Japan Geoscience Union Meeting 2015
(May 24th - 28th at Makuhari, Chiba, Japan)

MZZ45-P01 Room:Convention Hall Time:May 24 18:15-19:30

Our Place in the Universe - Reply to Smart’s question

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It was in 1987 that the Australian philosopher J.J.C. Smart delivered his public lectures on Our Place in the Universe. In his response to the question , ”What is our place in the universe?”, he said the answers could be given threefold, and concluded that in every sense of the question our place in the universe was no longer special. Is this answer still valid in light of the contemporary context? This presentation will give some consideration to this answer.

Keywords: philosophy, cosmology, history of science

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The Sea of Japan as a trompe l'oeil: a brief review of the debate of the opening tectonics of the Sea of Japan

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The opening tectonics of the Sea of Japan is a classic geological issue of Japanese geology. There are two extreme models proposed for this issue, the double-door opening (DDO) model and the pull-apart model, respectively. The pull-apart model could logically explain geological features of the Sea of Japan, such as structural features of the Tsushima basin and the Tsuhima-Goto Fault, even paleomagnetic declinations if strike-slip components of earthquake vibration caused by strong mechanical coupling between the oceanic plates and Japan arcs are took into account. Nevertheless, the DDO model was predominantly adopted by Japanese geologists to use as a basic assumption to explain Cenozoic Japanese tectonics, even magmatism and seismicity.

The present DDO model was proposed based on paleomagnetic declinations in SW Japan (e.g. Otofuji & Matsuda, 1983, 1984). Geological test of the model, however, is insufficient. For example, the DDO model advocators regard that the Pre-Cambrian Hida Zone in SW Japan is the northeastern extension of the Okchon Belt in Korea. Ichikawa (1972), however, had pointed out that it is the northern maximum of the reconstruction to regard the Oki (Hida) zone as an extension of the the Yeongnam Massif at the south of the Okchon Belt, since there is no Pre-Cambrian zone at the south of the Hida Zone. Ichikawa (1972) also mentioned that Matsumoto (1967) had implied that the Okchon Belt would not constitute to Japan. The DDO model advocators, however, did not pay any attention to these suggestions.

In fact, geological relationship between north Kyushu and SE Korea indicates that SW Japan did not significantly rotate with respect to fixed Korea. Faults oriented to NNE-SSW strike both in the Sangun granites in north Kyushu and in the Bulguksa granite in SE Korea (e.g. Inoue, 1982), which indicating that north Kyushu did not meaningfully rotate with respect to SE Korea. Pre-Cretaceous strata show arraignment oriented to E-W both in north Kyushu and in western Chugoku district (Matsumoto, 1951), which indicate that north Kyushu did not rotate against Honshu. Thus, SW Japan did not significantly rotate with respect to fixed Korea.

In spite of its geological incompleteness, why did Japanese geologists so predominantly adopt the DDO model? In fact, the present DDO model is a revival of the model originally proposed by Koto (1906) based on a rhomboidal shape of the Sea of Japan. Koto (1906) related bending of Honshu with the crotch of the Korean Peninsula and proposed southeastward migration of Japanese Arcs. Terada (1927) inherited this hypothesis in the context of the continental drift. Kobayashi (1941) also did. The model perpetuated as a paradigm by Japanese geologists, then was embroidered with paleomagnetic data in 1980's. There is theory-ladenness, when researchers consider the opening tectonic of the Sea of Japan, since Koto is the authority at the earlier stage of Japanese geological community.

Matsumoto (1949) pointed out that geologists tend to give weight to geologic phenomena observed their living place. In other word, geologists tend to depreciate geologic phenomena at unfamiliar places. This would be applicable to the adaptation of the DDO model. In the current plume debate, plume skeptics pointed of theory-ladenness and disparagement of geology for plume advocators (e.g Anderson and Natland, 2005). The debate of the opening tectonics of the Sea of Japan, therefore, can be regard as a typical geological controversy.

Keywords: the Sea of Japan, opening tectonics, theory-ladenness, paradigm

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Motivation of Science selection from Earth Science approach-The effect of Science class Wonder of the Jewel-

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[Purpose of research] In Ehime University, [Women future development Center] was founded in 2010. The first event of Science course selection support project for high school girls in Ehime University was held in 2011, which I myself joined. And because of this event, I decided to apply to science course in Ehime University. After I entered Ehime University Super Science Course (SSC), I joined [Science Himeko (female students)] project. From these experiences, I started research and investigation on when and how the girls motivation for science course selection is made up.

[Introduction] Based on various environment and education, the situation to motivate to take science course differs. In my case, the first circumstance to be interested in science was one-year Science Education Center (SEC) when I was 5th grade of primary school. In SEC, I participated workshop in Misaki Coast, had observation of insects and plants etc. accompanied by science teachers in the same ward. In high school, I had many chances to join field training at Coasts and Forests, and astronomical observation. These experiences strengthened my mind to choose science course. In general cases, what could be the major factors for girls to be motivated to select science courses? I assumed three points: 1) [Information] about natural science, 2) [Environment] as experiences in childhood and parent cooperation, 3) [Media] as tools to make the communication easier. Based on these assumptions, I conducted three times of Science classes for girls and parents. I selected earth science topics that are relatively minor in school curriculum, had a lecture on Ehime related minerals and let them make jewelry art.

This research was supported by Research and Examination Project by Ehime University students (Project E) and its budget.

[Process of research]

1. To draw attention to the earth science, minerals were referred to as accessories for example.
2. We set the class in a holiday, and made it subject to parent and child participation, so that the art would be made cooperatively and can be brought home. The materials of the art were crystal, pearl etc.
3. In advertising posters, jewels and image characters were painted with pastel colors, so that younger children could feel familiarly.

[Results] In every class, both younger children and parents concentrated on the lectures of minerals, and many questions were asked. When making paperweights, children and parents are both interested in choosing stones. This was true even for the fathers. Questionnaires were collected from 31 pairs of them.

Part of the results: Parents enjoying science classes with their children: 73%

Many children are interested in sciences however they do not strongly wish to get scientific jobs: 29%. Other responses: Teacher/Designer 10%, patissier 6%, Not Clear 55%.

[Reflections]

Fliers had been distributed in many places where children gather, however the majority of guest families had got the information from Ehime University web-site or related events. From this fact, it is inferred unless parents are interested in science their children are not given the chances of joining outside studying.

Minerals attract not only children but also parents.

Because children tend to like TV stars, celebrated female scientists should exist.

I would like to express my gratitude to Women future development Center [Science Himeko] to conduct science classes in this research.

Keywords: earth science, science club, mineral, gender, Ehime university