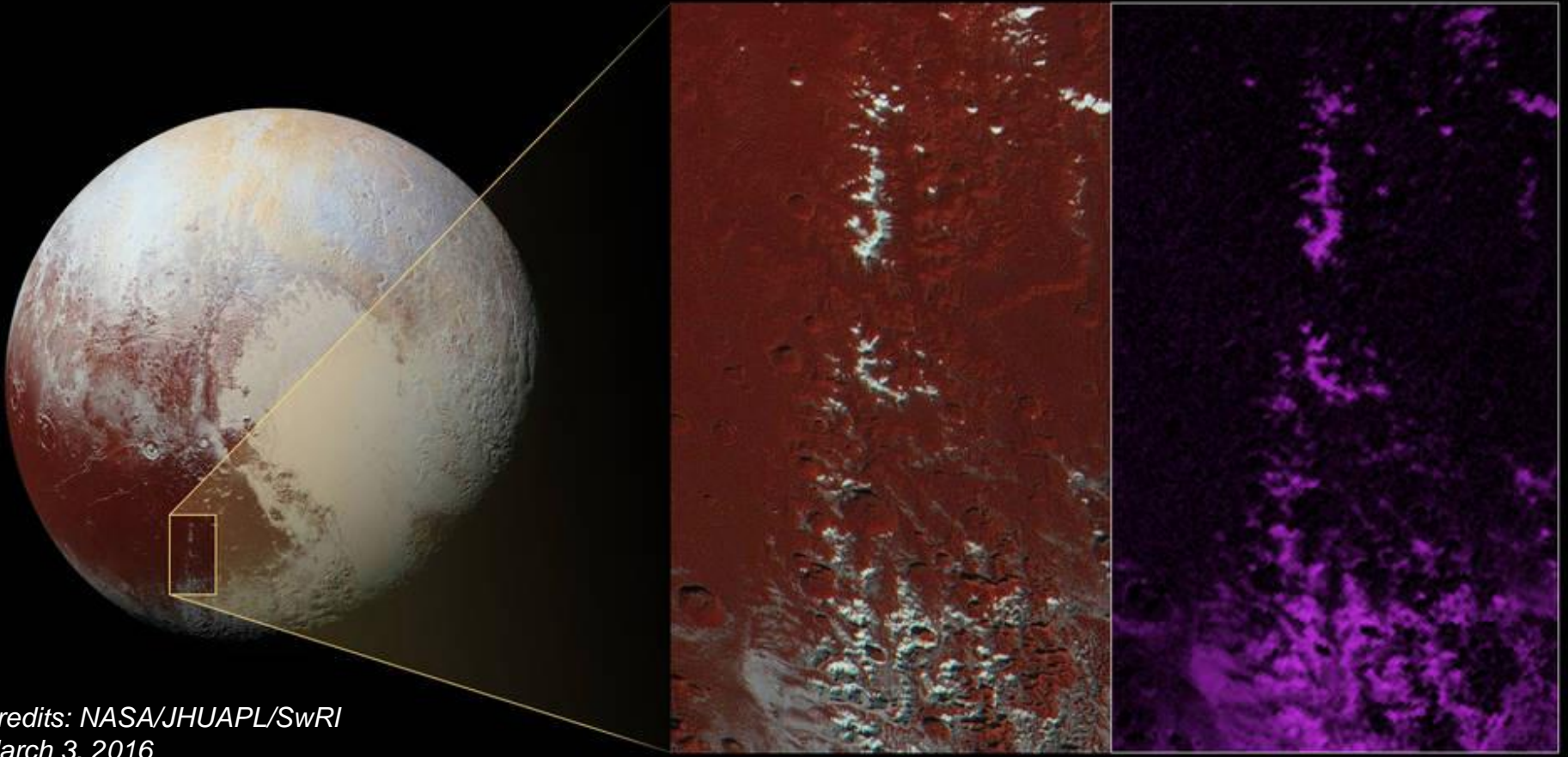
Selected Science Highlights



Methane Snow on Pluto's Peaks



The New Horizons team has discovered a chain of exotic snowcapped mountains stretching across the dark expanse on Pluto.

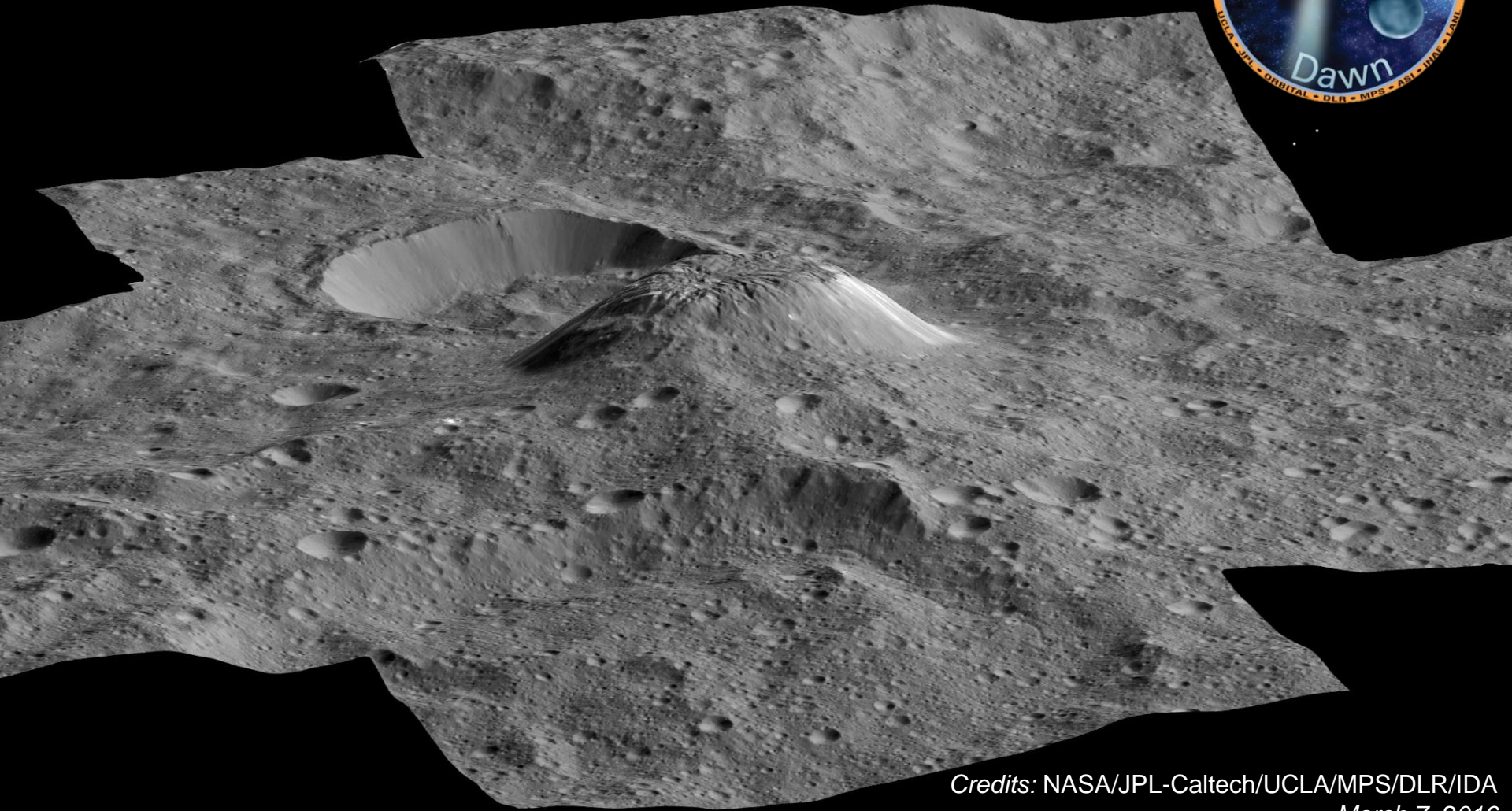


Credits: NASA/JHUAPL/SwRI
March 3, 2016

The reddish enhanced color image (middle) reveals a mountain range located in southeast Cthulhu that's 260 miles long, largely covered by a layer of dark tholins. The bright peaks are thought to be predominantly methane (right image is a map of methane ice) that has condensed as ice from Pluto's atmosphere.

Dawn's First Year at Ceres

A Mountain Emerges: Ahuna Mons

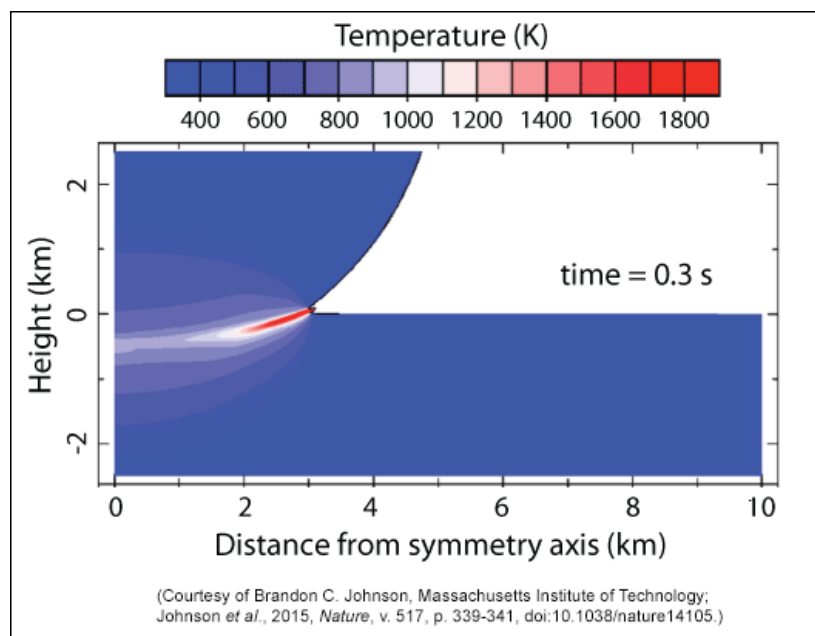


Credits: NASA/JPL-Caltech/UCLA/MPS/DLR/IDA

March 7, 2016

One year ago, on March 6, 2015, the Dawn spacecraft slid into orbit around Ceres, and since then, has delivered a wealth of images and other data of this previously unexplored world. Ahuna Mons has an average height of 4 km, and Dawn's latest images are yielding new details of this enigmatic feature.

A new idea suggests that chondrules could have formed as the result of impact jetting caused when large planetesimals collided during planet formation.

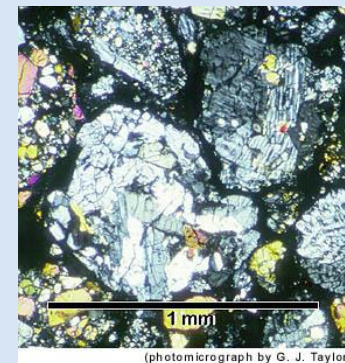


Graph shows 2D view of computer simulation of the jetting process at the interface of two colliding objects. The jet is hot enough to be molten.

Forming Chondrules by Impact Jetting

Chondrules are mysterious millimeter-sized rocky droplets in chondritic meteorites.

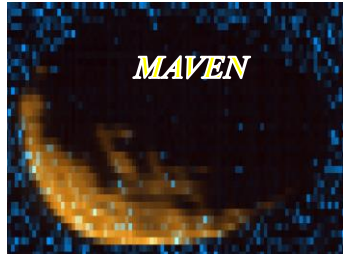
They formed during the first 5 million years of the Solar System, have diverse chemical compositions, cooled slowly (5–3000 K/hour), and accreted in abundance.



A new idea for the origin of chondrules depicts their formation as a consequence of planetary accretion: Large planetesimals (> 1000 km in diameter) accrete by impacting one another. During the first stage of such an impact event, molten material is jetted from the point of impact. As the jet disperses, little droplets of silicate melt form, making mysterious little objects that cosmochemists have studied for decades.

Mars Exploration Program Analysis Group (MEPAG)

chartered by NASA HQ to assist in planning the scientific exploration of Mars



Our 'Eyes' at Mars

