

Editorial: Progress in radiolarian research during the last two decades

Atsushi MATSUOKA* and Tsuyoshi ITO**

“Radiolarian Revolution”—This term indicates the rapid development of radiolarian research in 1980s and the overturn of previously-believed scenarios for geological history by interpreting newly accumulated radiolarian fossil evidence. Many radiolarian studies had been performed in Japan, so that Japan was at the major stage of the revolution in 1980s. In October, 1994, the 7th International Radiolarian Symposium (InterRad VII) was held in Osaka, Japan. The excursion guidebook containing three articles for the InterRad VII was published (Ishiga, 1994; Matsuoka et al., 1994; Sakai and Aita, 1994), presenting the latest achievements of radiolarian research at that time.

For the first time in 23 years, the InterRad returns to Japan in October for its fifteenth gathering. Since the last InterRad in Japan, numerous radiolarian studies have been continued and research results have been accumulated steadily. Five excursions (two pre-conference, two mid-day, and one post-conference excursions) are designated in the InterRad XV (Fig. 1). This volume, the supplement volume of no. 32 of *Science Reports of Niigata University (Geology)*, comprises six articles for the excursions of InterRad XV. We here introduce an outline of each article and its significance.

The article by Motoyama et al. (2017a) deals with the Boso Peninsula in Chiba Prefecture. Cenozoic strata with various sedimentological and tectonic settings are well exposed in the Boso Peninsula facing to both Tokyo Bay and the Pacific Ocean. The article introduces these Cenozoic strata, such as uplifted fore-arc cover sediments, trench-slope basin deposits, and accretionary complexes of the trench-fore-arc system. This is the first report of radiolarian occurrences from the Tabuchi section, which is a hopeful candidate of the Global Boundary Stratotype Section and Point (GSSP) of the Middle Pleistocene Stage with the transition from the reversed-polarity Matuyama Chron to normal-polarity Brunhes Chron.

The article by Motoyama et al. (2017a) also describes the Bandai area in the Aizu region, Fukushima Prefecture. The area is well-known for the Bandaisan Geopark. One of the main

* Department of Geology, Faculty of Science, Niigata University, Niigata 950-2181, Japan

** Stratigraphy and Tectonics Research Group, Research Institute of Geology and Geoinformation, Geological Survey of Japan, AIST, Tsukuba 305-8567, Japan

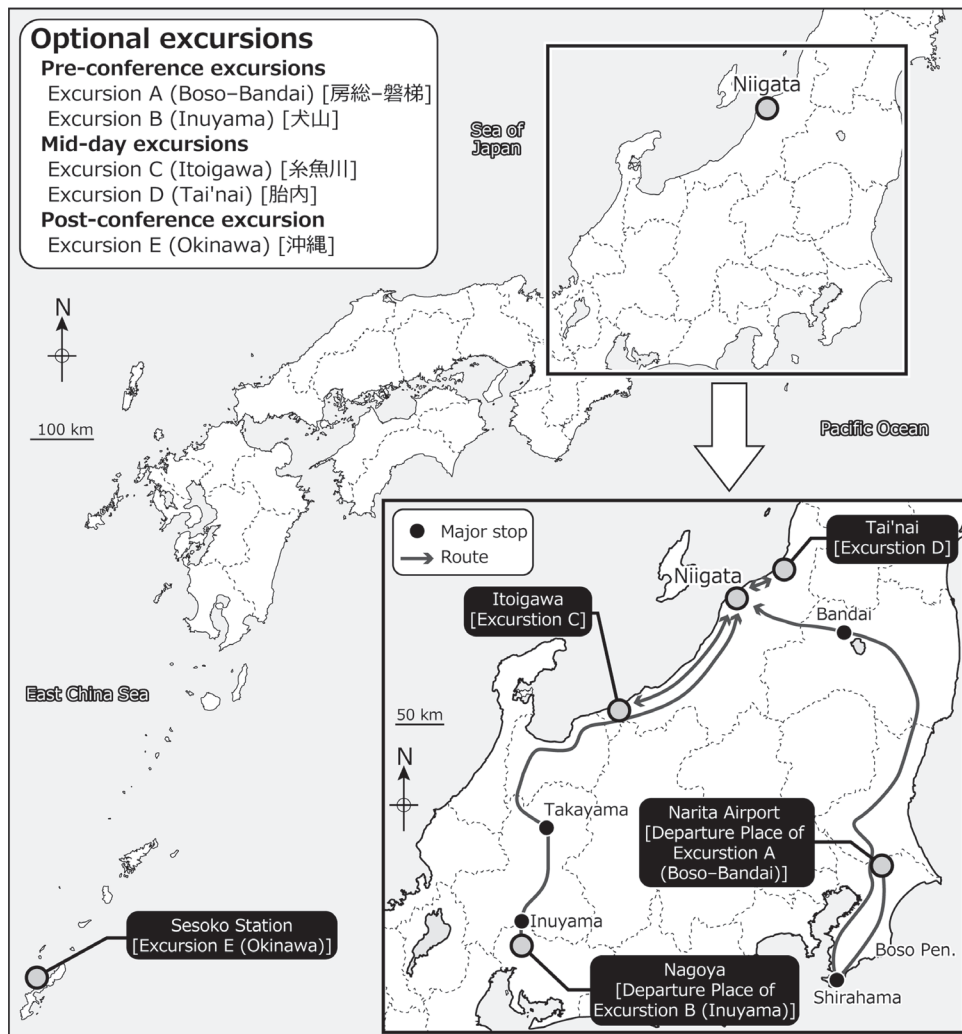


Fig. 1. Optional excursions of InterRad XV in Niigata 2017.

features of the geopark is the Bandai Volcano, an active stratovolcano. Although the Bandai volcano had collapsed several times by eruption in the past and had caused terrible volcanic disasters, it also formed beautiful and magnificent landscapes.

The article by Onoue et al. (2017) compiles numerous studies of Mesozoic radiolarians and accretionary complexes in the southern part of the Mino area. The Triassic–Jurassic chert sequences in the area are one of the most significant and complete records of the Panthalassan pelagic ocean environments. Onoue et al. (2017) show several themes in the area including Early Triassic ocean anoxia and its recovery, Late Triassic Pluvial Event, Late Triassic bolide impact and radiolarian faunal turnover, end-Triassic radiolarian extinction, and Triassic–Jurassic astronomical cycles recorded in the chert sequences. By reviewing the article by Matsuoka et al. (1994), which demonstrated the latest achievements

in research at that time in the same area, the participants will easily realize a great progress in research of these pelagic sequences during the last two decades.

The article by Ito et al. (2017) introduces an outline and history of the Itoigawa UNESCO Global Geopark in Itoigawa, Niigata Prefecture. The geopark was approved as a Global Geopark in 2009, becoming one of the first Global Geoparks in Japan. In fact, the word “geopark” was first coined in Itoigawa when the Fossa Magna Park opened in 1990. One of the main attraction of the Itoigawa UNESCO Global Geopark is the exposures of various rocks in a wide range in origin and age, including various-aged radiolarian occurrences.

The article by Motoyama et al. (2017b) deals with Middle Miocene–Pliocene biosiliceous and microfossil-bearing-siliclastic sediments at the Natsui section along the Tainai River, Niigata Prefecture. Several biostratigraphies have been constructed in the Natsui section based on microfossils, such as pollen, diatom, planktonic foraminifera, calcareous nannofossil, and ostracod. Motoyama et al. (2017b) newly present Middle to Upper Miocene radiolarian biostratigraphy for the Natsui section. The radiolarian faunas are typical in the Sea of Japan in the Neogene.

The article by Matsuoka et al. (2017) shows previous studies on living radiolarians resulted from annual workshops called “Okinawa Radiolarian Tour” at the Sesoko station (Tropical Biosphere Research Center of the University of the Ryukyus) in Sesoko Island, Okinawa Prefecture. The successive tours have provided valuable knowledge on living radiolarians (e.g., faunal characteristics, biological activities, skeletal growth, and molecular phylogeny); therefore, the station is one of the most important research stations for living radiolarian studies in the world. In addition, the article compiles brief histories of radiolarian biological research and introduces practical information on oceanographic conditions, travel, safety, and handling and storage procedures for radiolarian studies in the Sesoko Station. For beginners of living radiolarian study, the article can contribute to handle living radiolarians as a first step.

The article by Ito and Matsuoka (2017) describes the geology and radiolarian occurrences in Ie Island, Okinawa Prefecture. Mesozoic accretionary complexes are exposed in the Okinawa Islands, but its exposure is scattered because the Pleistocene Ryukyu Group covers them. Ie Island is therefore the valuable area for Paleozoic and Mesozoic radiolarian researches in the Okinawa Islands. The bedded cherts of the Gusukuyama Formation in Mt. Gusuku in the central part of the island contain late Permian–Late Jurassic radiolarians; siliceous mudstones in the southern flank of Mt. Gusuku yield latest Jurassic–earliest Cretaceous radiolarians. Red chert clasts within the Pleistocene Ryukyu Group at Waji in the north coast of Ie Island contain Permian radiolarians including dimorphic pairs of *Albaillellaria*, which are rarely reported worldwide.

The above-mentioned articles include not only the compilation of numerous previous studies but also valuable unpublished data. The participants may realize that “Radiolarian

Revolution” is still ongoing in Japan. Moreover, the articles cover subjects of general interest, such as regional geology and geoparks. We hope these articles will help all participants to enjoy the excursions.

Acknowledgements

We would like to express our thanks to all of the excursion leaders who have submitted informative and scientifically valuable guides for the InterRad XV. We express our gratitude to reviewers for many helpful suggestions and comments that have improved the manuscripts of the articles in this volume. The list of reviewers is as follows: Dr. Yoshiki Saito (Geological Survey of Japan, AIST), Prof. Richard W. Jordan (Yamagata University), Dr. Ko Takenouchi (Fossa Magna Museum), Mr. Theodore Brown (Itoigawa Geopark Promotion Office), Dr. Shin-ichi Kamikuri (Ibaraki University), Dr. David Lazarus (Museum für Naturkunde, Humboldt University, Germany), and Prof. Yoshiaki Aita (Utsunomiya University).

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