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

MZZ45-01 Room:203 Time:May 24 11:00-11:15

Paleontological Study of Edmund Naumann (1854-1927)

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Edmund Naumann came to Japan from Germany in 1875 to teach geology in the mining school. He taught geology at the University of Tokyo, founded the Geological Survey, and made geological researches till 1885. His doctoral thesis of Die Fauna der Pfahlbauten im Starnberger See in 1875 was paleontological work, but he wrote only 6 paleontological papers. The second paper of Ueber des Vorkommen der Kreideformation auf der Insel Yeso (Hokkaido) in 1880 and the third paper of Ueber das Vorkommen von Triasbildungen im nordlich Japans were stratigraphical works. The fourth paper of Uber japanische Elephanten der Vorzeit in 1882 was the original paper on Naumann elephant. The fifth paper of Fossile Elephantenreste von Mindanao, Sumatra und Malakka in 1887 and the sixthe paper on Stegodon mindanensis, eine neue Art von Uebergangs-mastodnten in 1890 were written in Germany based on the specimens of the German and Bergian Museums.

Naumann also made the archaeological study on Omori shell mound and registered the samples into the Folk Museum in Wien.

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Keywords: Naumann, Paleontology, Naumann elephant, Omori shell mound

Japan Geoscience Union Meeting 2015
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MZZ45-02 Room:203 Time:May 24 11:15-11:30

The history of the Japanese earthquake prediction study is a series of repetition

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In the history of conventional Japanese seismology, it has been told that the history of the Japanese earthquake prediction study began with ”Blue Print” (Prediction of Earthquakes: Progress to Date and Plans for Furthere Development) made in 1962.

But the time of the Seismological Society of Japan made with foreigner teachers in 1880, something which should be called an earthquake prediction study already existed. They’re John Milne and Seikei Sekiya that it was its center. After Nobi earthquake of 1891, Earthquake Investigation Committee established to set up earthquake disaster reduction plans. In its committee, a study of earthquakes prediction was raised in one of the two pillars along with a study about the earthquake-resistant improvement of the structure. The history of the Japanese earthquake prediction study extends more than 130 years.

When I look at the history of the earthquake prediction study in temporal axes more than 130 years, an invisible thing is seen until now. It is that the similar history has been repeated.

Whenever a big earthquake occurs, earthquake interest in prediction of earthquakes becomes lively, and the new institutional frame about earthquake studies is made. New researchers enter the earthquake prediction study with this, and the study presents an active state. However, realization of the prediction of earthquakes is not an easy thing. Many researchers and the social interest cool down before long. Then a major earthquake hits again, and the history that the heat of the earthquake prediction study revived seemed to be repeated.

About the method of the earthquake prediction study, repetition is seen.

As for what kind of research subject becomes popular, repetition is also seen.

Keywords: the history of the Japanese earthquake prediction study, Blue Print, the Seismological Society of Japan, Imperial Earthquake Investigation Comittee, repetition

Japan Geoscience Union Meeting 2015
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MZZ45-03 Room:203 Time:May 24 11:30-11:45

Seitaro Tsuboi and the National Museum of Nature and Science

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The author has conducted a research on historical materials about Seitaro Tsuboi (1893 - 1986), one of leading geologists in his days. The materials have been collected by Multi-media and Socio-information Studies Archive (MSSA), where some of the materials have been stored in MSSA Library and others in another building. Due to some reasons, the latter were transferred to the National Museum of Nature and Science in December, 2014.

Tsuboi was the director of the Museum between 1939 and 1945, who made his effort to preserve the Museum's materials and specimens during World War II. After his retirement, he had had sympathy towards the Museum, which would be discussed in the presentation.

Keywords: History of Science, History of Geology in Japan, Seitaro Tsuboi, National Museum of Nature and Science, Archive

Japan Geoscience Union Meeting 2015
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MZZ45-04 Room:203 Time:May 24 11:45-12:00

The origin of ”Fujiwhara effect” which describes interaction between two close tropical cyclones

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”Fujiwhara effect” which describes interaction between two close tropical cyclones including typhoons, is one of the few eponyms in meteorology with Japanese name. It is known that this is named for Japanese meteorologist Sakuhei Fujiwhara (1884-1950) who served as Director of Central Meteorological Observatory of Japan from 1941 to 1947. The origin of this word was investigated by bibliographic survey.

The interaction between two typhoons was first studied theoretically by Diro Kitao (Kitao, 1889). Fujiwhara published numerous papers, including Fujiwhara (1923), about interaction between two vortexes in 1920’s and 1930’s with the knowledge of Kitao’s studies in style of his own.

During World War II, U.S. forces were damaged by typhoons several times including twice devastation of Third Fleet. This was a motive that they established a center for typhoon tracking in Guam in June 1945 that performed aircraft reconnaissance and warning operation in North West Pacific.

Two typhoons (Susan and Ruth in U.S. name) that progressed slowly in the western Pacific between Okinawa and Japan, interacting each other, in late August 1945 postponed McArthur’s occupation plan of Japan for 48 hours. They could observe and analyze the detailed motion of two typhoons by aircraft reconnaissance.

It is inferred that therefore some experts in meteorological services in U. S. gave this process the name of a chief of meteorological service of the enemy and also a meteorologist who had studied interaction between vortexes.

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Keywords: Fujiwhara effect, typhoon, Sakuhei Fujiwhara, Diro Kitao, World War II, U.S. forces

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MZZ45-05 Room:203 Time:May 24 12:00-12:15

The Beginnings of the Numerical Prediction of Typhoons in Japan

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In 1959, the Japan Meteorological Agency (JMA) began its routine operation of weather forecasting with an electronic computer. It was based on previous work carried out by researchers who had formed a study group called the ”Tokyo NP group.” The present lecture attempts to describe the early developments of numerical prediction by those meteorologists in the 1950s. Particular attention will be paid to the prediction of the movement of a typhoon, the method for which was developed independently in Japan.

Numerical weather prediction with an electronic computer was first conducted in 1950 in the United States. It was done by a research group led by J. Charney at the Institute for Advanced Study in Princeton. The results of Charney and others greatly impressed S. Syono, then professor at Tokyo University and an expert in dynamical meteorology. One of Syono’s students, K. Gambo, made contact with Charney and studied at Princeton from 1952 to 1954. The American success pushed Japanese meteorologists to investigate numerical prediction, and Syono organized the ”NP group” at the end of 1953. Gambo became a de facto leader after his return to Japan.

One of the characteristics of the ”NP group” was that the members came from both academic and practical institutions: Tokyo University, the Central Meteorological Observatory (CMO, reorganized into JMA in 1956), and the Meteorological Research Institute (MRI, associated with CMO/JMA). As far as the prediction of typhoons was concerned, the main contributions in the 1950s were made by Y. Sasaki and K. Miyakoda from Tokyo University; E. Terauchi, Y. Nabeshima, and others from CMO/JMA; and Y. Masuda from MRI. When the computer-aided forecasting at JMA was begun in 1959, works for typhoon prediction were prepared by Terauchi, Masuda, and others.

Before the advent of electronic computers, the forecasting of a typhoon was performed in empirical ways. Weather forecasters had obtained some practical rules for the movement of typhoons, of which the primary one was that a typhoon is carried by a general flow, i.e., the flow of atmosphere surrounding the vortex of a typhoon. Sasaki and Miyakoda incorporated this empirical idea into the method of numerical predictions. By separating the vorticity field into that of the typhoon itself and the residue, they succeeded in reproducing the course of some typhoons. Because of the lack of computational machines, they performed their calculations by hand. Their result, published in 1954, was immediately deemed to be an important contribution made in Japan.

The Sasaki-Miyakoda method was soon adopted and extended by other meteorologists. At JMA, the method was tested for several typhoons in 1955 and compared with other methods. In the next year, researchers at JMA could use the ETL Mark II, a relay computer constructed at the Electrotechnical Laboratory. Using this opportunity, Terauchi and his collaborators modified their model to incorporate the effect of baroclinicity. On the other hand, the necessity of improving a barotropic model was insisted upon by Masuda, who proposed in 1957 an alternative method whereby the stream function is employed. In performing his computations, Masuda used another relay computer, the FACOM 128 of Fujitsu, as well as the FUJIC, a small electronic computer developed at Fuji Photo Film. It was through these earlier efforts that JMA could launch the operational forecasting of typhoons as soon as the IBM 704 was installed in 1959.

While the calculating tools changed from human hands to relay and electronic computers, the Sasaki-Miyakoda method, which was based on earlier empirical knowledge, provided a basic idea for modeling work through the 1950s. The early development of the numerical prediction of typhoons shows a continuity, rather than discontinuity, before and after the emergence of electronic computers.

Keywords: history of meteorology, numerical prediction, typhoon

Japan Geoscience Union Meeting 2015
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MZZ45-06 Room:203 Time:May 24 12:15-12:30

Living with Non-Spherical Earths: Co-Construction of Geodesists and the Concept of the Shape and the Size of the Earth

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This paper will argue how the practice of geodesy make the concept of the shape and size of the earth and the sociality of geodesists transformed, describing the genealogy of the practice and the contemporary situation of geodesy.

In science studies, scholars have presupposed that scientists are the group which share some attribution. For example, ”the people who exercise their reason and explore the truth of the world”, ”the group who share the particular paradigm” and ”the social group who share some interests.” These presuppositions are introduced in order to explain how scientific knowledge is constructed and how they become taken for granted.

However, these presupposition interfere of the understanding how people transform the attribution of the objects for exploration and how people transform themselves by their exploration. Based on Actor-Network Theory, the anthropological theory which is proposed by Michelle Callon, Bruno Latour and John Law, I will propose how people change ontological status of objects and themselves, analyzing the case of geodesy.

The concept of shape and size of the earth is drastically transformed as time passes. In ancient Greek, people cannot perceive the whole entity of the earth and some philosophers made sophisticated reasoning and calculation system of the size of the earth. In contemporary period, artificial satellites perceive the entire figure of the earth. Some instruments even perceive the dynamics which human body cannot perceive. In the process, the sociality of scientists are also transformed; from librarian to data analysts of artificial satellites. This paper will describe a part of the history and will analyze the sociality of geodesists in contemporary Japan.

Keywords: Anthropology of Science, Geodesy, Co-Construction, Actor-Network Theory, the Size and Shape of the Earth, Historical Ontology

Japan Geoscience Union Meeting 2015
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MZZ45-07 Room:203 Time:May 24 12:30-12:45

Science of Science Communication: Technical Method and Mind Climate to be linked together

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Recent decades have transformed our societies into information societies, while increasing their democratization. The citizens are now capable of gathering large amounts of information by themselves and attempt to make informed decisions on a variety of social issues. Society-wide decision-making requires building a consensus among large number of individuals which, given the abundance of often contradictory or misleading information, is far from easy to achieve.

We consider the consensus-building process as requiring involved parties to achieve a level of understanding not only on logical grounds but also emotional ones. We believe the role of the latter is largely underappreciated in group consensus-building and emotions such as fear or distrust often play a much bigger role than the actual understanding on logical grounds. We call these emotional factors that influence society-wide behavior and thinking a current ”mind climate”.

We believe that understanding how ”mind climate” emerges in modern societies is essential to understanding how we build group-consensus. And although the term may seem intuitive, what exactly should be considered a part of ”mind climate” needs to be defined first. We will report the results of our discussions aiming to clarify the concept of ”mind climate” and introduce an experiment we conceived to identify factors that are necessary for making consensus-building more efficient.

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Keywords: Science Communication

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MZZ45-08 Room:203 Time:May 24 14:15-14:30

Interdisciplinary research initiative in earth science during 1960's and 70's based on oral history

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In order to advance scientific research requires researchers to challenge interdisciplinary research. In solid Earth science, from the 1960s to 70s, some such researchers had active experimental work. In this study, we collected oral histories of the two outstanding researchers. We considered the dissimilarity and similarity of thought and actions that need to develop a new scientific research field.

Keywords: oral history, earth science, interdisciplinary research, Nagoya Univ.

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MZZ45-09 Room:203 Time:May 24 14:30-14:45

From An Enlarged Conception of Earth Science to the Trans-Science: Professor Yasuo Shimazu and the History of Science

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This paper examines the studies of earth science of Professor Yasuo Shimazu (b. 1926), the geophysicist at Nagoya University, in his 1970s. He presented a conception‘socio-geoscience’ in his book of 1970. The ‘socio-geoscience’ included three areas of sciences: earth science, ecology and economy, which he called ‘3E approach’, with the method of computer simulation. This ‘enlarged’ earth science has a character that the American physicist Alvin Weinberg suggested ‘trans-science’ because of its inclusion of decision-making of citizens. Also, the tendencies of environmental assessment and educational reformation in the 1970s will be discussed.

Keywords: socio-geoscience, controlling the environment, trans-science, Yasuo Shimazu, history of geoscience in the 1970s