Diatom **29**: 77–92. December 2013

The 33rd JSD Research Meeting Program
日本珪藻学会第 33 回研究集会プログラム

Date: Nov. 15th to 17th, 2013　　期日：2013 年 11 月 15 日（金）〜17 日（日）
Venue: Sesoko Station, Tropical Biosphere Research Center, University of the Ryukyus
会場：琉球大学熱帯生物圏研究センター瀬底研究施設（〒905–0227 沖縄県国頭郡本部町瀬底 3422）
President of JSD: Shigeki Mayama,　　学会会長：真山 茂樹
Chairman: Shoichiro Suda,　　集会会長：須田彰一郎

＊集会が準備するレンタカーに分乗される方は，那覇空港国内線 1 階・到着ロビー B 出口側の熱帯魚水槽前にお集まりください。レンタカーは複数台あります。人数が集まり次第出発します。最後の出発は 14 時 00 分となります。15 日当日の連絡先は（須田　携帯：090–1366–4601）です。航空機の遅れ等で間に合わなかった方は，高速バスで名護バス停（終点）までお出で下さい。上記携帯にご連絡いただけばお迎えに上がります。

第 1 日　11 月 15 日（金）Nov. 15（Friday）

15:00〜　Registration，受付，ポスターの掲示
16:15　Group Photograph［写真撮影］
16:25　Lecture Room 講義室，Opening 開会　　学会会長・研究集会会長挨拶

《International Mini Symposium: Diatoms in Eastern Asia》　［Chair: Shigeki Mayama］
15 min speech followed by 5 min discussion per presentation
《国際ミニシンポジウム：東アジアの珪藻》 発表 15 分　質疑 5 分　【進行　真山茂樹】

16:30　1. Shinya Sato（Yamaguchi University, Japan）〜Invited speaker〜
Life history of diatoms
16:50　2. Gyeongje Joh（Inje University, Korea）
Biodiversity of benthic diatoms in mountain peatlands and the intertidal sandflats of the Nakdong River estuary, South Korea
17:10　3. Yahui Gao, Qianying Ma, Junrong Liang, Changping Chen, Chunyan Liu（Xiamen University, China）
Observations on valve deformation of a marine diatom *Pseudo-nitzschia multiseries*
17:30　4. Matthew Julius（St. Cloud State University, U.S.A.）
Divergent homologies distinctive of Thalassiosiroid diatoms from Eastern Asia, especially Japan
17:50　5. Noriaki Nakamura[1], Hiroki Isoyama[1], Tomoko Yuasa[1], Kazuhiko Fujita[2] and Shigeki Mayama[1]（[1]Tokyo Gakugei University, [2]University of the Ryukyu, Japan）
Organic layers covering protoplasts of marine epipsamic diatoms *Pseudoleyanella* and *Psammoneis.*
18:10　6. Ae Suk Jeong[1], Kazuhiro Katoh[2], Shigeki Mayama[3] & Jung Ho Lee[1]（[1]Daegu University, [2]Tokyo University, [3]Tokyo Gakugei University）
Diatom assemblages distribution along environmental gradients and estimates of species optima and tolerance for nutrients in the Nakdong River, Korea
18:30　Comprehensive discussion　総合討論

18:45　Dinner（move to Restaurant Hawaii），近隣のレストラン（レストランハワイ）へ移動・夕食
＊この食費も参加費に含まれます。追加注文や飲み物は各自お支払い下さい。

第 2 日　11 月 16 日（土）Nov. 16（Saturday）

Poster Session, 3 min speech par poster, 30 min discussion in the latter half.　《講演：ポスター発表》

8:30〜9:40　Room 1，会場 1　（1 題につき 3 分の発表，演題（1）〜（12），討論時間 30 分）
Room 1, Student Experiments Room［Chair: Taisuke Ohtsuka］　会場 1　学生実験室 【進行　大塚泰介】

（1）○Joh, G.（Inje University, Korea）: *Aulacoseira* diatoms occurring in mountain peatlands of South Korea

（2） ○Joh, G.（Inje University, Korea）: Diatom flora of the old genus *Navicula* on intertidal sandflats in the Nakdong River estuary, South Korea

（3） ○Ito, A. & Mayama, S.（Tokyo Gakugei Univeristy）: Preliminary study of diatom flora in the Tama River estuary
○伊藤綾奈・真山茂樹（東学大・教）：多摩川河口における珪藻フロラの予備的研究

（4） ○Imamura, Y.[1], Hori, S.[1], Ohno, T.[1], Mayama, S.[2] & Umemura, K.[1]（[1]Faculty of Science, Tokyo University of Science, [2]Faculty of Education, Tokyo Gakugei University）: Effects of variation in medium temperatures and substrates on *Nitzschia palea* motility
○今村　悠[1]・堀駿一朗[1]・大野智宏[1]・真山茂樹[2]・梅村和夫[1]（[1]東理大・理，[2]東学大・教）：培地温度及び基板が *Nitzschia palea* の運動に与える影響

（5） ○Sadoya, Y.[1], Nagao, K.[1], Oikawa, R.[2], Hanada, Y.[2,3], Sugioka, K.[3], Mayama, S.[4] & Umemura, K.[1]（[1]Tokyo University of Science, [2]Hirosaki University, [3]RIKEN, [4]Tokyo Gakugei University）: Quantitative evaluation of diatom motion vector by two-dimensional video analysis
○佐渡谷雄介[1]・長尾一希[1]・及川良太[2]・花田修賢[2,3]・杉岡幸次[3]・真山茂樹[4]・梅村和夫[1]（[1]東理大・理，[2]弘大・理工，[3]理研，[4]東学大・教））：二次元動画解析による珪藻運動のベクトルの定量評価

（6） ○Chanthirath, I.（St. Cloud State University, U.S.A.）: Floating frustules: Why do some siliceous components sink and others float, observations of *Cyclotella meneghiniana* in mass culture

（7） ○Chiba, T., Fujino, S. & Kobori, E.（University of Tsukuba）: Fossil diatom assemblages and paleoenvironmental changes in the drilling core obtained from Tainohama, Tokushima Prefecture
○千葉　崇・藤野滋弘・小堀詠美（筑波大）：徳島県田井ノ浜で掘削されたボーリングコアから産出した珪藻化石群集と古環境

（8） ○Matsuoka, T. & Nagumo, T.（Department of Biology, The Nippon Dental University）: Morphological and taxonomical studies of *Nitzschia* sp. collected from Goto islands in Nagasaki Prefecture
○松岡孝典・南雲　保（日歯大・生物）：長崎県五島列島久賀島で採取した *Nitzschia* sp. の殻微細構造の観察

（9） ○Takimoto, A.[1], Suzuki, H[1], Sakanishi, Y.[2], Abe, S.[2], Nagumo, T.[3] & Tanaka, J.[1]（[1]Department of Ocean Sciences, Tokyo University of Marine Science and Technology, [2]Japan Sea National Fisheries Research Institute, Fisheries Research Agency, [3]Department of Biology, The Nippon Dental University）: Epiphytic diatom flora on *Zostera marina* and *Z. caulescens* from Sado Island, Niigata Prefecture, Japan
○滝本彩佳[1]・鈴木秀和[1]・坂西芳彦[2]・阿部信一郎[2]・南雲　保[3]・田中次郎[1]（[1]海洋大・藻類，[2]水研セ・日水研，[3]日歯大・生物）：新潟県佐渡島産海草アマモ類の付着珪藻相

（10） ○Miyauchi, M.[1], Suzuki, H.[1], Matsuoka, T.[2], Nagumo, T.[2], & Tanaka, J.[1]（[1]Graduated School of Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University）: Morphologic and taxonomic study of *Berkeleya* Greville
○宮内麻由美[1]・鈴木秀和[1]・松岡孝典[2]・南雲　保[2]・田中次郎[1]（[1]海洋大・藻類，[2]日歯大・生物）：管状群体を形成する海産珪藻 *Berkeleya* 属の形態と分類

（11） ○Kaneko, S.[1], Suzuki, H.[1], Miyazaki, N[1], Nagumo, T.[2], Tanaka, J[1]（[1]Department of Ocean Sciences, Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University）: Attached diatom flora on quay wall in the Shibaura Canal, Tokyo Bay
○金子詩歩[1]・鈴木秀和[1]・宮崎奈穂[1]・南雲　保[2]・田中次郎[1]（[1]海洋大・藻類，[2]日歯大・生物）：東京湾芝浦運河岸壁の付着珪藻相

（12） ○Kang, I. & Kashima, K.（Kyushu University）: Diatom assemblages in coastal lakes in Antarctica and their applications to Quaternary environmental studies

9:50〜11:00　Room 2，会場 2　（1 題につき 3 分の発表，演題（13）〜（25），討論時間 30 分）
Room 2, Dining Room［Chair: Akihiro Tuji］　会場 2　食堂　【進行　辻　彰洋】

（13） ○Tamura, Y.[1], Suda, S.[2] & Tsuchiya, M.[2]（[1]Miyako Agriculture, Forestry and Fisheries Promotion Center, [2]Fac. Sci. Univ. Ryukyus）: The benthic diatom flora of rocky intertidal reef and the formation of floating mucus flocs
○田村　裕[1]・須田彰一郎[2]・土屋　誠[2]（[1]沖縄県・宮古農振セ，[2]琉大・理）：岩礁潮間帯における浮遊粘液フロックの形成と底生珪藻相

（14） ○Amada, K.（Life, Env. and Mat. Sci., Eng., Fukuoka Inst. Tech.）: Characterization and cultivation of diatoms isolated in Malaysia
○天田　啓（福岡工大・工・生命環境）：マレーシアで分離した珪藻の同定と培養

（15） ○Ohtsuka, T.[1] & Arita, S.[2]（[1]Lake Biwa Museum, [2]Tansaibou-no-kai）: Diatoms in Yawata moor, Kitahirosima, Hiroshima Prefecture, Japan

○[1] 大塚泰介・[2] 有田重彦（[1] 琵琶湖博物館，[2] たんさいぼうの会）：八幡湿原（広島県山県郡北広島町）の珪藻

（16） ○Mizobuchi, A[1], Handa, S.[1] & Nakano, T[2] ([1]Hiroshima Environment and Health Association, [2]Hiroshima Institute of Bio-Environment): Morphology and ecology of a large diatom (*Surirella* sp.) from Hii River, Shimane, Japan

○溝渕　綾[1]・半田信司[1]・中野武登[2]（[1] 広島県環境保健協会，[2] 広島生物環境研究所）：島根県斐伊川に生育する大型珪藻 *Surirella* sp. の形態と生態

（17） ○Kumisaka, K. & Kashima, K.（Faculty of Science, Kyushu University): Diatom Assemblage of Lakes Megata, Oga Peninsula, Akita Prefecture

○組坂健人・鹿島　薫（九州大学）：秋田県目潟湖沼群の珪藻群集

（18） ○Kuroda, T. & Kashima, K.（Faculty of Science, Kyushu University): Diatom assemblages in Shioya Bay and Haneji Inner Bay, Okinawa Island

○黒田知子・鹿島　薫（九州大学）：沖縄本島羽地内海と塩屋湾の珪藻群集

（19） ○Hara, Y.[1], Suzuki, H.[1], Nagumo, T.[2] & Tanaka, J.[1] ([1]Department of Marine Sciences, Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University): Epipelic diatoms blooming in a tidal flat in Iriomote Island, Okinawa.

○原　陽太[1]・鈴木秀和[1]・南雲　保[2]・田中次郎[1]（[1] 海洋大・藻類，[2] 日歯大・生物）：沖縄県西表島沿岸の砂地に生育する付着珪藻相

（20） ○Mikame, Y.[1], Suzuki, H.[2], Yamashiro, H.[3], Nagumo, T.[4] & Tanaka, J.[2] ([1]Tokyo University of Marine Science and Technology, [2]Department of Marine Sciences, Tokyo University of Marine Science and Technology, [3]Tropical Biosphere Research Center, University of the Ryukyus, [4]Department of Biology, The Nippon Dental University): Morphology of two araphid diatom species on the coral from Nago, Okinawa.

○三瓶ゆりか[1]・鈴木秀和[2]・山城秀之[3]・南雲　保[4]・田中次郎[2]（[1] 海洋大，[2] 海洋大・院・藻類，[3] 琉球大・熱生研，[4] 日歯大・生物）：Morphology of two araphid diatom species on the coral from Nago, Okinawa

（21） ○Yoshida, N.[1], Suzuki, H.[1], Nagumo, T.[2] & Tanaka, J.[1] ([1]Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology. [2]Department of Biology, The Nippon Dental University): Seasonal changes of auxosporulation in natural population of benthic diatoms, *Melosira moniliformis* and *Pleurosira laevis* in Tokyo Bay –the 4th report–

○吉田野空海[1]・鈴木秀和[1]・南雲　保[2]・田中次郎[1]（[1] 海洋大・院・藻類，[2] 日歯大・生物）：東京湾産付着珪藻 *Melosira moniliformis* と *Pleurosira laevis* の天然での増大胞子形成の動態・第 4 報

（22） ○Tuji, A.（Department of Botany, National Museum of Nature and Science): On several procedure for collecting and export specimens in developing countries

○辻　彰洋（国立科学博物館・植物研究部）：海外調査で必要になる様々な手続きについて

（23） ○Kashima, K.（Faculty of Sciences, Kyushu Unniversity): The application of diatom analysis for the coastal hazards (Tsunami and Storm) prediction

○鹿島　薫（九州大）：珪藻遺骸を用いた津波堆積物・波浪堆積物の判定の可能性

（24） ○Shinohara, K.[1], Maruyama, A.[2], Rusuwa, B.[3] & Ohtsuka, T.[4] ([1]Kawabe ikimonono mori, [2]Ryukoku University, [3]University of Malawi, [4]Lake Biwa Museum): Taxonomic revision of three diatoms found in Lake Malawi; *Afrocymbella brunii* (Fricke) comb. nov., *Afrocymbella rossii* (Kociolek & Stoermer) comb. nov., and *Aulacoseira euareolata* (O.Müller) comb. nov. et nom. nov.

○篠原耕平[1]・丸山　敦[2]・Bosco Rusuwa[3]・大塚泰介[4]（[1] 河辺いきものの森，[2] 龍谷大学・理工，[3] マラウイ大学，[4] 琵琶湖博物館）：マラウイ湖産珪藻 3 種の再分類；*Afrocymbella brunii* (Fricke) comb. nov., *Afrocymbella rossii* (Kociolek & Stoermer) comb. nov., *Aulacoseira euareolata* (O.Müller) comb. nov. et nom. nov.

（25） ○Julius, M.[1], Gorcica, W.[1] & Mayama, S.[2] ([1]St. Cloud State University, U.S.A., [2]Tokyo Gakugei University, Japan): Leveling up: Adding a macroscale gamescape to SimRiver a widely adopted environmental education software tool

《Workshop》《珪藻採集会》

11:20〜15:00　Marine Course for Bisezaki，海水コース（備瀬崎）
　　Freshwater Course for the Genka River，淡水コース（源河川）

15:30　Microscopic observation of collected diatoms in Sesoko Station　実験室で珪藻の顕微鏡観察

〈Optional tour for Curaumi Aquarium，オプションツアー（美ら海水族館見学），16:00〜17:30〉

19:00　BBQ Party　バーベキュー懇親会

第 3 日　11 月 17 日（日），Nov. 17 (Sunday)

8:30	Final Discussion	《最終討論および閉会》 8:30
8:55	Closing	閉会
9:00	Poster removal	ポスター撤収，荷物のまとめ，片付け，宿舎の掃除等
9:30	Departure for Okinawa Naha Airport	那覇空港に向けて出発

〈Optional tour available to Shuri castle, registered as a world heritage, if your flight time is later than 3:00 p.m.〉

＊オプションとして，途中，首里城で下車し観光することも可能です。その場合，首里城観光後，那覇空港までの道のりは学会準備のレンタカーは利用できません。モノレール（ゆいレール）をご利用下さい。守礼門～首里駅　徒歩 15 分（バスもあります），首里駅～那覇空港　27 分。

日本珪藻学会第 33 回研究集会　発表要旨
Abstracts of the 33rd JSD Research Meeting Program

International Mini Symposium: Diatoms in Eastern Asia

1. ○Shinya Sato: Life history of diatoms

There is a well-accepted idea of diatom life history, in that cells reduce the size as they divide vegetatively, followed by sexual reproduction（oogamy for centrics and isogamy for pennates）with small parental cells, and subsequent size restoration via auxosporulation. Although some unusual phenomena, such as abrupt cell size reduction or vegetative enlargement, have sporadically been reported from wide range of diatoms, these were largely neglected or regarded as exceptional cases. In my talk, along with the abrupt cell size changes, I provide some examples of "abnormality" observed on culture materials, including uniparental auxosporulation, haploid parthenogenesis and hitherto-unknown sex cells, and discuss their biological significance. These observations may indicate the possibility that the diatom life history is far more complicated than what we currently know. I would emphasize that there are still many observations to be made on living cells, to which less attention has been paid in the past diatom research but could potentially shed new light on the diatom life history, and that it should be one of our next steps toward a better understanding of the biology of diatoms.（Graduate School of Science and Engineering, Yamaguchi University, Japan）

2. ○Gyeongje Joh: Biodiversity of benthic diatoms in mountain peatlands and the intertidal sandflats of the Nakdong River estuary, South Korea.

Diverse diatom species and intraspecies are found in the 29 mountain peatlands and 32 sampling locations in the intertidal sand-flats in the Nakdong River estuary, Korea. The benthic diatom assemblages account for over 300 taxa in peatlands and 450 taxa in the intertidal area. Their diatom occurrences scarcely overlap in two area and the floristic study summarizes informations for over 750 taxa. The most species-rich groups are in serial orders of genus *Pinnularia*（65 taxa）, *Eunotia*（42）, old *Navicula*（22）in the peatlands, and old genus *Navicula*（89）, *Nitzschia*（40）, *Achnanthes*（29）, *Amphora*（22）on the intertidal sediments. Peatlands developed around the summits of mountains are unique to the diatom flora and the floral distributions are different with the other freshwater habitats. The acidophilous and acidobiontic diatoms are widespread over the oligotrophic and acidic mountain wetlands, however, a dominant diatom taxon represent the scattered distribution, never reaching to high abundance over the most peatlands. On the other hands, the endemic diatoms to benthic habitats occur on the sand-flats as invading planktons from the inland rivers and the sea waters are scarcely found. In a report, the Korean biodiversity 2000, the diatom flora is listed to be 724 taxa in freshwater and 667 taxa in marine habitats in South Korea. This study expands an earlier annotated list of Korean diatoms.（Department of Environmental Science and Engineering, Inje University, South Korea）

3. ○Yahui Gao, Qianying Ma, Junrong Liang, Changping Chen, Chunyan Liu: Morphological Observations on Valve Deformation of a Marine Diatom *Pseudo-nitzschia multiseries*

Pseudo-nitzschia multiseries is a marine diatom species with potential toxic effect which may cause red tide, and the correct identification of this species is very essential. However, the frequent valve deformation occurred both in culture and in field samples often leads to the incorrect identification of this species. In the present study, the valve deformation of *P. multiseries* was observed under light and electronic microscopy with 5 strains of *P. multiseries*（including toxigenic and non-toxigenic strains）in artificial culture conditions, and with field samples. The results showed that the valve deformation forms of *P. multiseries* could be classified into the following five types:（1）Deformed valve outline, including bent, incised, protrusions, constricted, and swollen. The deformed position is common in central, ends or the edge of the valve. Some frustules show changed lanceolate to rounded. Severe deformed frustules change to undulating contours;（2）Changes in striation pattern and costae, including loss, interrupt, branched, distorted, bent of the costae, and the malformation of striae（interruption, distortion, and the numbers become more or less）;（3）Raphe canal modifications, distorted, curved and position changes in canal raphe;（4）Long-chain cells change to short chain or single cell; and（5）Mixed type, different types of deformation may occur simultaneously and become complex mix type, e.g., deformed outline always along with the change in striation pattern or costae. It is also showed that some morphological differences in the teratological forms exist among the different strains and the cells found in natural conditions. The diatom valve deformation is usually considered to be caused by environmental factors, but the mechanism needs further studies. This study was supported by NSFC（No. 41076079）and National 973 Program（No. 2010CB428704）.（School of Life Sciences, Xiamen University, Xiamen 361005, China）

4. ○Matthew L. Julius: Divergent homologies distinctive of Thalassiosiroid diatoms from Eastern Asia, Especially Japan

Our rapidly expanding understanding of diatom diversity at the morphological and molecular level has created considerable taxonomic instability in the specific epithets applied to taxa around the world. It is generally understood that the limited nature of diatom identification guides has caused the false impression that many taxa have a global distribution. The outcome of this realization has been the increased description of endemic taxa and a new view that diatoms create distinct regional floras. These two views of diatom floras represent a dichotomy in categorical views, what is missing in this understanding is an analysis of evolutionary trends focusing on species. Two patterns consistent with each of the categorical described can be found. Some taxa appear to have a slow rate of dispersal and develop species indicative of narrow geographic ranges others appear

to genuinely have broad global distributions. One is most pronounced in the fossil record and the second is more obvious in modern systems. Japan and Hawaii provide excellent examples of these two biogeographic patterns. Taxic examples are limited to Thalassiosiroid diatoms, as these are the best understood systematically. A suggested approach to testing dispersal rate as the causal mechanism for this pattern is also presented.（Department of Biological Sciences,St. Cloud State University, U.S.A.）

5. ○Noriaki Nakamura[1], Hiroki Isoyama[1], Tomoko Yuasa[1], Kazuhiko Fujita[2] & Shigeki Mayama[1]: Organic layers covering protoplasts of marine epipsamic diatoms *Pseudoleyanella* and *Psammoneis*

Diatotepum is an internal organic layer lining silicified frustules. Portions of diatotepum's profile has been observed in cell cross sections by multiple researchers, however, its entire structure remains unobserved. In this study, we observed diatotepum in its entirety from the *Pseudoleynella lunata* Takano and *Psammoneis* sp.

Pseudoleyanella lunata is a marine centric diatom in the Cymatosiraceae. pecimens were collected from the Banzu tidal flats in Tokyo Bay. This diatom has marginal ridges arranged in X-like meshes on the valve face. These structures are used to form ribbon-shaped colonies by interlocking meshes of sibling valves. Areolae are circular and the outer openings are occluded by cribra. *Psammoneis* sp. is a marine araphid diatom. It was isolated from *Cycloclypeus carpenteri,* a giant foraminifera, where it lived as an endosymbiant. *Cycloclypeus carpenteri* with *Psammoneis* sp. was collected from the bottom at a 100 m Pacific Ocean locality near Okinawa Island. The areolae are rectangular and lack occlusions.

Cultured cells of the two species were treated with sodium hypochlorite and exposed to hydrogen fluoride to obtain diatotepa. Diatotepa from both species were bag-like in structure, with the outer shape corresponding to the whole siliceous frustule, valves plus cingulum. Diatotepa was stained with Toluidine Blue. In *Pseudoleyanella,* stain concentrated in circular patterns beneath areolae. In TEM observations of non-stained specimens, areas of high electron density corresponded to stained areas of other specimens. This is the first documentation identifying areolae in diatotepum. In *Psammoneis,* patterns reflecting areolar position was not observed in stained diatotepum, however, TEM observations indicated that the area lining the valve face possessed a high electron density. Both species appear to accumulate more polysaccharides in these areas to enhance wall structure. In addition, polysaccharides may have a protective role for the protoplast, potentially inhibiting viral invasion via areolar openings.（[1]Tokyo Gakugei University, Japan, [2]University of the Ryukyu, Japan）

6. ○Ae Suk Jeong[1], Kazuhiro Katoh[2], Shigeki Mayama[3] & Jung Ho Lee[1]: Diatom assemblages distribution along environmental gradients and estimates of species optima and tolerance for nutrients in the Nakdong River, Korea

In this study, epilithic diatom assemblages in the Nakdong River, Korea were assessed to determine which environmental variables best explained the spatial and temporal variation in species composition of the assemblages and to analyze the relationship between nutrient status and the occurrence of major taxa. Epilithic diatom samples were collected twice at 135 stations in May and October 2011. Simultaneously, the following physical and chemical variables were measured as parameters for water-quality assessment: water temperature, dissolved oxygen, pH, conductivity, turbidity, biochemical oxygen demand（BOD）, total nitrogen（TN）, NH_3-N, NO_3-N, total phosphorus（TP）and PO_4-P. Canonical correspondence analysis（CCA）was carried out to analyze the relationship between the environmental variables and diatom species composition. CCA revealed two major ecological gradients（i.e., coenoclines）: an eutrophication gradient that had a strong correlation with TP and TN, and a gradient mainly related to seasonal change in water temperature. The species associated with eutrophication were *Cyclotella meneghiniana*, *Luticola goeppertiana*, *Sellaphora pupula*, *Sellaphora seminulum*, *Eolimna subminuscula*, *Navicula veneta*, *Nitzschia amphibia*, *Nitzschia dissipata*, *Nitzschia frustulum* and *Nitzschia intermedia*. Particularly, *Luticola goeppertiana* was the species most tolerate（TN: 1.675～14.967 mg L^{-1}, TP: 0.017～0.852 mg L^{-1}）to eutrophication in the Nakdong River, followed by *Nitzschia amphibia* and *Nitzschia palea*.（[1]Department of Biology Education, Daegu University, Republic of Korea, [2]Graduate School of Agriculture and Life Science, The University of Tokyo, Japan, [3]Department of Biology, Tokyo Gakugei University, Japan）

Poster session

（1）○Joh, G.: *Aulacoseira* diatoms occurring in mountain peatlands of South Korea

Benthic and periphytic diatoms were collected from 29 mountain peatlands, which are moderately acidic and have low-alkalinity, to identify the flora present and the distribution of *Aulacoseira* diatoms. Eight *Aulacoseira* diatom taxa were observed across nine peatlands, including six species, i.e., *Aulacoseira alpigena*, *A. ambigua*, *A. coroniformis*, *A. crassipunctata*, *A. nygaardii* and *A. tethera*, and four unidentified *Aulacoseira* taxa. The latter four species are newly reported for this country and were restricted to acidic and dystrophic environments such as peat bogs. The frequency and abundance of each taxon fluctuated greatly in the peatlands, showing an irregular and scattered distribution. These *Aulacoseira* species showed wide ranges of variations in cell dimensions and morphology, particularly in the forms of interlocking spines between two valves. Apart from the genus *Aulacoseira*, no other centric diatoms were found in the mountain peatlands.（Department of Environmental Science and Engineering, Inje University, South Korea）

（2）○Joh, G.: Diatom flora of the old genus *Navicula* on intertidal sand-flats in the Nakdong River estuary, South Korea

Species diversity of benthic diatoms is high in intertidal sand-flats of the Nakdong River estuary, one of the most dynamic and productive area in Korea. Benthic diatoms were collected from the sandy sediments to clarify the taxonomic accounts and diversity of the old genus *Navicula*, i.e., the naviculoid

flora. Total 89 taxa belonging to *Navicula sensu stricto* and 22 genera separated from *Navicula sensu lato* are reported with brief descriptions and micrographs. The genera are ranked by the number of diatom taxa: *Navicula* (33), *Fallacia* (15), *Placoneis* (5), *Fogedia* (4), *Austariella*, *Hippodonta, Parlibellus* and *Petroneis* (3), *Cosmioneis*, *Diadesmis*, *Luticola*, *Moreneis* and *Sellaphora* (2), *Berkeleya*, *Chamaepinnularia*, *Cocconeiopsis*, *Diademoides*, *Dickieia*, *Eolimna*, *Geissleria*, *Haslea*, *Lyrella* and *Mayamaea* (1). The diatom taxa are composed of free-living forms (epipelon) and attached forms (epipsammon). The naviculoid diatoms constitute an average of 27% (range: 5% in minimum and 75% in maximum), of the benthic diatom assemblages. Through 32 samplings of the 12 areas, the important species were identified *Navicula perminuta*, *N. gregaria*, *N. torneensis*, *Fallacia cuniae*, *F. litoricola*, *F. subforcipata*, *F. tenera*. The dominant species were observed to fluctuate with sampling site and time and the remaining species occurs rarely over the sediments. Among the reported naviculoid diatoms, 42 taxa are newly reported in Korea. (Department of Environmental Science and Engineering, Inje University, South Korea)

(3) ○Ito, A. & Mayama, S.: Preliminary study of diatom flora in the Tama River estuary

Tidal flats are classified to estuarine tidal flat, coastal tidal flat etc. by its origin. The Tama River is one of main rivers flowing into Tokyo Bay and has some small estuarine tidal flats. In order to understand the ecological characters of estuarine diatoms, samples from Daishi estuarine tidal flat near river mouth were examined and the data was compared with that of Banzu tidal flat, a costal tidal flat located at opposite side of the Tama River mouth in Tokyo Bay.

Surface sands of Daishi tidal flat were collected on March 2013 and May 2013, rinsed in with water, boiled in HCl and H_2SO_4, followed by repetition of sedimentation or centrifuge in water. Cleaned valves more than 400 were counted and identified.

Observed taxa were 96 in March and 80 in May. The most frequent 5 taxa were *Navicula gregaria*, *Planothidium* sp. 1, *Planothidium* sp. 2, *Amphora* sp. 1, *Amphora* sp. 2 in March and *Amphora holsatica*, *N. gregaria*, *Nitzschia* sp., *Eolimna minima*, *Sellaphora seminulm* in May. Ratio of saline species in Daishi was about 65% in both months. However, diatoms in Banzu were almost saline species (data in January and July). As we did not discriminate live or dead cells in this study, the ecology of freshwater species in Daishi is still unknown. Shannon-Wiener's diversity index (bit) was very high in Daishi (more than 5.2 in both March and May). Moreover, diversity index using only saline species was still high (4.73 in March and 4.27 in May). These values were similar to that of Banzu. This result may indicate the presence of common potential diversity of the saline diatoms distributed in the tidal flats of Tokyo Bay. (Tokyo Gakugei Univeristy)

○伊藤綾奈・真山茂樹：多摩川河口における珪藻フロラの予備的研究

干潟は成因によって河口干潟，前浜干潟，潟湖干潟などに分けられる。河口干潟における珪藻群集の特性を明らかにするため，多摩川の大師干潟から得た珪藻の観察を行った。そしてその結果を東京湾の対岸に位置する前浜干潟である盤州干潟北端部のものと比較した。

2013 年 3 月 13 日と 5 月 28 日の大潮干潮時に大師干潟において表層の砂を採集した。砂を水で洗浄後，塩酸および硫酸で煮沸し，沈澱・遠心操作を繰り返すことで珪藻被殻のみを得た。どちらの試料においても検鏡により 400 殻以上を計数・同定した。

3 月では 96 分類群，5 月では 80 分類群が観察された。3 月に多く出現した種は *Navicula gregaria*, *Planothidium* sp. 1, *Planothidium* sp. 2, *Amphora* sp.1, *Amphora* sp. 2 であり，5 月に多く出現した種は *Amphora holsatica*, *N. gregaria*, *Nitzschia* sp., *Eolimna minima*, *Sellaphora seminulm* であった。大師干潟における分類群中の塩水種の割合は 3 月，5 月共に約 65% であった。これに対して，前浜干潟である盤洲では出現した珪藻はほとんど塩水種であった（1 月，7 月調査）。本研究では細胞の生死を確認していないため，出現した淡水種の大師干潟における生態は不明である。本地点における Shannon-Wiener の多様性指数（bit）は淡水種を含めると非常に高く 5.2 以上であった。淡水種を除いた指数は 4.73（3 月），4.27（5 月）となるが，この値はほとんど塩水種から構成される盤洲干潟の珪藻群集と同様の値であった。（東学大・生物）

(4) ○Imamura, Y.[1], Hori, S.[1], Ohno, T.[1], Mayama, S.[2] & Umemura, K.[1]: Effects of variation in medium temperatures and substrates on *Nitzschia palea* motility

We studied the effects of medium temperatures and substrates on velocity of diatom cell motion. We observed motions of *Nitzschia palea* (*N. palea*) every other second during 60 seconds on three types of substrates (glass, polystyrene, and polydimethylsiloxane (**PDMS**)) at 15, 18, and 25°C.

As a result, it was confirmed that averaged velocity of the cells increased according to the increase of the medium temperature. Further, the velocities were changed due to the types of the substrates. The highest average velocity was obtained on the PDMS substrate at 25°C. Contrarily, the lowest average velocity was observed on the polystyrene substrate at 15°C.

Reliability of the data was verified by *t*-test. Although standard error (SE) was larger at higher temperature (25°C), the above conclusion was reliable for all the comparisons at significance level of 1%. Here we further studied the relation between the number of samples and *t*-value. Concerning the difference between medium temperature 15°C and 25°C, we analyzed the *t*-value changes when the number of data was varied. As a result, to meet significance level of 1%, we found that the data with 20–30 cells, 15–20 cells, and 15–20 cells were necessary in the case of glass, polystyrene substrate, and PDMS substrates, respectively.

These results indicated that the data from more than 20 cells are suitable to discuss effects of the types of substrates. In addition, the polystyrene substrate was suitable to illuminate the effects of the medium temperature. ([1]Faculty of Science, Tokyo University of Science, [2]Faculty of Education, Tokyo Gakugei University)

○今村　悠[1]・堀駿一朗[1]・大野智宏[1]・真山茂樹[2]・梅村和夫[1]：培地温度及び基板が *Nitzschia palea* の運動に与える影響

珪藻の滑走運動について，当研究室にて，培地温度及び基板の材質と運動の速さの関係を調べる実験を行った。3 種の基板

（ガラス，ポリスチレン，Polydimethylsiloxane（**PDMS**））上の培地温度を 15, 18, 25°C に制御し，珪藻細胞（*Nitzschia palea*）の位置を 1 秒おき 60 秒間撮影し，動画解析ソフトで移動速度を計測した。その結果，培地温度が高いほど動きが速く，基板により運動の速さが異なることが確認された。

上記実験で，細胞の動きは培地温度 25°C の場合，**PDMS** 基板上で最も速く，15°C の場合，ポリスチレン基板上で最も遅く，15〜25°C 間での速さの上昇率はポリスチレン基板上で最大であった。温度が高いほど，標準誤差は大きくなったが，15〜25°C 間での速さの違いは，*t* 検定によりいずれも 1% 水準で有意性が認められた。

今回の研究では，統計学的観点から，個体数と *t* 値の関係を調べた。培地温度 15°C 及び 25°C の速さのデータについて，個体数を変化させた場合に *t* 値がどう変化するか解析した。その結果，15°C〜25°C 間の速さの差について，1% 水準の有意性を得るには，ガラス基板の場合約 20〜30，ポリスチレン基板で約 15〜20，PDMS 基板では約 15〜20 個体必要なことが分かった。

以上の結果から，温度による細胞運動の違いを観察するには，ポリスチレン基板を用いるのが最適で，個体数は少なくとも 20 以上用いるべきと考えられる。（[1] 東理大・理，[2] 東学大・教）

（5）○Sadoya, Y.[1], Nagao, K.[1], Oikawa[2], Hanada, Y.[2,3], Sugioka, K.[3], Mayama, S.[4] & Umemura, K.[1]: Quantitative evaluation of diatom motion vector by two-dimensional video analysis

In recent years, micron-sized chamber has been able to apply for cell motion studies, thus, it has become possible to continuously observe the same cell in the chamber. Further, detailed trajectory analysis of single cell motilities has become also available on a computer with video analysis software. In this paper, we quantitatively analyzed two-dimensional gliding motions of two types of diatom cells（*Navicula pavillardii*（NP），*Seminavis robusta*（SR））on a solid surface by this method.

The microchamber was made with the photosensitive glass（volume was 0.2 mm^3）. The chamber was filled with f/2 culture medium that containing one to ten cells, and then the chamber was put in a Petri dish. After filling the Petri dish with the f/2 culture medium, cell movements were observed with an inverted microscope under 4000 lx at 18°C. NP and SR were observed 7 and 15 days after starting the latest subculture, respectively. Motions of 10 cells for one minute period were analyzed using the two-dimensional trajectory analysis software（Move-tr/2D 7.0, Library Inc.）for NP and SR. Cells that moved along the wall of the chamber were excluded from the analysis because it was hard to observe such cells.

Positions（x, y）of the cells were determined from the video data by the software, and then migration distance, velocity（v_x, v_y）, and acceleration（a_x, a_y）of each cell were calculated. To quantify rotation of the cells, we calculated $\theta = \tan^{-1}(y/x)$. By this approach, the linear motion for NP and the circular motion for SR were successfully quantified as variation of θ. We found maximum value of rotation angle is 5.07 and 0.58 degrees for NP and SR, respectively.（[1]Tokyo University of Science, [2]Hirosaki University, [3]RIKEN, [4]Tokyo Gakugei University）

○佐渡谷雄介[1]・長尾一希[1]・及川良太[2]・花田修賢[2,3]・杉岡幸次[3]・真山茂樹[4]・梅村和夫*：二次元動画解析による珪藻運動ベクトルの定量評価

近年，微細加工技術によりミクロンサイズのチャンバーの作製が可能になり，チャンバー内の同一細胞を継続的に観察することが可能になった。また，動画解析ソフトの性能向上により，詳細な運動解析ができるようになった。それらの技術を駆使して，2 種類の珪藻細胞（*Navicula pavillardii*（NP），*Seminavis robusta*（SR））の滑走運動様式の違いを定量的に解析した。

本研究では，体積 0.2 mm^3 の感光性ガラスのチャンバーを使用し，培養液を注入し 1〜10 個体の細胞を閉じ込めたチャンバーを，培地（f/2）で満たされたシャーレの中に置いた。運動観察は倒立顕微鏡を用い，培地 18°C，明るさ 4000 lx，の条件下で行った。NP は植え継ぎから 7 日目，SR は 15 日目に観察を行った。運動を記録した動画は avi 形式でコンピュータに取り込み，二次元動画解析ソフト（Move-tr/2D 7.0 ライブラリー社）を用いて，各 10 個体の 1 分間の運動解析を行った。壁面に沿って運動をした細胞は，見えなくなるため解析には含めなかった。

解析ではまず細胞の各時刻での位置座標を求め，位置座標データをもとに移動距離，速度などを計算した。細胞の回転を定量するため，x 軸，y 軸上で単位時間あたりに移動した距離の x 成分，y 成分から（y/x）$= \tan\theta$ を求め，$\theta = \tan^{-1}(y/x)$ より，角度 θ を算出した。その結果，NP は角度を変化させずほぼ直線運動をしていることが，SR は円を描いて運動していることが数値として示された。また，各珪藻の単位時間毎の角度の変化の平均を数値として各 10 個体求めたところ，SR は最大で 5.07°，NP は最大で 0.58° であった。（[1] 東理大・理，[2] 弘大・理工，[3] 理研，[4] 東学大・教）

（6）○Chanthirath, I.[1], Haglin, K.[2], Mayama, S.[3] & Julius, M.[1]: Floating frustules: Why do some siliceous components sink and others float, observations of *Cyclotella meneghiniana* in mass culture

During a standard acid digestion of large diatom（*Cyclotella meneghiniana*）biomass quantities produced via a photobioreactor, it was observed that a portion of the cleaned diatoms floated in the cleaning while another portion sank in the cleaning vessel. Samples of the sinking and floating materials revealed that floating materials consisted exclusively of whole valves while sinking materials consisted of separated valves and girdle bands. This observation is inconsistent with the generally held belief that whole valves will readily sink in planktonic environments due to mass of the silica cell wall. High resolution 3D imagery has been produced via the atomic force microscope to prepare initial density and buoyancy calculations for *C. meneghiniana*'s frustule. Direct estimates of frustular volume were also made via a gas blanketing technique on acid cleaned specimens. Additionally, ecophenotypic variation in the intercostal region of additional *C. meneghiniana* frustules grown in varying salinities was imaged via the atomic force microscope. These measurements were used to calculate variations in friction which were then used to calculate the force needed to move materials through intercostal pores. This "force" estimate was then correlated with culture media density for each ecophenotypic variant. Preliminary results are presented here and suggest that ecophenotypic variation may be in response to functional constraints produced by the cells environment.（[1]Department of Biological Sciences, St. Cloud State University, [2]Department of Physics, St. Cloud State University, [3]Department of Biological Science, Tokyo Gakugei University）

（7）○**Chiba, T., Fujino, S. & Kobori, E.: Fossil diatom assemblages and paleoenvironmental changes in the drilling core obtained from Tainohama, Tokushima Prefecture**

Yuki city, Tokushima prefecture which is located in northwestern part of the Nankai Trough has been subsided and many tsunamis occurred along the coast of the Shikoku islands accompanied by the previous Nankai earthquakes. Therefore, some historical records and monuments that have documented past Nankai earthquakes and tsunamis remain in this city. However, not all information about these earthquakes and tsunamis remain in these historical records.

Interplate earthquakes and subsequent tsunamis often leave geological evidence such as tsunami deposits. Therefore studies of coastal paleo-environment changes and tsunami deposits are also important for long-term earthquake reoccerrences.

We conducted a 700 cm deep core drill at a small marsh in Tainohama of Minami city nearly Yuki city, in order to obtain the geological evidences. The core includes more than 12 sand layers in organic-rich muddy sedimentary succession up to 500 cm deep. we analyzed fossil diatoms and measured Radiocarbon ages of plant macrofossils from the core up to 500 cm deep.

The diatom assemblages included in the organic-rich muddy deposits were predominated by fresh and brackish water species, especially *Pseudostaurosira brevistriata*, *Pseudostaurosira subsalina*, *Staurosirella pinnata*, *Tabellaria fenestrate*. *Pinnularia* spp. and *Eunotia* spp. are also dominated. In contrast to the above mentioned sand layers, brackish water and marine species, especially *Diploneis smithii* and *Mastogloia recta* were increased.

The diatom assemblages from the organic-rich muddy deposits and Radiocarbon ages showed that freshwater marsh or saltmarsh were formed in this region during at least the past 4000 years. On the other hand, the diatoms from the sand layers showed salinity of the environments when the layers were formed was higher than freshwater marsh or saltmarsh environment. The diatoms suggest that the sand layers was brought from seaside by strong currents, such as tsunami.（University of Tsukuba）

○**千葉　崇・藤野滋弘・小堀詠美：徳島県田井ノ浜で掘削されたボーリングコアから産出した珪藻化石群集と古環境**

徳島県由岐町には，過去の南海地震による津波の被害について書かれた多くの資料や石碑が残されている。歴史時代に発生した古地震や古津波の履歴や規模を検討するためには，こうした歴史記録と津波堆積物や微化石などの地質記録を合わせて検討する必要がある。さらに，先史時代の記録は地質記録を検討する以外に情報を得る手段はなく，より長期的な古地震の履歴を明らかにするためにも地質記録を検討することは重要である。本発表では，南海トラフ起源の地震及び津波の履歴を明らかにすることを目的として，由岐町に隣接する美波町田井ノ浜で掘削された深度 700 cm のボーリングコアのうち，深度 500 cm までを対象として分析を行い，産出した珪藻化石群集の組成及び群集より推定された古環境について報告する。

コア掘削が行われた地域は，現在は耕作地であるが，かつては海岸が砂州で閉じることで形成された低湿地環境であったことが空中写真から読み取られる。掘削されたコアは，表層～深度 50 cm までが耕作土層であるが，それより下位の層準は主に塩性植物の葉や根及び種子などを多く含む泥炭層～有機質泥層から成り，少なくとも 12 枚の砂層が狭在する。砂層は層厚が 1 cm 未満のものから 70 cm 程度のものまで様々である。また，放射性炭素年代測定から，表層～500 cm までの層準は少なくとも過去 4000 年間で堆積したものであると推定される。

泥炭層～有機質泥層では，*Pseudostaurosira brevistriata*, *Pseudostaurosira subsalina*, *Staurosirella pinnata*, *Tabellaria fenestrate* などが優占し，*Pinnularia* 属や *Eunotia* 属が随伴した。一方，狭在する砂層からは，*Diploneis smithii*, *Mastogloia recta* などのより高塩分環境に生育する珪藻が相対的に多く産出した。以上のことから，過去 4000 年間において，この地域には波浪の影響が及ばない淡水～塩性湿地が形成されていたと推定される。一方，コア掘削地域周辺には大河川が無いことから，狭在する砂層が河川由来である可能性は低い。また，より高塩分環境の珪藻を含むことから，砂層はいずれもコア掘削地点より海側から，津波などの強い流れにより運搬された可能性が示唆される。これらの砂層が南海トラフ起源の地震津波によりもたらされたものであるかは，さらに地殻変動の有無を検討する必要がある。（筑波大学）

（8）○**Matsuoka, T. & Nagumo, T.: Morphological and taxonomical studies of *Nitzschia* sp. collected from Goto islands in Nagasaki Prefecture**

We found sigmoid-shaped diatom belonging to the genus *Nitzschia*, collected from hisaka-jima, goto islands in Nagasaki Prefecture. We observed this specimen using light microscopy and scanning electron microscopy.

Cells of this spesies（*Nitzschia* sp.）are more or less sigmoid in girdle view, and linear with wedge-shaped ends in valve view. Cells are about 150 μm long, 6 μm wide in valve view, and about 20 μm wide in girdle view. Girdle width varies with the stage of the cell cycle. The raphe keel is about the centre, with irregularly spaced ribs consist of 2 to 4 costa. Parallel rows of pores cross the valve surface, about 30 rows in 10 μm. The girdle is formed of 4 open bands that also contain pores.（Department of Biology, The Nippon Dental University）

○**松岡孝典・南雲　保：長崎県五島列島久賀島で採取した *Nitzschia* sp. の殻微細構造と分類学的研究**

羽状珪藻 *Nitzschia* 属は，Hassall（1845）によって設立された。本属には現在 1000 種類以上が記載されていて，属としては非常に大きい分類群である。本研究では，2013 年 7 月長崎県五島列島久賀島の細石流（ざざれ）地区で採取したサンプルを検鏡した結果，被殻が S 字状に屈曲した珪藻が観察された。特徴的な形状から *Nitzschia* 属であることは推測できたが，同定のために，殻微細構造の観察を行った。本種の特徴は，光学顕微鏡観察においては，被殻は帯面観では中央で幅がやや広く，両端に向かって細くなり，多少 S 字状に彎曲している。殻は線状皮針形で，端部でやや細くなり殻端は頭状を呈す。縦溝は殻の辺縁部を取り巻いて走っている。竜骨はやや幅広く，竜骨点の形態は不揃い。被殻は薄く，条線は点紋で構成される。SEM 観察では，殻外面における竜骨の形態，縦溝は竜骨間に位置すること，中心裂溝，両極裂などが確認された。また，殻内面では中心域では中心内裂孔の周りには目立った構造はみられず，殻端では極節に終わる。本種の特徴的な構造は，縦溝を挟んで存在する小骨にある。小骨は 2～4 本の間条線で構成されていて，癒合せずに間条線の束として認められる。そしてその間隔も不規則である。殻帯は 4 つの帯片で構成されている。本報では，今回観察された *Nitzschia* sp. について報告する。（日歯

大・生命歯学部・生物学教室）

（9）○Takimoto, A.[1], Suzuki, H.[1], Sakanishi, Y.[2], Abe, S.[2], Nagumo, T.[3] & Tanaka, J.[1]: Epiphytic diatom flora on *Zostera marina* and *Z. caulescens* from Sado Island, Niigata Prefecture, Japan

The seagrass *Zostera marina* commonly occurs in the coast of temperate to arctic zones of the northern hemisphere. It is usually perennial, and found in the sub-tidal zone at a depth from one to several meters in the bay areas from Kyusyu to Hokkaido Districts in Japan. Although several studies have approached the diatom flora on *Zostera marina* in Japan, none of them has attempted to it from the Sea of Japan. Species composition of epiphytic diatoms on *Z. marina* and *Z. caulescens* was observed in Sado Is. Niigata Pref. by light and electron microscopy. The following taxa were found there *Achnanthes*, *Amphora*, *Cocconeis*, *Navicula*, and *Tabularia*. The dominant taxon was *Cocconeis*; *C. coronatoides*, *C. dirupta*, *C. heteroidea*, *C. scutellum* var. *scutellum*, *C. shikinensis*, *C. stauroneiformis*, and *Cocconeis* sp.（[1]Department of Ocean Sciences, Tokyo University of Marine Science and Technology, [2]Japan Sea National Fisheries Research Institute, Fisheries Research Agency, [3]Department of Biology, The Nippon Dental University.）

○滝本彩佳[1]・鈴木秀和[1]・坂西芳彦[2]・阿部信一郎[2]・南雲保[3]・田中次郎[1]：新潟県佐渡島産海草アマモ類の付着珪藻相

海草アマモ（*Zostera marina*）は北半球の温帯域から亜寒帯域の沿岸に広く分布する。本邦では北海道から九州までの内湾，水深 1〜数 m の波の穏やかな砂泥底質の海底に生育し，群生してアマモ場を形成する。アマモ葉上に付着する珪藻は，動物群集を含むアマモ場生態系の重要な構成要素であり，沿岸浅海域の漁業生産にも大きな役割を果たしている。

本邦におけるアマモ葉上の珪藻相の研究は，演者らによる北海道厚岸湖や千葉県館山市沖ノ島，神奈川県横須賀市天神島，岡山県玉野市渋川海岸で行われている。しかし，日本海での報告はないため，本研究では新潟県佐渡島白瀬で採集されたアマモ類の付着珪藻相を明らかにすることを目的とした。

試料は 2013 年 4 月 23 日に同地で採集されたアマモとタチアマモ（*Z. caulescens*）に付着した珪藻を定法に従って処理をした後，光学及び電子顕微鏡で観察した。

観察の結果，*Achnanthes*, *Amphora*, *Cocconeis*, *Navicula*, *Tabularia* 各属の分類群が確認された。*Cocconeis* 属に関しては，*C. coronatoides*, *C. heteroidea*, *C. scutellum*, *C. stauroneiformis* が確認された。出現分類群は，これまでの研究で明らかになっているものと大きな違いは見られなかったが，固着性の *Cocconeis* 属は他の属と比べ，種の多様が高いと考えられる。（[1] 海洋大・藻類，[2] 水研セ・日水研，[3] 日歯大・生物）

（10）○Miyauchi, M.[1], Suzuki, H.[1], Matsuoka, T.[1], Nagumo, T.[2], & Tanaka, J.[1]: Morphologic and taxonomic study of *Berkeleya* Greville

Marine tube-dwelling diatom genus *Berkeleya greville* is growing on rocks and algae. Some species are occurred on the Japanese coast, Shimoji-island, Okinawa Pref. and Banjin, Niigata Pref. *Berkeleya micans* and *Berkeleya* sp. were examined by light and electron（SEM and TEM）microscopies. *B. micans* forms thin plexiform colony as branch. Valve lanceolate. Striae parallel in central nodule, convergent towards the apices. Many girdle bands with two rows of pores. *Berkeleya* sp. forms plexiform colony as taper-off branch. Considerable differences are showed in colonization and valve thickness between *B. micans* and *Berkeleya* sp., on the other hand, are not showed in valve form and striae.（[1]Graduated School of Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University）

○宮内麻由美[1]・鈴木秀和[1]・松岡孝典[2]・南雲　保[2]・田中次郎*：管状群体を形成する海産珪藻 *Berkeleya* 属の形態と分類

ヒメクダズミケイソウ属 *Berkeleya* はタイドプールの岩や海藻・海草類の表面などに付着し，管状群体を形成する羽状類双縦溝珪藻である。本属の殻の微細構造は明らかになっていないものが多く，特に群体構造も合わせて観察した研究は未だ十分でない。演者らは，本邦沿岸より採集した試料から，*Berkeleya micans*（Lingbye）Grunow と *Berkeleya* sp. の群体を得た。今回はこれらの群体や殻，帯片の構造について，光学顕微鏡及び走査型電子顕微鏡を用いて観察を行ったので，その結果を報告する。*Berkeleya micans* は沖縄県宮古島市下地島より採集した。群体は叢状で，分枝する細い枝からなる。殻形は披針形で，殻長は 45.5–55.5 μm，殻幅 5.0–5.5 μm。条線は 10 μm あたり 26–30 本で，その配列は中心節付近で並行，殻端ではやや収斂する。半殻帯は 2 列の胞紋列をもつ帯片からなる。*Berkeleya* sp. は新潟県柏崎市番神より採集した。群体は叢状で，分枝する先細りの枝からなる。殻形は披針形，殻長は 54.5–58.5 μm，殻幅は 4.0–5.5 μm である。条線は 10 μm あたり 29–31 本で，その配列は中心節付近で平行，殻端ではやや収斂する。半殻帯は 2 列の胞紋列をもつ帯片からなる。前種と比較すると，殻形や条線密度などは似るが，群体の形状と殻の薄さが異なる。（[1] 海洋大・藻類，[2] 日歯大・生物）

（11）○Kaneko, S.[1], Suzuki, H.[1], Miyazaki, N.[1], Nagumo, T.[2], Tanaka, J.[1]: Attached diatom flora on quay wall in the Shibaura Canal, Tokyo Bay

It is known that the attached organism which inhabits a reef intertidal zone forms the zonation corresponding to a tide level. Attached diatom was investigated at the following seven habitable zones of attached animals and alga on the quay wall in the Shibaura Canal; A: splash zone, B: *Nodilittorina exigua*, C: *Chthamalus challengeri*, D: *Caloglossa ogasawaraensis*, E: *Xenostrobus securis*, F: *Ficopomatus* sp., and G: *Molgula manhattensis*. The samples were examined for the species composition using the light and electron microscopy, and for the estimation standing crop of microalgae measuring Chl. *a* concentration. Dominant taxa of each zone were C: *Navicula gluënsis*, D: *Melosira nummuloides*, E: *Nitzschia* sp. 1, F: *Diploneis* sp. 1, and G: *Karayevia amoena*, respectively. Additionally, *Amphora polita* was very abundant on E–G zones.（[1]Department of Ocean Sciences, Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University）

○金子詩歩[1]・鈴木秀和[1]・宮崎奈穂[2]・南雲　保[3]・田中次郎[1]：東京湾芝浦運河岸壁の付着珪藻相

汽水域は海水と淡水が混合する特殊な環境であり，生息する生物にも影響を与えている。これまで，汽水域の付着生物に関する研究は河口域や汽水湖などで行われてきた。また，岩礁潮間帯に生息する付着生物は，潮位に対応した帯状分布を形成することが確認されている。

そこで本研究では，芝浦運河係船場岸壁に生育する付着珪藻

を，付着動物や海藻の垂直分布によって A〜G の 7 層に分けた区画で調査した。各層は，A は飛沫帯，以下，B：アラレタマキビ，C：イワフジツボ，D：ホソアヤギヌ，E：コウロエンカワヒバリガイ，F：ゴカイの一種，G：マンハッタンボヤの生息帯であった。試料は 2013 年 5 月に，各層 10 cm×10 cm の範囲内で採集した。その際，D, E 層は海藻や付着動物ごと，その他の層は歯ブラシで表面をこすり取って採集した。これらの試料は定法に従って処理した後，光学顕微鏡と電子顕微鏡を用いて観察した。また，同年 7 月に A〜F 層の付着珪藻を同法で採集し，蛍光光度計を用いて Chl.*a* 測定を行った。

観察の結果，A, B では珪藻をほとんど観察できなかった。C では *Navicula gluënsis* が明確な優占を示し，D は *Melosira nummuloides*，E は *Nitzschia* sp. 1，F は *Diploneis* sp. 1，G は *Karayevia amoena* が多く見られた。また，E〜G では共通して *Amphora polita* が多く確認できた。種組成は各層で異なり，垂直方向に分布が変化すると考えられる。Chl.*a* 量は F, C, A＝B, E, D の順で高くなった。今回はこれら付着珪藻の種組成や優占種の形態について報告する。（[1] 海洋大・藻類，[2] 海洋大・生物海洋，[3] 日歯大・生物）

（12）○Kang, I. & Kashima, K.: Diatom assemblages in coastal lakes in Antarctica and their applications to Quaternary environmental studies

We are trying to estimate the influence of global warming by human activities using the paleo-limnological changes in coastal lakes along Antarctica. Since the LGM (the Last Glacial Maximum, ca. 21 ka) several times of marked warming periods in Antarctica were recorded in the sediments of coastal lakes those were separated from oceanic bay by the eustatic uplifts since LGM. We present our preliminary studies of diatom assemblages of the samples, and discuss the possibilities to estimate the influences of future global warming by human activities. *Paralia sulcata, Staurosira contruens, Tryblionella littoralis, Amphora oligotraphenta, N. gregaria, Diadesmis perpusila* were found from the cores as environmental key species.（Kyushu University）

（13）○Tamura, Y.[1], Suda, S.[2] & Tsuchiya, M.[2]: The benthic diatom flora of rocky intertidal reef and the formation of floating mucus flocs

Mucus films, flocs or foams frequently occur in the surface waters of rocky intertidal reefs during incoming tide. These masses are referred to as mucus flocs (MF), consisting of fine sand, silt, benthic diatom and mucus component such as polysaccharide. It is considered that MF supplement nutrient uptake of benthic organisms living in upper intertidal zones where are restricted in available feeding time due to periodic exposure to air. MF seem to have several source since their forms are different by the location. The diatom species compositions were compared between MF and substrates in the reef edge, the front reef, the lagoon's edge and the back reef where MF occur in Odo coast, Okinawa Island.

The results of nonmetric multidimensional scaling ordination appeared that the diatom flora of the MF and the substrates were similar in the front reef and the back reef. It suggests that the contributions of benthic diatom to MF formation were high in these locations. Conversely, the diatom flora of the MF and the substrates showed low similarity in the lagoon's edge. In the lagoon's edge, water was coming from various directions by wind and incoming tide, therefore, diatoms grown in other locations might be mixed to the MF. The diatom flora of the MF and the substrates were different in the reef edge, despite they collected in the isolated tidepool. Since the abundant macroalgae provide high substrate complexity in the reef edge, there may be various diatoms such as benthic and algal associated species those have different levels of adhesion and mobility. As a result, some species were more likely to float and contribute to the MF formation and some were not in this location.

These results determined that the diatom flora of MF was sometimes similar with that of substrates and sometimes not. Motile diatoms such as Naviculaceae and Bacillariaceae are often contained in MF, therefore, they are considered to play a role in MF formation. However, this study showed that aplanetic sessile species were contained in the MF depending on the location, which was reflecting the substrate diatom flora. ([1]Miyako Agriculture, Forestry and Fisheries Promotion Center, [2]Fac. Sci. Univ. Ryukyus）

○田村　裕[1]・須田彰一郎[2]・土屋　誠[2]：岩礁潮間帯における浮遊粘液フロックの形成と底生珪藻相

岩礁潮間帯では，干潮から上げ潮時に水面に粘着性のある膜，フロック及び泡が観察される。これらはミューカスフロック（MF）と総称され，細砂，シルト，底生珪藻，多糖類などの粘液成分から構成される。上げ潮によって潮間帯上部へ運ばれ，潮の干満によって採餌時間が制約される潮間帯上部の生物の栄養摂取を助けると考えられている。MF は観察される場所によって色などの形態が異なるため，いくつかの異なる発生源を持つと考えられる。そこで，調査地の沖縄島大度海岸において，MF の形成が確認された礁縁，前方礁原，礁池の縁，後方礁原の 4 カ所で，MF と底質の珪藻群集を光学顕微鏡で観察し，比較した。

非計量多次元尺度構成法を用いて群集構造の類似性を座標に示した結果，前方礁原や後方礁原では，MF と底質の珪藻相は類似度が高かった。これらの場所では，底質中の珪藻が浮上して MF を形成する割合が大きいことが示唆された。一方で，礁池の縁では，MF と底質の珪藻相は類似度が低かった。この場所では，南西の風と上げ潮により，礁池の様々な方向から海水が流れてくる状況であったため，その場所以外で生育した珪藻が MF に混入したと考えられる。また，礁縁では，隔離されたタイドプールであったにも関わらず，MF と底質の珪藻相に違いがでた。礁縁の岩盤には大型藻類が多く，底質構造が複雑で，様々なレベルの付着力や移動性を持った珪藻が生育しており，浮上して MF 形成に寄与しやすい種とそうでない種があったと考えられる。

これらの結果から，MF の珪藻相は，その周辺の底質と類似する場合と異なる場合があることが明らかとなった。MF には Navicula 科や Bacillaria 科など，運動性を持つ珪藻が多く含まれ，これらが MF の形成に関与していると考えられている。しかし，場所によっては，底質の珪藻相を反映して，運動性の低い底生固着性の種も含まれることが分かった。（[1] 沖縄県・宮古農振セ，[2] 琉大・理）

（14）○Amada, K.: Characterization and cultivation of diatoms isolated in Malaysia

Diatoms isolated in Borneo Island, Malaysia, were identified by

morphological and phylogenetic analysis and cultured on an agar plate.

Several fallen leaves collected around the river jetty at Rampayan Laut in northern Borneo Island were directly inoculated onto a GPY（glucose, peptone, and yeast extract）agar plate. The fast-growing diatoms were isolated and designated as R2–D1.

R2–D1 was cleaned with sulfuric acid and observed using a light microscope. The valve appearance was narrow lanceolate and sigmoid with fibula and cuneate or capitate end. Detailed information about R2–D1 was obtained using a scanning electron microscope.

The partial 18S rRNA gene of R2–D1 was cloned, sequenced, and compared using BLAST program against the DNA databank of Japan, showing the highest identity with sequences of *Nitzschia communis* and *N. sigma*.

The growth rate of R2–D1 was observed on the agar plate. When R2–D1 was inoculated on a new agar plate, it reached the edge of the plate within 4 days. The growth rate in liquid medium was also measured.（Life, Env. and Mat. Sci., Eng., Fukuoka Inst. Tech.）

○天田　啓：マレーシアで分離した珪藻の同定と培養

珪藻の培養は，思い通りの種を増やせないなど，ほかの藻類と比べ比較的難しいとされている。しかしながら，中には培養の容易な種も存在し，海産物の初期餌料などとして用いられる場合もある。

今回，マレーシアのボルネオ島で採取した落ち葉に付着した微生物を分離している際に，寒天培地上で旺盛な繁殖力を示した珪藻が出現したため，分離を試みた。

分離した珪藻の種類を同定するために，被殻の調製と DNA の調製をおこなった。まず，寒天培地上の珪藻を培地ごと硫酸で処理し，被殻を調製した。光学顕微鏡での観察の結果，*Nitzschia* 属の一種ではないかと推察された。次に，DNA 調製キット（キアゲン社）を使用して調製した DNA を使って，18S rRNA 遺伝子の後半部分を PCR 法で増幅し，塩基配列を決定した。解析結果をデータベースと比較したところ，*N. sigma* の遺伝子と相同性が高かった。被殻観察と DNA 解析の結果から，今回分離された珪藻は，*N. sigma* か，あるいはその近縁種ではないかと考えられる。現在，走査型電子顕微鏡にて条線密度，胞紋密度，竜骨の数などの微細構造を調査しているところである。

また，増殖の速さを観察したところ，5 mm 角に切った珪藻を含む寒天培地を新しい寒天培地上に植えつけ，室温で増殖させた珪藻は，4 日以内に直径 9 cm のシャーレの縁に到達した。現在，液体培養における増殖曲線について検討しているところである。（福岡工大・工・生命環境）

（15）○Ohtsuka, T.[1] & Arita, S.[2]: Diatoms in Yawata moor, Kitahirosima, Hiroshima Prefecture, Japan

Yawata moor is a group of transitional moors or poor fens scattered in the Yawata Highland located in the northern part of Hiroshima Prefecture, Japan. *Moliniopsis japonica—Cirsium sieboldii* community, a representative plant community of middle moors in Japan, was originally described in this moor. Peat deposition and type of water supply（seepage or surface water）depend on the moors.

We collected in total 12 diatom samples at six sampling sites in four moors consisting Yawata moor. Representative substrata at each site, i.e., *Sphagnum palustre* above the water level, living/dead plants in the water, or surface sediment in a pool were collected depending on the moor environments.

Electric conductivity（3.6–3.9 mS m^{-1}）, pH（5.9–6.6）, and concentration of dissolved phosphorus（0.04–0.11 μmol l^{-1}）were not largely different between the sampling sites. Concentration of dissolved nitrogen was much higher in streams（43.9 and 53.2 μmol l^{-1}）than in pools（5.6–8.9 μmol l^{-1}）.

On *S. palustre*, *Aulacoseira alpigena*, *Eunotia compactata*, or *Fallacia vitrea* was dominant depending on the moors. Either *A. alpigena* or *Frustulia saxonica* was dominant on the dead plants in the pools. *Brachysira brebissonii* was dominant on the surface sediment. *Diatoma mesodon*, *Eunotia minor*, and *Fragilaria gracilis* was dominant on the living/dead plants in the streams.（[1]Lake Biwa Museum, [2]Tansaibou-no-kai）

○大塚泰介[1]・有田重彦[2]：八幡湿原（広島県山県郡北広島町）の珪藻

八幡湿原は，北広島市の八幡高原に点在する中間湿原の総称である。中間湿原を代表するヌマガヤ–マアザミ群集は，八幡湿原の研究に基づいて命名された。ただしその中には，湧水湿原と谷湿原が混在しており，また泥炭の堆積程度も湿原によって大きく異なる。

水源や泥炭堆積の程度が異なる 4 つの湿原，6 つの調査地点で，2012 年 11 月 18 日に調査を行った。陸上のオオミズゴケ，水中の枯死した植物，底泥など，その地点の代表的な付着基質から 2 試料ずつ，計 12 試料を採集した。

電気伝導度（3.6–3.9 mS m^{-1}），pH（5.9–6.6），溶存態リン濃度（0.04–0.11 μmol l^{-1}）は全地点であまり変わらなかった。溶存態窒素濃度は止水と流水で大きく異なり，止水の 4 地点では 5.6–8.9 μmol l^{-1} の範囲だったのに対して，流水の 2 地点ではそれぞれ 43.9, 53.2 μmol l^{-1} の高値を示した。

オオミズゴケ上では湿原ごとに優占種が異なり，*Aulacoseira alpigena*, *Eunotia compactata*, *Fallacia vitrea* が優占種となった。止水中の植物遺体上では *A. alpigena* あるいは *Frustulia saxonica* が優占種となった。泥炭堆積が見られる長者ヶ原湿原の底泥上では，*Brachysira brebissonii* が優占種であった。流水中の植物上では，*Diatoma mesodon*, *Eunotia minor*, *Fragilaria gracilis* が優占種となった。（[1] 琵琶湖博物館，[2] たんさいぼうの会）

（16）○Mizobuchi, A.[1], Handa, S.[1] & Nakano, T.[2]: Morphology and ecology of a large diatom（*Surirella* sp.）from Hii River, Shimane, Japan

A large diatom species（*Surirella* sp.）was collected from Hii River, Shimane, Japan. The valves of the diatom were examined using a light microscope. In the study, we have reported the ecology and morphology of the chloroplast and valves of this species. *Surirella* sp. is unicellular, and valves of the frustule are lanceolate and loosely constricted in the middle, with valve ends being broadly rounded. The valves are slightly twisted about the apical axis and are 270–370 μm in length and 45–50 μm in width. The costae are 2 per 10 μm, extending from the margin to not reach the apical axis. The wing fenestrae are not visible, and the central line is slightly sigmoid. There are two plate-like chloroplasts. Because the specimens were drifting diatoms, their original habitat is unknown. Although this species is large,

there have been no reports of this *Surirella* sp., despite studies of epilithic algae in Hii River and a floristic study of phytoplankton in Shimane Prefecture. We believe this *Surirella* sp. is an epiphyte or a waterweed with a benthic habitat. (1Hiroshima Environment and Health Association, 2Hiroshima Institute of Bio-Environment)

○溝渕　綾[1]・半田信司[1]・中野武登[2]：島根県斐伊川に生育する大型珪藻 *Surirella* sp. の形態と生態

島根県を流れる斐伊川において，羽状珪藻コバンケイソウ属の一種 *Surirella* sp. の大型種を河川水中から確認した。既存の文献では，本種に該当する種が見られず，今回，その被殻構造と葉緑体の形態，および生態について調査を行ったので報告する。細胞は単細胞性で，被殻の殻面は舟形，中央がわずかに狭まり，殻端は広円になる。殻長は約 270–370 μm，殻幅は約 45–50 μm で，帯面観はややねじれている。肋は中央線まで発達することなく 2/10 μm で，翼窓は出現しない。中央線は S 字にゆるやかに湾曲している。葉緑体は 2 枚で，板状である。今回の調査では，河川の流下珪藻として確認されたが，これほど大型であるにもかかわらず，斐伊川で行われた付着藻類の調査や，島根県の池沼のプランクトン調査において，このような形態の *Surirella* の報告がない。そこで，本種は，底泥の表面あるいは水草に付着して生育しているのではないかと推察し，現在調査を進めている。([1] 広島県環境保健協会，[2] 広島生物環境研究所)

(17) ○Kumisaka, K. & Kashima, K.: Diatom Assemblage of Lakes Megata, Oga Peninsula, Akita Prefecture

Micorofossil data (diatom) was used to reconstruct the seasonal changes in Lakes Megata. The study areas are Lake Ichi-no-Megata, Ni-no-Megata and San-no-Megata located in the Oga Peninsula, Akita prefecture. These maar lakes have some unique features; the water temperature shows thermocline, decline of dissolved oxygen, and the lake basin is flat. Ichi-no-Megata was drilled on 2006 and 2013, and the thickest varve sediments (82 m) in Japan were reported. The sample was taken by mini-ice-finger sampler on July of 2012, and then light and dark lamination of the core used for diatom analysis. In addition, I report the living diatom assemblage. *Asterionella* sp. and *Aulacoseira* sp. dominate the two layers. The diatom valves per 1 g sediments and the ratio of *Aulacoseira* sp. are high in the dark lamination. In this study, I expect to reveal the seasonal changes of diatom assemblage. (Faculty of Science, Kyushu University)

○組坂健人・鹿島　薫：秋田県男鹿半島の目潟湖沼群の珪藻群集

本研究の調査地である一ノ目潟，二ノ目潟，三ノ目潟湖は，秋田県の男鹿半島北西部に位置するマール湖である。佐藤ほか (1986) によると，各湖には水温躍層が発達しており，溶存酸素量の低下，鍋底状の湖底地形などの特徴が報告されている。近年，湖底の表層堆積物のサンプリングが行われ，ミリ単位の年縞の堆積が確認されている。また，一ノ目潟においてボーリング調査が 2006 年，2013 年に行われており，国内で最厚となる 82 m の年縞が確認されている。

本研究では 2012 年 7 月にミニアイスフィンガーサンプラーを用いて得られたコアの明色及び暗色ラミナでの珪藻分析を行った。また，本年 6 月に現地調査で現生珪藻のサンプリングを行ったのでその詳細を報告する。

コアに関しては暗色ラミナ，明色ラミナ共に，*Ast-erionera* 属，*Aulacoseira* 属が多産した。また，暗色ラミナでは含まれる珪藻数が多くなり *Aulacoseira* 属の割合が増加する。(九州大・理)

(18) ○Kuroda, T. & Kashima, K.: Diatom assemblages in Shioya Bay and Haneji Inner Bay, Okinawa Island

Two boring cores were taken at Shioya Bay and Haneji Inner Bay, Okinawa island, July of 2010. Shioya Bay and Haneji Inner Bay are located on the west coast of Okinawa Island. In the cores, the three eventual sediments by Tsunami were presumed. For diatom analysis of cores, we made clear the distribution of living diatom assemblages in the two lakes. We took filed survey to measure water quality and to take samples of the lake water and surface sediments on April, 2013. The preliminary results at three points of Shioya Bay, the dominated diatom were *Cheatoceros* sp. and *Thalassionema nitzschioides* all sampling points. However *Staurosira consiruens* and *Neidium* sp., living in fresh or brackish condition, were found a lot only at the point near the river inlet. We will analyze samples of Haneji Inner Bay and will report the result of diatom analysis. (Faculty of Sciences, Kyushu University)

○黒田知子・鹿島　薫：沖縄本島塩屋湾と羽地内海の珪藻群集

沖縄本島では塩屋湾と羽地内海で 2010 年 7 月にマッケラスコアリングが行われ，2 本のコアが採取された。塩屋湾と羽地内海は沖縄本島の西岸に位置している，ほとんど閉鎖的な海域である。この 2 本のコアからは津波によるものと思われるイベント堆積物が見つかっており，まだ珪藻分析は行われていない。このコアの珪藻分析を行うために，まず塩屋湾と羽地内海の現生の珪藻群集を知る必要がある。そこで，今年の 4 月に塩屋湾と羽地内で簡易水質調査，海水と海底表泥のサンプリングをし，珪藻分析を行った。珪藻学会では，この珪藻分析の結果を報告する。分析には，海とつながっているところ，河口付近，マッケラスコアリングが行われたポイント付近の 3 つのポイントで採取したサンプルを使った。塩屋湾においては 3 地点すべてで *Cheatoceros* sp. の休眠胞子，*Thalassionema nitzschioides* が優占した。これに対して河口付近では淡水ー汽水種の *Staurosira consiruens* や淡水種種が多く産出しており明らかに異なった珪藻群集となっていた。同様に羽地内海においても分析を行い，塩屋湾と羽地内海の現生の珪藻群集をまとめる。(九州大・理)

(19) ○Hara, Y.[1], Suzuki, H.[1], Nagumo, T.[2] & Tanaka, J.[1]: Epipelic diatoms blooming in a tidal flat in Iriomote Island, Okinawa

Epipelic diatoms live on sediment surfaces and move actively through the sediment. Some species often increases there specifically. Epipelic species are important primary producer in littoral zones. However, diatom flora of Japanese tidal flats has been very little known, especially in South–West Islands. Most of the floristic reports have been focused on epiphytic or planktonic diatoms (e.g. Nagumo & Tanaka, 1990; Nagumo & Mayama, 2000; Matsuoka et al., 2012).

The present study is a taxonomic report on a blooming diatom assemblage on Haimita Tidal Flat, Iriomote Island. Diatom samples were collected at the area from 2005 to 2013. Diatoms were examined using LM and SEM. The observation revealed that the dominant species were *Amphora longa*, *Anorthoneis* sp.,

Cocconeiopsis orthoneoides, *Donkinia carinata*. *Caloneis*, *Fallacia*, *Navicula* and *Nitzschia* also appeared. ([1]Department of Marine Sciences, Tokyo University of Marine Science and Technology, [2]Department of Biology, The Nippon Dental University)

○原　陽太[1]・鈴木秀和[1]・南雲　保[2]・田中次郎[1]：沖縄県　西表島沿岸の砂地に生育する付着珪藻相

潮間帯の砂地や干潟には，砂泥に付着し，その上を滑走する珪藻が生育する。そこでは，時に特異的に増殖する種がある。これらの珪藻は，沿岸生態系で一次生産者として重要な役割を担っている。しかし，本邦における海産付着珪藻の植生に関する研究の中で，砂付着珪藻に注目して観察したものは少ない。特に南西諸島においてはそれが顕著であり，これまでは鹿児島県徳之島（南雲・田中，1990）や沖縄県瀬底島（南雲・真山，2000），同県伊良部島（松岡ら，2012）など，主に海藻付着珪藻が対象であった。

そこで，本研究は，沖縄県西表島の砂付着珪藻相のより詳細な把握を目的とし，調査を行った。

珪藻試料は，2005 年から 2013 年にかけて西表島南風見田の浜で不定期に採集した。これらを定法に従って被殻洗浄し，プレパラートを作製したのち，LM と SEM を用いて出現分類群の観察および同定を行った。

これまでの観察により，*Amphora longa*, *Anorthoneis* sp., *Cocconeiopsis orthoneoides*, *Donkinia carinata* の他，*Caloneis* 属，*Fallacia* 属，*Navicula* 属および *Nitzschia* 属の出現が認められた。このうち，本調査で最も多く出現した *C. orthoneoides* は温暖な海域で確認されている種であった。今回は，これらの主要な分類群の形態について報告する。([1] 海洋大・藻類，[2] 日歯大・生物)

(20) ○Mikame, Y.[1], Suzuki, H.[2], Yamashiro, H.[3], Nagumo, T.[4] & Tanaka, J.[2]: Morphology of two araphid diatom species on the coral from Nago, Okinawa

In June 2012, diatoms attached on the coral were observed from Oura bay in Nago city, Okinawa prefecture. We observed them using light and scanning electron microscopies. We report the fine structures of two araphid diatoms in this sample.

Fragilaria sp.: Cells forming long ribbon-like colonies. Valves triundulate with capitate apices. Valves are 56.0–69.0 μm in length, 7.5–9.0 μm in breadth with striae 27–28 in 10 μm. Striae uniseriate, parallel, except at the apices. Narrow axial area. One rimoportula at each end. No apical pore field. Small and short linking spines situated along the valve edge in valve apices.

Hyalosira sp.: Cells forming zig-zag colonies. Valve linear with subcapitate apices. Valve are 35.0–75.0 μm in length, 4.0–7.5 μm in breath with striae 18–19 in 10 μm. Striae uniseriate, parallel. Narrow axial area. An apical pore field present at each end. Rimoportula at one side of the pole. Internally the transapical costae developed. ([1]Tokyo University of Marine Science and Technology, [2]Department of Marine Sciences, Tokyo University of Marine Science and Technology, [3]Tropical Biosphere Research Center, University of the Ryukyus, [4]Department of Biology, The Nippon Dental University)

○三瓶ゆりか[1]・鈴木秀和[2]・山城秀之[3]・南雲　保[4]・田中次郎[2]：Morphology of two araphid diatom species on the coral from Nago, Okinawa

本研究では 2012 年 7 月沖縄県名護市大浦湾チリビシにてアオサンゴ上に珪藻が繁茂する様子が観察され，これを採集した。本試料より得られた無縦溝珪藻 2 分類群の形態について報告する。

Fragilaria sp.：被殻は，殻面で互いに付着して長いリボン状の群体を形成し，基質に絡みつく。殻面観は 4 カ所が大きくくびれた三波形，殻端は頭状である。殻長は 56.0–69.0 μm，殻幅は 7.5–9.0 μm，条線密度は 27–28/10 μm。条線は平行で，殻端では放射状に配置する。狭い軸域をもつ。両殻端に唇状突起を各 1 個もち，殻端小孔域はない。殻端部の殻肩には小さく短い連結針をもつ。帯片は片端開放型で，複数の胞紋列をもつ。

Hyalosira sp.：殻端で互いに付着してジグザグ状の群体を形成する。殻面観は線形で，片側にわずかに湾曲することもある。殻端部はややくびれて頭状である。殻長は 35.0–75.0 μm，殻幅は 4.0–7.5 μm，条線密度は 18–19/10 μm。条線は平行で，軸域をもつ。殻端小孔域を両殻端にもち，唇状突起は一方の殻端にのみ 1 個もつ。唇状突起は条線と平行に細長い。殻内面では間条線と軸域に沿って肋が発達する。帯片は片端開放型で，2 本の胞紋列をもつ。([1] 海洋大，[2] 海洋大・院・藻類，[3] 琉球大・熱生研，[4] 日歯大・生物)

(21) ○Yoshida, N.[1], Suzuki, H.[1], Nagumo, T.[2] & Tanaka, J.[1]: Seasonal changes of auxosporulation in natural population of benthic diatoms, *Melosira moniliformis* and *Pleurosira laevis* in Tokyo Bay –the 4th report–

Population dynamics of *Melosira moniliformis* and *Pleurosira laevis* were examined from June 2012 to October 2013 in the Shibaura Canal, Tokyo Bay. Biweekly samplings were carried out to observe the seasonal changes of auxosporulation in natural populations. These species were the most abundant attached diatom in the sampling site.

The seasonal peaks of auxosporulation in *M. moniliformis* and *P. laevis* were June 2013 and August 2012 & 2013, respectively. At these peaks, the appearance frequency of auxospores, the average diameters of auxospores, its mother cells, and vegetative cells of the former species were 4.4%, 95.1 μm, 35.9 μm, and 41.9 μm, of the latter species were 8.5 & 7.8%, 117.9 & 117.1 μm, 42.2 & 42.7 μm, and 50.3 & 51.9 μm.

There was a two months difference between the seasonal peaks of auxosporulation on the two species, despite they were living in the same site. ([1]Graduate School of Marine Science and Technology, Tokyo University of Marine Science and Technology. [2]Department of Biology, The Nippon Dental University)

○吉田野空海[1]・鈴木秀和[1]・南雲　保[2]・田中次郎[1]：東京湾産付着珪藻 *Melosira moniliformis* と *Pleurosira laevis* の天然での増大胞子形成の動態・第 4 報

付着珪藻の長期にわたる天然の増大胞子形成の消長を観察した報告は少ない。今回，東京都港区芝浦運河に多く生育する付着珪藻 *Melosira moniliformis* と *Pleurosira laevis* 2 種の栄養細胞の大きさと増大胞子形成の関係を調査した。

採集は潮汐の影響の無い浮き桟橋で，2012 年 6 月から 2013 年 10 月の期間に約 2 週間ごと行った。サンプルは研究室に持ち帰り，グルタルアルデヒドで固定後，両種を，光学顕微鏡を用いて 300 群体以上観察して，増大胞子の有無を確認し，殻面の直径を計測した。

観察の結果，*M. moniliformis* では増大胞子の出現頻度のピークは 2013 年 6 月で，出現頻度 4.4%，増大胞子とその母細胞の直径，細胞サイズの平均値は 95.1 μm, 35.9 μm, 41.9 μm であっ

た。

一方，*P. laevis* では 2012 年および 2013 年の 8 月に増大胞子形成のピークが確認された。2012 年，2013 年でそれぞれ，出現頻度 8.5%，7.8%，増大胞子の直径は 117.9 μm，117.7 μm，母細胞の直径は 42.2 μm, 42.7 μm，細胞サイズの平均値は 50.3 μm, 51.9 μm であった。

これら 2 種は同じ生育環境であるにも関わらず，増大胞子形成時期は 2 ヶ月間ずれるということが観察された。（[1] 海洋大・院・藻類，[2] 日歯大・生物）

（22）○Tuji, A.: On several procedure for collecting and export specimens in developing countries

Bio-diversity and gene resources become very important topics, and these conservations are challenges in the world.

Even for academic usage, export of biological materials from developing countries, need several procedures.

Diatom community especially amateur diatomists in Japan, has not pay attention for these procedures. It has not caused the problem, but, it should become problem in future.

In my presentation, several procedures for collecting and export specimens in developing countries, such as export permission, MOU, permission for field work, customs and quarantine in Japan, are discussed.（Department of Botany, National Museum of Nature and Science）

○辻　彰洋：海外調査で必要になる様々な手続きについて

国際的に生物多様性や遺伝子資源に関する認識が高まる中で，たとえ研究目的であっても，海外からの生物試料の持ち出しに制限がかかるようになった。

珪藻学会では，観光のついでに採集してきた試料についての発表が時に見られる。現在まで，トラブルは聞いていないが，今後はこの様な持ち出しについても注意が必要となる。

今回の発表では，海外，特に発展途上国で，必要となる輸出許可・現地機関との研究に関する協議（MOU）・調査立ち入り許可，および国内での通関・検疫について事例を交えて報告したい。（国立科学博物館・植物研究部）

（23）○Kashima, K.: The application of diatom analysis for the coastal hazards（Tsunami and Storm）prediction

We are trying to use the diatom assemblages from the sediments as indicator of sedimentary environment to presume the eventually layers in the cores. At the tsunami hazards, upward currents（from ocean to inland）and back currents（from inland to ocean）cyclically oscillated for one or several days with one or two hours intervals, after then huge submergence brackish ponds often appear along the coasts by tsunami current depositions and tectonically subsidence of huge earthquakes. Diatom assemblages recorded clearly those environmental processes at tsunami hazards and post-tsunami sedimentations, because we can presume not only oceanic environment but also brackish and freshwater environment using diatom assemblages. In addition to it, we are presumably identifying the differences between tsunami hazard deposits and huge storm deposits by diatom analysis.（Faculty of Sciences, Kyushu University）

○鹿島　薫：珪藻遺骸を用いた津波堆積物・波浪堆積物の判定の可能性

巨大津波災害および台風などの異常気象災害の予知のため，沿岸湖沼や内湾堆積物から過去のイベント性堆積層の判定とその堆積環境の復元が重要となっている。珪藻遺骸はこれらのイベント性堆積層の判定に有効な指標の一つとして注目されている。九州大学におけるこれまでの研究成果を総合すると，津波堆積物の判定には以下のような特徴が重要であることが明らかとなった。①津波堆積物は砂質であっても珪藻遺骸を多く含む。これは砂丘砂など他の沿岸域の砂質堆積物とは大きく異なる特徴である。②珪藻遺骸の多様性が大きく，さまざまな環境下に生息する珪藻遺骸が混在する。また珪藻殻の完個体率は低下する。③津波堆積物は下部の砂質堆積物と上部の泥質堆積物がセットとなることが多いが，上部の泥質堆積物は津波直後形成された沼沢に堆積したものであり，淡水～汽水生種が多産する。④津波堆積物の最上部で休眠胞子が増加する。

これに対して，波浪堆積物については情報が限られている。堆積物中の珪藻数の変動のほか，陸側からの洪水に伴って流入する淡水性遺骸，珪質鞭毛藻など明瞭に外海からの流入を示す指標を組み合わせることが必要となる。（九州大・理）

（24）○Shinohara, K.[1], Maruyama, A.[2], Rusuwa, B.[3] & Ohtsuka, T.[4]: Taxonomic revision of three diatoms found in Lake Malawi; *Afrocymbella brunii*（Fricke）comb. nov., *Afrocymbella rossii*（Kociolek & Stoermer）comb. nov., and *Aulacoseira euareolata*（O.Müller）comb. nov. et nom. nov.

In Lake Malawi where cichlid fishes are abundant and diverse, floristic information on epilithic diatoms is important for studies on the food habits and microhabitats of cichlid fishes. However, no studies of the diatom flora of this region have been conducted since Müller（1903, 1904, 1905, 1910）and Hustedt（1949）. Thus based on epilithic diatom samples collected from the rocky littoral zone of Lake Malawi（102 diatom taxa belonging to 34 genera）we proposed the transfer of three taxa to new genera. *Afrocymbella brunii*（Fricke）comb. nov. was transferred from *Gomphonema* because of its dorsiventral valve and its transapically elongated dorsal stigma. *Afrocymbella rossii*（Kociolek & Stoermer）comb. nov. was also transferred from *Gomphocymbella*, which is actually a synonym of *Gomphonema*. *Aulacoseira euareolata*（O.Müller）comb. nov. et nom. nov. was transferred from *Melosira* because of the presence of linking spines and mantle areolae, and its specific epithet was replaced because of homonymy with *Aulacoseira areolata* Moisseeva.（[1]Kawabe ikimonono mori, [2]Ryukoku University, [3]University of Malawi, [4]Lake Biwa Museum）

○篠原耕平[1]・丸山　敦[2]・Bosco Rusuwa[3]・大塚泰介[4]：マラウイ湖産珪藻 3 種の再分類；*Afrocymbella brunii*（Fricke）comb. nov., *Afrocymbella rossii*（Kociolek & Stoermer）comb. nov., and *Aulacoseira euareolata*（O.Müller）comb. nov. et nom. nov.

多種多様なシクリッド魚類が生息するマラウイ湖では，シクリッド魚類の食性やマイクロハビタットを研究する上で礫付着性珪藻の植生情報が重要である。しかし，この地域のまとまった珪藻の植生研究は Müller（1903, 1904, 1905, 1910），Hustedt（1949）以来，行われていない。そこで本研究では，マラウイ湖岩礁沿岸帯から採集した礫付着性珪藻の植生を調査し，34 属 102 種の珪藻が観察された。その結果，3 種について属の組み換えが必要であると考えられたので，新属への組み換えを提案

した。まず，*Gomphonema* 属とされてきた *Afrocymbella brunii*（Fricke）comb. nov. は，背腹性のある殻と背側にある遊離点の形状から *Afrocymbella* 属に移した。同様に，*Gomphocymbella* 属（*Gomphonema* 属のシノニム）とされてきた *Afrocymbella rossii*（Kociolek & Stoermer）comb. nov. も *Afrocymbella brunii* と同じ理由で *Afrocymbella* 属に移した。最後に，*Melosira* 属とされてきた *Aulacoseira euareolata*（O.Müller）comb. nov. et nom. nov. は，殻套の胞紋の構造，連結針が見られたことから *Aulacoseira* 属に移し，*Aulacoseira areolata* Moisseeva のホノニムになるのを避けるため新しい種小名をつけた。（[1] 河辺いきものの森，[2] 龍谷大・理工，[3] マラウイ大学，[4] 琵琶湖博物館）

（25）○Julius, M.[1], Gorcica, W.[1] & Mayama, S.[2]: Leveling up: Adding a macroscale gamescape to SimRiver a widely adopted environmental education software tool.

SimRiver is an educational tool for the middle school science classroom. The program is freely available and works on either Mac or PC systems. The simulator allows students to manipulate various parameters in a river basin; including landuse, population, and season. Primary production species communities, specifically diatoms, are produced by the program based upon the environmental parameters selected by the students in developing the river basin. Students can quantitatively and qualitatively evaluate these species communities to measure water quality. Environmental variables can then be adjusted producing a new simulated species community, allowing students to discover the resulting change in water quality. SimRiver allows students the opportunity to participate in a hand on experimental environment change activity that allows a complex understanding of the relationship between organisms and environmental disturbance. Activities such as this are often unavailable to educators because the complexity and time required to observe actual changes in species communities. While SimRiver has been a success and has been adopted in schools around the world, a common theme in feedback from users is the desire for an interactive environment simulating the ecology created by students during the SimRiver exercise. An interdisciplinary team is working to address these concerns and new modules are being developed to allow students to explore the macroscale river environment created during the “original” SimRiver gaming experience. The first of these modules is presented and participants are welcome to test this “Beta” version and provide feedback to the authors.（[1]Department of Biological Sciences, St. Cloud State University, United States, [2]Department of Biological Science, Tokyo Gakugei University, Japan）