Japan Geoscience Union Meeting 2011
(May 22-27 2011 at Makuhari, Chiba, Japan)

PPS023-01 Room:303 Time:May 26 08:30-08:45

Lunar and planetary explorations in a coming decade: Current status and ongoing schedule

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Future Planetary Exploration Working Group of Japanese Planetary Science Society is discussing planetary explorations that will be strongly supported by this community. Then we started ”Planetary Exploration in a Coming Decade” activity last year aiming to organize a new mission to be launched between 2017 and 2027. The first stage of the activity is ending in March, 2011. A summary of the first stage will be reported by 5 panels; (1) terrestrial solid planets, (2) terrestrial atmosphere and magnetosphere, (3) minor body, (4) Jovian planets, icy satellites, and exoplanets, and (5) astrobiology. Each panel received proposals regarding ”top sciences” of each category from the community in the summer of 2010. On September 10, an open meeting was held at Kobe University to discuss top sciences among the community of planetary scientists. From the summer of 2011, the second stage begins. Proposals for new mission and instruments will be accepted by the second-stage committee who advises the applicants not only to improve the proposal, but also to raise and develop exploration groups.

Keywords: Planetary exploration

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PPS023-02 Room:303 Time:May 26 08:45-09:15

Results of America's Planetary Science Decadal Survey

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Once every ten years, the U.S. National Research Council carries out a "decadal survey" in planetary science. The objective is to recommend a decade-long national strategy for solar system exploration for NASA and the NSF. The most recent planetary decadal survey has placed particular emphasis on formulating a strategy that can realistically be implemented with the funds expected to be available for NASA and the NSF in the decade from 2013 to 2022. Inputs to the decadal survey were provided at a number of "town hall" meetings at professional conferences, and via 199 white papers written and submitted by more than 1600 members of the scientific community. These inputs led to definition of a set of high priority science questions, which in turn prompted study of 28 different mission candidates. Some of these mission candidates were studied in detail by the Applied Physics Laboratory, Goddard Space Flight Center, the Jet Propulsion Laboratory, and Marshall Space Flight Center. Missions studied in detail were also subjected to a cost and technical evaluation conducted by Aerospace Corporation. A recommended set of missions for the decade was then assembled, taking into account science priorities, cost and technical risk, and available resources. The plan also includes recommendations regarding funding for research and analysis, technology development, ground-based and orbital telescope facilities, and other topics. Consideration of possible international collaboration in planetary exploration was an important part of the decadal process. The report will be released in the first part of 2011, and the recommendations from the report will be described in this presentation.

Keywords: Planetary Science, Decadal Survey, The National Academies

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PPS023-03 Room:303 Time:May 26 09:15-09:30

Sciences for the moon and solid planets toward planning future planetary explorations

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Here we report major scientific issues for the future explorations of the moon and solid planets on the basis of the over twenty proposals and workshops opened for the Japanese planetary science community.

Keywords: moon, solid planets, planetray exploration, internal structure, origin and evolution, surface environment

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PPS023-04 Room:303 Time:May 26 09:30-09:45

Panel Report on Explorations for Small Solar System Bodies

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[1]Nagoya University, [2]National Astronomical Observatory, [3]Hokkaido University

The small body panel performed interviews on the opinions on future exploration plans (as an activity for future ten years of planetary explorations) through the explanation of the aim and the hearing to parties concerned to the researcher group (material analysis, collision experiments, observations, and celestial mechanics etc.) that relates widely, and 12 proposals have been discussed. A panel meeting, including the secretariat of the JSPS was held in National Astronomical Observatory and Mitaka on September 1, 2010, and the consolidated opinion was made public in the forum (Kobe University) on September 10. The subcommittee meeting was held in National Astronomical Observatory Mitaka on December 10 after the forum, and then, the intelligence sharing of the explanation of aim and the meaning of the inquiry proposal was aimed at from a main proposer of each proposal. For searching for a top science out of the proposals through the series of discussions, we tried to classify the proposals along two axes of the science targets. One axis is a primitive degree of the material that composes the small celestial body. There is a vague part in the definition, but it is based here on the content of the organism and the ice that conflicts with silicates. Another axis is a structure of the body, that is, the size of the body or a differentiation degree. In addition, the proposals were classified into three categories with the exploration methods. ;(a) sample return or in-site analysis, (b) a geophysical exploration technique like the achievement of the collision experiments etc. , and (c) remote sensing. The graph with two science target axes was made respectively of three categories, and we examined where each proposal locates and how they were distributed. As for the science target examined there, if the different proposals proposed by a different proposer has the same science target distribution, it is important together for a lot of researchers, and, therefore, the effect to the entire planetary science must be also high. As a result, the inquiry of the exploration (if it was possible, sample return) to the primitive and undifferentiating bodies stood out. We enumerate directionality of the exploration to such primitive and undifferentiating bodies as one of the ”Top science” targets such as cometary nuclei and D type planetoids. In addition, we arrived at the common view that the understanding obtained from the re-visit often considered was able to become extremely deep, compared with a single visit of the exploration. The re-visit done in a large bodies wants to strike a note of warning in tending the oversight of going of eyes only to the diversity of the bodies probably because of in the case small bodies. Therefore the importance proceeded from the discovery stage to the understanding step because of ”Revisit” inquiry that visits the same body two or more times as the means to achieve ”Top science” target will be enumerated as this panel. In this presentation, we introduce two directionality and the concrete examples of the top science.

Keywords: Planetary Exploration, Future Plan, Top Science

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PPS023-05 Room:303 Time:May 26 09:45-10:00

Report of Jupiter, Icy satellite, Extrasolar planets panel of next decade initiatives for lunar planetary explorations

Yukihiro Takahashi[1*], Kensuke Nakajima[2], Jun Kimura[1], Taishi Nakamoto[3], Yoshizumi Miyoshi[4]

[1]Hokkaido University, [2]Kyushu University, [3]Tokyo Institute of Technology, [4]Nagoya University

Jupiter, Icy satellite, Extrasolar planets panel members

One of the panels of Next decade initiatives for lunar planetary explorations has dealt with topics of future exploration, including Jovian atmosphere, icy satellite, extrasolar planets, and Jovian magnetosphere. Panel leaders with experts of broad range of related-science discussed possible explorations basically from the pure scientific point of view, taking into account both near future missions that have been already planned and ideas for far future exploration. Not only the direct explorations but also the space and ground-based telescopic observations, as well as theoretical studies, were argued.

Keywords: exploration, Jupiter, icy satellite, extrasolar planets, atmosphere, magnetosphere

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PPS023-06 Room:303 Time:May 26 10:00-10:15

Summary of the Astrobiology Panel in the first stage

Kensei Kobayashi[1*], Akihiko Yamagishi[2]

[1]Yokohama National University, [2]Tokyo University of Pharm. Life Sci.

Top sciences in the lunar and planetary missions in the next ten years were discussed from the point of view of astrobiology. Astrobiology targets life's origin, evolution, distribution and future of life. We selected (1) Mars life detection missions and (2) missions for detection of life and organics in ice satellites and small bodies. Recent finding of methane on Mars has made life on Mars more plausible. Several missions are in progress in USA and Europe, but we can expect Japan's own Mars mission (MELOS). In the mission, living organisms can be targeted since we have unique life detection methodologies. Among many ice satellites, Europa, Titan and Enceladus are major targets since they could have their own biosphere. In addition, it is expected to have fossils of chemical evolution toward the generation of life which were lost on Earth. Missions to ice satellites may not be prepared in the next 10-15 years, but we should develop instrumentation to detect life and organic compounds in extreme cold environments in the coming 10 years. Cultivation of Japanese community for this purpose is strongly required.

Keywords: planetary missions, astrobiology, Mars, ice satellites, life detection, organic compounds

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PPS023-07 Room:303 Time:May 26 10:45-11:00

SGEPSS's activities toward planetary exploration

Masaki Fujimoto[1*], Naoki Terada[2], Yoshizumi Miyoshi[3]

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SGEPSS's activities toward planetary exploration will be presented.

Keywords: Planetary exploration, SGEPSS

Japan Geoscience Union Meeting 2011
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PPS023-08 Room:303 Time:May 26 11:00-11:15

Plans for planetary atmosphere exploration in Japan

Takeshi Imamura[1*]

[1]Japan Aerospace Exploration Agency

This talk will introduce the status of the planning of planetary atmosphere explorations in Japan. The exploration will start with the Venus orbiter Akatsuki, followed by a Mars exploration MELOS which is under discussion. Further Venus explorations and missions to other planets are also candidates.

Keywords: planet, atmosphere

Japan Geoscience Union Meeting 2011
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PPS023-09 Room:303 Time:May 26 11:15-11:30

Toward future magnetic exploration of moons and planets

Masaki Matsushima[1*], Futoshi Takahashi[1]

[1]Tokyo Institute of Technology

Exploration of lunar and planetary interiors aims at clarifying their origin and evolutionary processes. The present interior structure of moons and planets is a consequence of their thermal history after their formation. It is also possible to understand the dynamics of the Moon and planets if their precise structures are known.

Magnetic exploration enables us to obtain information on lunar and planetary interior structure, which is independent of those estimated through seismic measurement, heat-flux measurement, and gravity measurement. Existence of lunar and planetary intrinsic magnetic field implies that there is energy to generate magnetic field by dynamo action in their interior. Magnetic anomalies can be a clue to investigate a possibility of ancient dynamo process. Electromagnetic response of moons and planets contains information on their electrical conductivity structure, from which thermal structure can also be inferred. Thus, lunar and planetary magnetic exploration is very important to understand their interior structure, origin and evolution.

In the future, based on the above, we should promote the following plans; electromagnetic sounding at the lunar surface to estimate lunar interior structure; determination of the origin and age of lunar magnetic anomalies to understand lunar evolution; detail mapping of Martian magnetic anomalies to understand Martian evolution; and electromagnetic sounding at the Martian surface to estimate Martian interior structure.

Keywords: magnetic exploration, planets, moons, interior structure

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PPS023-10 Room:303 Time:May 26 11:30-11:45

A future image of lunar and planetary explorations from the viewpoint of a young scientist

Tomokatsu Morota[1*], Yoshiaki Ishihara[2]

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We will argue future designs for lunar and planetary explorations from the viewpoint of a young scientist.

Keywords: lunar and planetary explorations, young scientists

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PPS023-11 Room:303 Time:May 26 11:45-12:00

Planetary exploration and space science community

Sei-ichiro Watanabe[1*]

[1]Nagoya University

I will discuss how the science community is involved to planetary exploration.

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PPS023-12 Room:303 Time:May 26 12:00-12:30

The role of ISAS in the Japanese Exploration

Masato Nakamura[1*]

[1]Inst. of Space and Astronautical Science

ISAS has important role in Japanese exploration. Details are given in Japanese.

Keywords: Exploration