[EE] Evening Poster | B (Biogeosciences) | B-AO Astrobiology & the Origin of Life

[B-AO01]Astrobiology

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Twenty years have passed since when the field of Astrobiology, which aims to unveil the origins, evolution, and habitability of life by integrating multidisciplinary fields, was established. Origins of Life are currently being re-conceptualized via expansion of prebiotic chemistry to systems chemistry and chemical space. Besides their relationship to life's building blocks, it is expected to demonstrate the significant roles of organic molecules in the history of planetary formation. The linkages among the variations in chemical compositions of deep-sea hydrothermal environments, geological settings, and ecological systems were systematically investigated. Cassini, which accomplished in the long-term explorations of the planets bearing liquid, had "Grand Finale" this year. Discoveries of extrasolar planets have been dramatically increased to date.

Originally, Astrobiology does not need a specific science category. We therefore aim to make this session so that Earth and Planetary scientists from all the categories join for discussing 'where we came from and where we are going' and for making novel integrated researches.

For the next stage of Astrobiology, presentations on the instrument development in space explorations, comparative studies of solar system and exoplanets, etc, will be very much welcome.

[BAO01-P14]Investigation of optimum density of fluorescent dyes used for Life Detection Microscope on Mars surface

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Keywords:Mars, fluorescent microscope

In the Viking mission performed on Mars in 1970s, no appreciable organic compound was detected[1)]. However, the detection sensitivity of organic compound of Viking TV-GC-MS was found to be too low to detect microbes in the area with low densitiy of microbes on Earth, such as Atakama dessert.

The Curiosity: Mars Science Laboratory (MSL) of NASA detected organic matter in the Gale Crater on Mars[2)]. H_2O ice was discovered in Phoenix mission[3)]. The seasonal apparence of black lines on the slope of craters called Recurrent Slope Lineae (RSL) were obseved by Mars Reconnaissance Orbiter (MRO)[4)], which may be related some water activities. These suggest the possible presence of life on Mars.

Yamagishi and his colleagues have proposed a Mars exploration mission for *in situ* life detection by directly observing cells and organic matters in the soil on the surface of Mars with a fluorescence microscope[5)]. The microscope was named as Life Detection Microscope (LDM). The LDM has the sensitivity 1000 times higher than that by Viking apparatus. We plan to use two fluorescent dyes, SYTO24 and Propidium Iodide (PI), in LDM. SYTO24 can be transported across the cell membrane and stains organic matter locating both outside and inside of cells. PI can not be transported across the cell membrane nor can stain in side of cells. By using these two dyes, it is possible to judge the presence or

absence of organic matter and whether the latter be the living or dead cells.

We have dettermined the optimum concentrations of PI and SYTO 24 for LDM and report our progress on the development of LDM.

1) Navarro-Ginzalez, R., et al.,2006, PNAS, 103: 16089-16094. 2) Freissient, C., et al.,2015, J. Geophys. Res. Planets. 120: 495-514. 3) Feldoman, W.C., et al., 2002. Science, 297, 75-78. 4) Alfred S. McEwen, et al., 2011, Science, 333: 740-743. 5) Yamagishi, A., et al., 2010, Bio. Sci. Space. 24: 67-82