

Report of the 15th meeting of the International Association of Radiolarists (InterRad XV), 20 October – 1 November, 2017, Niigata, Japan

Atsushi MATSUOKA* and organizing committee of the InterRad XV

Abstract

The InterRad XV was organized in Japan from 20 October to 1 November 2017, co-hosted by the International Association of Radiolarists, the Geological Society of Japan, the Palaeontological Society of Japan, the Society of Science on Form, Japan, and the Geological Survey of Japan, AIST. A total of 187 participants from 16 countries attended the meeting. The scientific sessions were held during 23–27 October at Niigata University, which was regarded as an activity of a joint seminar in the bilateral programs between Japan (Japan Society of Promotion of Sciences; JSPS) and China (National Natural Science Foundation of China; NSFC). An Abstract Volume including 128 papers presented in the oral and poster sessions was printed as Volume 40 of “Radiolaria” (ISSN: 0297–5270), the formal newsletter of InterRad. Outreach programs were also included in the InterRad XV. Pre-, mid-, and post-conference excursions were carried out and an excursion guide was published in a volume of Science Reports of Niigata University (Geology) (ISSN: 1349–1237), No. 32 (Supplement), which is available at the Niigata University Academic Repository (Nuar). The proceedings of the InterRad XV will be published as special issues of *Island Arc*, *Paleontological Research*, *Revue de Micropaléontologie*, and *Bulletin of the Geological Survey of Japan*.

Key words: InterRad, radiolaria, joint seminar, JSPS–NSFC bilateral program, outreach, proceedings.

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Introduction

InterRad is the International Association of Radiolarists. It is a non-profit organization that promotes research on all aspects of radiolarian-related fields including biology, ecology, taxonomy, evolution, biogeography, biostratigraphy and so on. Meetings of InterRad (including former Eurorad) have been held every three years regularly since 1970. The 15th meeting of InterRad (InterRad XV) was organized from 20 October to 1 November 2017 in Japan. The scientific sessions were held during 23–27 October, 2017 at Niigata University. InterRad meeting returned to Japan after 23 years since the 7th meeting was held in October, 1994 in Osaka.

The InterRad XV aimed at having an opportunity to exchange idea for understanding all aspects of radiolarian-related topics beyond the radiolarian society. The organizing committee has strongly encouraged the involvement of non radiolarists including scientists of various research fields, science communicators such as geoparks, artists, and members of the general public who are interested in radiolarians. In order to achieve this goal, the committee organized interdisciplinary symposia in the scientific sessions, set up various outreach programs, and created new products in collaboration with artists for outreach purposes.

This report summarizes the organization of the InterRad XV in Niigata 2017, the scientific sessions, excursions, and outreach activities. Reports on the InterRad XV in Niigata 2017 have already been published in Abstracts of Society of Science on Form, Japan (Matsuoka, 2017) and in “News” of the Geological Society of Japan (Fujii, 2018; Nakagawa et al., 2018). A short summary of the meeting was also reported in Volume 41 of “Radiolaria”, the official newsletter of InterRad (Matsuoka, 2018a). Additional reports will be presented in “Fossils” of the Palaeontological Society of Japan (Ichinohe and Yamashita, 2018) and in the Journal of Geography of the Tokyo Geographical Society (Matsuoka, 2018b).

Organization of InterRad XV in Niigata 2017

The InterRad XV in Niigata 2017 was planned and conducted by the following committees and was co-hosted by the International Association of Radiolarists, the Geological Society of Japan, the Palaeontological Society of Japan, the Society of Science on Form, Japan, and the Geological Survey of Japan, AIST.

Organizing Committee of InterRad XV in Niigata 2017:

Honorary Chairperson: Akira YAO (Osaka City University)

Chairperson: Atsushi MATSUOKA (Niigata University)

Main Secretary: Noritoshi SUZUKI (Tohoku University)

Sub Secretary: Takuya ITAKI (Geological Survey of Japan) and Tsuyoshi ITO (Geological Survey of Japan)

Treasurer: Toshiyuki KURIHARA (Niigata University)

Executive Members: Satoshi NAKAE (Geological Survey of Japan), Yukihiisa NISHIZONO (West Japan Engineering Consultants Inc.), Yoshihito KAMATA (Tsukuba University), and Takashi YOSHINO (Toyo University)

Webmaster: Takashi YOSHINO

Publication Planners:

Co-chief: Atsushi MATSUOKA, Noritoshi SUZUKI, and Takuya ITAKI

Editorial Members: Katsuo SASHIDA, U. Kagan TEKIN, Keisuke ISHIDA (Island Arc), Atsushi TAKEMURA (Paleontological Research), Satoshi NAKAE (Bulletin of the Geological Survey of Japan), and Taniel DANELIAN (Revue de Micropaléontologie)

Excursion Coordinator: Tsuyoshi ITO

Excursion Leaders:

Pre-meeting Excursions

Excursion A (Boso–Bandai) [cancelled]: Isao MOTOYAMA, Takuya ITAKI, Shin'ichi KAMIKURI, Yojiro TAKETANI, and Makoto OKADA

Excursion B (Inuyama): Tetsuji ONOUE, Rie S. HORI, and Satoru KOJIMA

Mid-day Excursions

Excursion C (Itoigawa): Tsuyoshi ITO, Yousuke IBARAKI, and Atsushi MATSUOKA

Excursion D (Tainai): Isao MOTOYAMA, Toshiyuki KURIHARA, and Takuya ITAKI

Post-meeting Excursion

Excursion E (Okinawa): Atsushi MATSUOKA, Tsuyoshi ITO, Noritoshi SUZUKI, Katsunori KIMOTO, Akihiro TUJI, Xin LI, and Ryo ICHINOHE

Scientific Committee:

Atsushi MATSUOKA, Takuya ITAKI, Yoshiaki AITA, Peter O.BAUMGARTNER, Marco CHIARI, Taniel DANELIAN, Špela GORIČAN, Weihong HE, Rie S. HORI, Richard W. JORDAN, Yoshihito KAMATA, Katsunori KIMOTO, Kiyoko KUWAHARA, Gang LI, Hui LUO, Fabrice NOT, Luis O'DOHERTY, Yusuke OKAZAKI, John ROGERS, Yuta SHIINO, Satoshi TAKAHASHI, U. Kagan TEKIN, and Yuki TOKUDA

Corporate Backers:

Niigata University; Faculty of Science, Niigata University; Graduate School of Science and Technology, Niigata University; Research Center of Science on Form, Niigata University;



Fig. 1. Program Booklet for InterRad XV in Niigata 2017.

Sesoko Station, the Tropical Biosphere Research Center, the University of the Ryukyus; Japanese Geopark Network; Itoigawa UNESCO Global Geopark; Bandaisan Geopark; RC GEAR; Image Mission Inc.; JUNKUDO Bookstore Niigata; The Niigata Nippo; The Asahi Shimbun Company (朝日新聞新潟総局); The Yomiuri Shimbun (読売新聞新潟支局); The Mainichi Newspapers (毎日新聞新潟支局); NHK (Japan Broadcasting Corporation); Broadcasting System of Niigata Inc.; NST; Television Niigata Network Co. Ltd.; The Niigata Television Network 21, Inc.; FM-NIIGATA Co. Ltd.

Outline of InterRad XV in Niigata 2017

A total of 187 participants, including 46 scientists from abroad, attended the meeting from 16 countries; Australia, China, France, Germany, Indonesia, Italy, Japan, Korea, Mongolia, the Philippines, Russia, Slovenia, Spain, Switzerland, Turkey, and the United States of America. A 14-page Program Booklet (Fig. 1) describes all of the activities held in Niigata. The scientific sessions were held on 23–24 October at the Ikarashi Campus of Niigata University and on 26–27 October at the “Eki-nan” Campus TOKIMATE of Niigata University. The scientific sessions with mid-day excursions were regarded as an activity of a joint seminar in the bilateral programs between Japan (Japan Society of Promotion of Sciences; JSPS) and China (National Natural Science Foundation of China; NSFC). An abstract Volume (Fig. 2A) including 128 papers presented in the oral and poster sessions was printed as Volume 40 of “Radiolaria” (ISSN: 0297-5270) (Ito et al. (eds.), 2017), the formal newsletter of InterRad. Outreach programs were performed on 22 and 25 October. The Icebreaker Party, Welcome Party, and Farewell Party were held in the evenings of 22, 23 and 27 October, respectively.

Two pre-conference excursions were planned; Boso–Bandai (Excursion A, Motoyama et

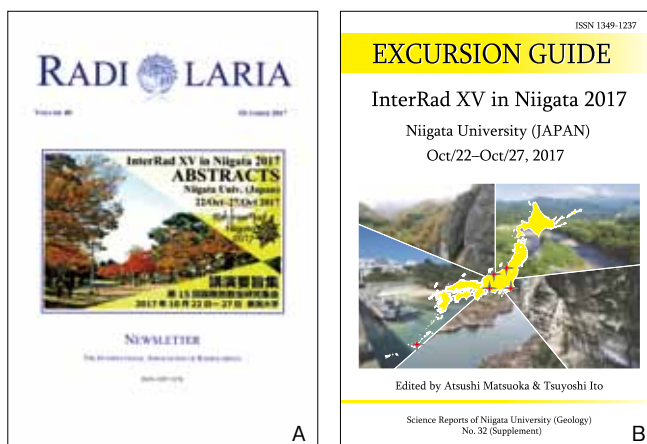


Fig. 2. Cover pages of Abstract Volume (A) and Excursion Guide (B) of InterRad XV in Niigata 2017.

al., 2017a) and Inuyama (Excursion B, Onoue et al., 2017), but only Excursion B was carried out. On 25 October, two mid-day excursions were held: Itoigawa (Excursion C, Ito et al., 2017) and Tainai (Excursion D, Motoyama et al., 2017b). After all activities in Niigata, a post-conference excursion was carried out in Okinawa (Excursion E, Ito and Matsuoka, 2017; Matsuoka et al., 2017). An excursion guide (Fig. 2B) was published in a volume of Science Reports of Niigata University (Geology) (ISSN: 1349–1237), No. 32 (Supplement), which is available at the Niigata University Academic Repository (Nuar).

Scientific sessions

The scientific sessions were held on 23–24 October in the Central Library in the Ikarashi Campus, Niigata University (Fig. 3) and on 26–27 October in the “Eki-nan” Campus TOKIMATE of Niigata University (Fig. 4).

1. Opening Ceremony

The Opening Ceremony was performed in the morning of 23 October at the Library Hall in the Central Library of Niigata University in a windy condition due to an unseasonable typhoon. It started with an opening address by MATSUOKA, A. (Chairperson of InterRad XV) and was followed by two welcome addresses by Sugata TAKAHASHI (President of Niigata University) and YAO, A. (Honorary Chairperson of InterRad XV) who was the chairperson of the InterRad VII in 1994. Group photographs (Fig. 3A) were taken inside of the Library Hall because of stormy weather.

2. Oral and poster presentations

A total number of 128 papers were presented in the oral and poster sessions during the



Fig. 3. Science sessions on 23–24 October in the Central Library of Niigata University (Ikarashi Campus). **A.** Group photograph in the Library Hall, **B.** Oral session in the Library Hall, **C.** Poster presentation in the Library Gallery, **D.** Poster presentation with hands-on exhibit, **E.** Display booth in the Exhibition Space.



Fig. 4. Science sessions on 26–27 October in TOKIMATE of Niigata University “Eki-nan” Campus. **A.** Entrance of TOKIMATE, **B.** Oral session in the Lecture Room, **C.** Poster presentation in the Meeting Room A.

scientific sessions at Niigata University. Abstract Volume of InterRad XV with 324 pages (Fig. 2A) was printed as Volume 40 of “Radiolaria”, formal newsletter of InterRad, which is available at the InterRad XV web page as well. A 14-page Program Booklet (Fig. 1) was prepared for all of the activities held in Niigata. Digital data of the printed material are included in a DVD which was delivered to all participants as one of conference material.

The first two days (23–24 Oct.) were devoted to special symposium composed of five oral sessions, namely Paleooceanography of Tethys and Panthalassa (Chairs: TAKAHASHI, S. and BAUMGARTNER, P. O.), Cenozoic Paleooceanography in Marginal Seas (Chairs: ITAKI, T., OKAZAKI, Y., and JORDAN, R. W.), Biology and Paleobiology of Shelled Protista (Chairs: KIMOTO, K. and NOT, F.), An Interface between Function and Evolution (Chairs: TOKUDA, Y. and SHIINO, Y.), and Jurassic–Cretaceous Boundary (Chairs: MATSUOKA, A. and LI, G.). All of these sessions were organized in an interdisciplinary manner. Specialists from a wide range of research fields including micropaleontology, oceanography, tectonics, molecular biology, science on form, etc. attended the sessions. Poster sessions of these topics were also held in the Library Gallery. The Geological Survey of Japan, Itoigawa UNESCO Global Geopark, RC GEAR, and Image Mission Inc. set up a booth and displayed their products or work in the exhibition space next to the Library Hall.

The last two days (26–27 Oct.) were assigned to general symposia consisting of eight oral sessions, namely Insightful Studies for Radiolarians (Chairs: AITA, Y. and ROGERS, J.), Biosiliceous Records (Chairs: ROGERS, J. and AITA, Y.), Modern Oceanography (Chairs: Hori, R. S. and KUWAHARA, K.), Paleobiogeography (Chairs: KUWAHARA, K. and HORI, R. S.), Evolution and Diversity (Chairs: HE, W. H. and CHIARI, M.), Biostratigraphy (Chairs: CHIARI, M. and HE, W. H.), Tibetan Tectonics (Chairs: DANELIAN, T. and LUO, H.), and European Tectonics (Chairs: LUO, H. and DANELIAN, T.). The oral sessions were held in the Lecture Room of TOKIMATE. The poster sessions of these topics were also held in the Multi-purpose Space and Meeting Room A in TOKIMATE. The Geological Survey of Japan and RC GEAR displayed their products in the Multi-purpose Space. The participants enjoyed the exhibition “World of Radiolaria” displayed as an activity of the Niigata University Week. Paleozoic, Mesozoic, and Cenozoic–Recent Working Group meetings were also organized in TOKIMATE. At the end of the meeting on 27 October, a business meeting and the Closing Ceremony were performed at TOKIMATE. During the business meeting, it was decided that the 16th InterRad meeting will be held in Ljubljana, Slovenia in September, 2020 and the next InterRad President would be GORIČAN, Š.

Icebreaker Party, Welcome Party and Farewell Party

1. Icebreaker Party

The Icebreaker Party was held at Art Hotel Niigata Station in the evening of 22 October just after the talk show “What’s Rad??” performed in Café Space in JUNKDO Bookstore Niigata, basement floor of the same building of Art Hotel Niigata Station. The participants enjoyed a good time at a buffet party.

2. Welcome Party

In the evening of 23 October, the Welcome Party was held at ANA Crown Hotel Niigata (Fig. 5A). The party started with a welcome address by MATSUOKA, A., followed by a “Kagami-Biraki”, a “sake” barrel opening ceremony (Fig. 5B) and toast proposed by Yuichiro TANAKA, representative of the Geological Survey of Japan, AIST. Participants enjoyed performance of dance and music by Niigata “Geigi” women (Fig. 5D) and by a Japanese drum team (Fig. 5E). Speeches by representative of the co-host organizations were as follows: Yoshio WATANABE, President of the Geological Society of Japan; Makoto MANABE, President of the Palaeontological Society of Japan; Kiyoshi MIYAMOTO, President of Science on Form, Japan.

3. Farewell Party

The Farewell Party was performed at Art Hotel Niigata Station in the evening of 27



Fig. 5. Welcome Party at ANA Crown Hotel Niigata. **A.** Sit-down dinner in Room Fuyo, **B.** “Kagami-Biraki”, “sake” barrel opening ceremony, **C.** “Choco”, small cup for “sake” rice wine, with logo of InterRad XV in Niigata 2017, **D.** Dance and music by Niigata “Geigi” women, **E.** Performance by a Japanese drum team.

October. Winners of the Best Oral and Poster Presentation Award for Young Scientists in InterRad XV were introduced and the awarding ceremony was also held during the Farewell Party (Fig. 6). The winners’ names in bold and the titles of their presentation are as follows.

Best Oral Presentation Award for Young Scientists:

Miguel M. SANDIN, Loic PILLET, Tristan BIARD, Camille POIRIER, Florence LE GALL, Estelle BIGEARD, Sarah ROMAC, Sebastien COLIN, Charles BACHY, Lucie BITNER, Taniel DANELIAN, Noritoshi SUZUKI, and Fabrice NOT: Time calibrated morpho-molecular classification of Polycystine Nassellaria (Radiolaria)

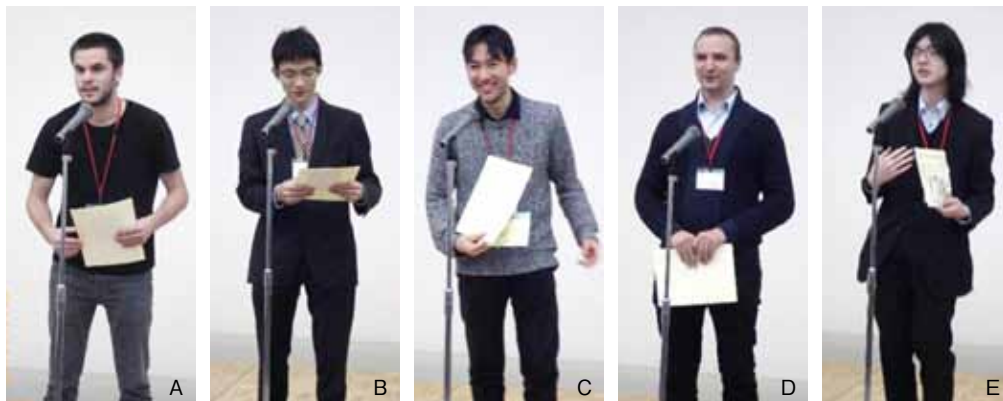


Fig. 6. Winners of Best Oral and Poster Presentation Awards for Young Scientists at Farewell Party. **A.** Miguel M. SANDIN, **B.** Shun MUTO, **C.** Yasuhide NAKAMURA, **D.** Maximilien BOLE, **E.** Kento NIIMURA.

Shun MUTO, Satoshi TAKAHASHI and Satoshi YAMAKITA: Three episodes of black claystone deposition in the pelagic Panthalassa during the Early Triassic

Best Poster Presentation Award for Young Scientists:

Yasuhide NAKAMURA, Rei SOMIYA, Akihiro TUJI, Dhugal J. LINDSAY, Hiroaki OHFUJI, and Rie S. HORI: Cell division of phaeodarians —the first step to clarify the life cycle—

Maximilien BOLE, Peter O. BAUMGARTNER, Rie HORI, and Masayuki IKEDA: Secular variations of oxygen and silicon isotopes in Mesozoic radiolarites from Panthalassa and Tethys —proxies for paleo temperature and paleo productivity

Kento NIIMURA, Yoshiaki AITA, Sakurako SUZUKI, Kako MASHIKO, Yoshino ISHIZAKI, and Naoko KISHIMOTO: Detailed internal structures of Middle Triassic *Glomeropyle galagala?* and unnamed *Glomeropyle* sp. with the use of X-ray micro-CT

Outreach activities

1. Outreach Programs

The InterRad XV in Niigata 2017 started with two outreach programs entitled “Let’s make friends with plankton” at TOKIMATE, a satellite (Eki-nan) campus of Niigata University during 14:00–15:00 on 22 October and “What’s rad??” at Café Space in JUNKDO Bookstore Niigata during 15:30–17:00 on the same day (Fig. 7).

The former was one of the Niigata University WeeK activities, which included an exhibition called “World of Radiolaria” in the Multi-purpose Space of TOKIMATE from 15 October to 27 October (Fig. 7A). The participants took delight in microscope observations of plankton with living radiolarians obtained from the Japan Sea off Sado Island by a staff in the Sado Marine Station belonging to Faculty of Science, Niigata University.



Fig. 7. Outreach activities during InterRad XV. **A.** Hands-on display “Let’s make friends with plankton” and exhibition “World of Radiolaria” in the Multi-purpose Space of TOKIMATE, **B.** Talk show “What’s rad??” at Café Space in JUNKDO Bookstore Niigata, **C.** International Communication Program in the Multi-purpose Space of TOKIMATE, **D.** Outreach items displayed in exhibition “World of Radiolaria”.

The talk show “What’s rad??” was performed by MATSUOKA, A. as a scientist and Hayato YOKOYAMA as an artist (Fig. 7B). This scientist–artist collaboration was assigned to the 101th performance of Science Café Niigata. Some of the participants in the show joined the Icebreaker Party held at Art Hotel Niigata Station and had an opportunity to talk with radiolarian specialists from all over the world.

2. International Communication Program

In the evening of 25 October, an International Communication Program was held in the Multi-purpose Space of TOKIMATE (Fig. 7C). BAUMGARTNER, P. O., Professor of the University of Lausanne in Switzerland, made a one-hour lecture on Mesozoic radiolarians and ocean circulation not only for scientists but also for radiolarian-loving persons with an English–Japanese consecutive interpretation by MATSUOKA, A. As many as 50 people attended the lecture.

3. Outreach items

The logo of the 15th InterRad in Niigata 2017 was a result of collaborative work with an

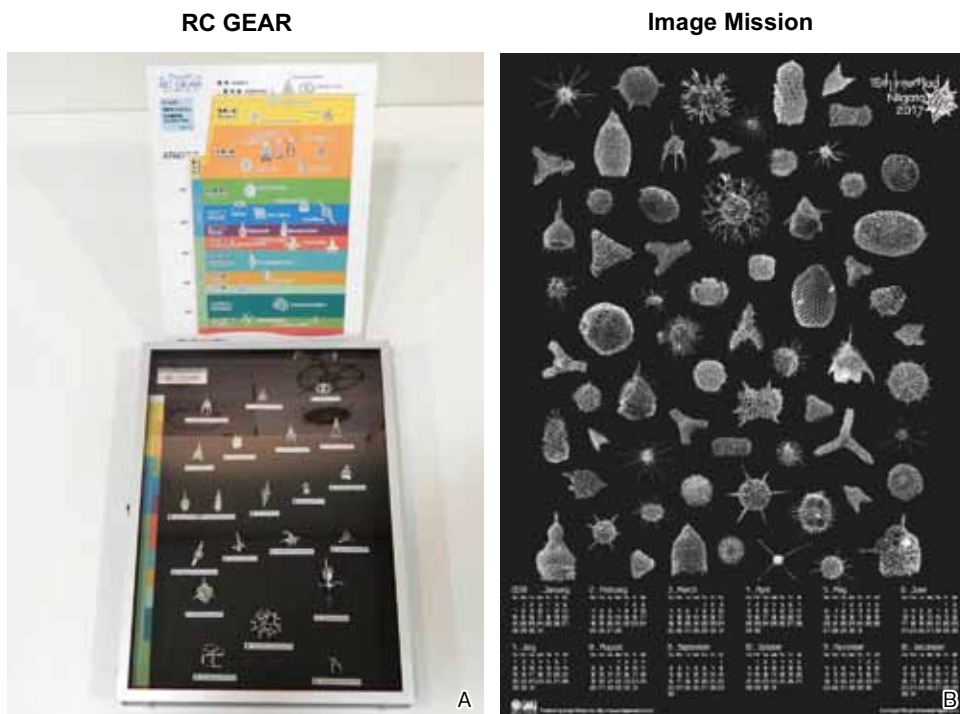


Fig. 8. Silver figures of radiolarians produced by RC GEAR (A) and 2018 radiolarian calendar made by Image Mission Inc (B).

artist (Kazuyuki MORIA). The logo was used for publicity activities, official documents, Abstract Volume, Program Booklet, and even for the design of *choko* small cups for sake (Japanese rice wine) (Fig. 5C). Silver figures of radiolarian skeletons ranging in age from the Cambrian to Quaternary (Fig. 8A), which were results of joint work between an artist (YOKOYAMA, H.) and radiolarian specialists, were an official commemorative gift for each participant. On the occasion of the InterRad XV, several outreach items were newly produced. Photomicrographic images or designs of radiolarian skeletons were used for calendars, playing cards, T-shirt prints and so on (Fig. 7D). A radiolarian calendar for the year of 2018 was made by Image Mission Inc. (Fig. 8B) and was sold at JUNKDO Bookstore Niigata, National Science Museum in Tokyo, Osaka Museum of Natural History, and others.

Excursions

A total of five excursions (A to E), two pre-conference, two mid-day, and one post-conference excursions, were planned (Fig. 9). Four of them, except Excursion A (Boso-Bandai), were implemented with some modifications due to weather conditions. An excursion guide (Fig. 2B) was published in a volume of Science Reports of Niigata University



Fig. 9. Excursion locations and group photograph of each excursion. **A.** Location map of Excursions, **B.** Kiso River bank in Excursion B, **C.** Fossa Magna Museum in Excursion C, **D.** Shimizu-en in Excursion D, **E.** Sesoko Marine Station in Excursion E.

(Geology) (ISSN: 1349–1237), No. 32 (Supplement), which is available at the Niigata University Academic Repository (Nuar). Highlights of each excursion were introduced by the editors (Matsuoka and Ito, 2017). The location map in the excursion guide and group photograph of each excursion are shown in Fig. 9.

1. Pre-conference excursion

Pre-conference Excursion B (Inuyama) with 19 participants started from Unuma near Nagoya on 20 October, visited several localities of Triassic–Jurassic chert sequences in the Mino and Hida areas, central Japan (Fig. 9B), and finished at Niigata Station in the afternoon of 22 October. Fujii (2018) and Nakagawa et al. (2018) reported their experience during the excursion. Detailed descriptions of all the stops are given in Onoue et al. (2017).

2. Mid-day excursions

In the mid-day of the meeting on 25 October, two mid-day excursions were carried out in the Itoigawa UNESCO Global Geopark (24 participants) and the Tainai area with a “sake” winery visit in Shibata (20 participants). Details of Excursions C (Itoigawa) and D (Tainai) are described in Ito et al. (2017) and Motoyama et al. (2017b), respectively.

3. Post-meeting excursion

In the morning of 28 October, the participants of the post-conference excursion (Excursion E) headed to Tokyo together with another unseasonable typhoon. After an unplanned overnight in Tokyo, the 22 participants flew to Okinawa, observed living radiolarians and enjoyed the Okinawa Churaumi Aquarium and the Nakijin Castle Ruins — a UNESCO World Heritage site. Detailed descriptions of procedures in living radiolarian research and the excursion sites are given in Matsuoka et al. (2017) and Ito and Matsuoka (2017).

All the activities of the InterRad XV ended successfully at Naha Airport in Okinawa on 1 November.

Proceedings

The proceedings of the InterRad XV will be published as special issues of *Island Arc* (SASHIDA, K., TEKIN, U. K., and ISHIDA, K.), *Paleontological Research* (TAKEMURA, A.), *Revue de Micropaléontologie* (DANELIAN, T.), and *Bulletin of the Geological Survey of Japan* (NAKAE, S.). Editors of each special issue are indicated in parentheses. MATSUOKA, A., SUZUKI, N., and ITAKI, T. act as publication planners.

Acknowledgements

The organizing committee would like to express sincere thanks to all participants and contributors who made the InterRad XV in Niigata 2017 fruitful and successful. Many thanks go to representatives of the co-host organizations who attended the meeting. InterRad XV was financially supported by Niigata Prefecture, Niigata Visitors and Convention Bureau, Tokyo Geographical Society, and the West Japan Engineering Consultants Inc. The scientific sessions in Niigata University and mid-day excursions of InterRad XV are regarded as an activity of a joint seminar in the bilateral program between Japan and China supported by the Japan Society of Promotion of Sciences (JSPS) and the National Natural Science Foundation of China (NSFC). This international conference was supported by JSPS KAKENHI Grant Numbers 15K05329 and 15H02142. The Palaeontological Society of Japan gave a supporting fund to three young scientists. Conference material including commemorative gifts and equipment were supplied by the Geological Survey of Japan, AIST; Fossa Magna Museum in the Itoigawa City Board of Education; RC GEAR; Image Mission Inc.; Shiokawa Sake Brewery; Kameda Seika Co. Ltd. Special thanks go to YOKOYAMA, H. and MORIA, K. for their great contribution to introducing radiolarians to members of the general public through their dedicated collaboration as artists. Theodore Brown of the Itoigawa UNESCO Global Geopark read the manuscript and corrected the English. Niigata University provided university facilities including the Central Library and TOKIMATE for the InterRad XV in Niigata 2017.

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*The title was translated by the authors.