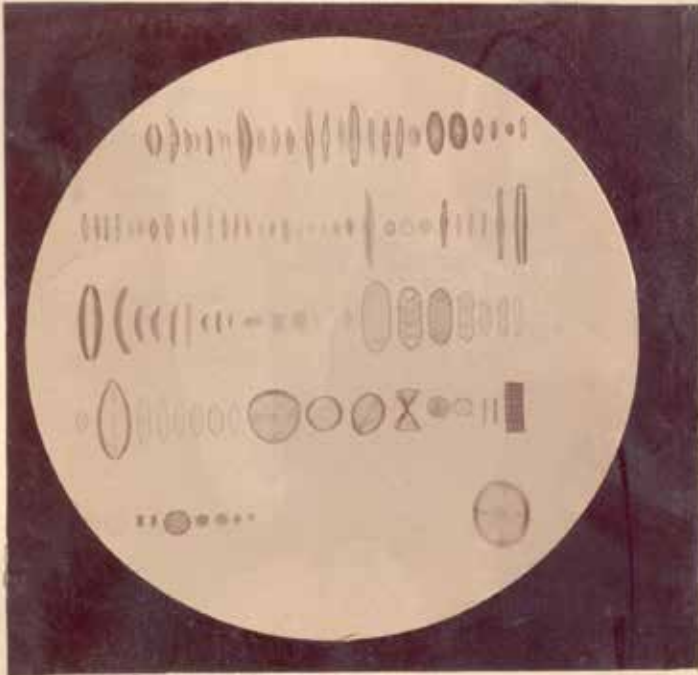


10th Central European Diatom Meeting

ABSTRACT & PROGRAM BOOK

EDITED BY ÉVA ÁCS AND KRISZTINA BUCZKÓ

Ostracoda magna
Barbo sarmat Bacillaria



fecit Fr. Antonsch Jöres eleges

20 – 23 April 2016 Budapest, Hungary

10th Central European Diatom Meeting
April 20-23, 2016
Budapest, Hungary

ABSTRACT & PROGRAM BOOK

WELCOME

In the name of the Organizing Committee we are pleased to invite you to participate in and contribute to the **10th Central European Diatom Meeting** (10th CEDM). The meeting will be held on **20 – 23 April, 2016** in Budapest, Hungary.

Budapest is the capital and the largest city of Hungary, and one of the largest cities in Central Europe. It is the principal political, cultural, commercial, industrial, and transportation centre of the country.

The **history of Budapest** began with Aquincum, originally a Celtic settlement that became the Roman capital of Pannonia Inferior. The re-established town became one of the centres of Renaissance humanist culture by the 15th century. Following the Battle of Mohács and nearly 150 years of Ottoman rule, the region entered a new age of prosperity in the 18th and 19th centuries, and Budapest became a global city after the unification of **Buda** and **Pest** in 1873. It also became the second capital of the Austro-Hungarian Empire, a great power that dissolved in 1918, following World War I.

Cited as one of the most beautiful cities in Europe, Budapest's extensive World Heritage Site includes the banks of the Danube River, the Buda Castle Quarter, Andrásy Avenue, Heroes' Square and the Millennium Underground Railway, the second-oldest metro line in the world. The city has around 80 geothermal springs, the world's largest thermal water cave system, second largest synagogue, and third largest Parliament building. The city attracts about 4.4 million tourists a year, making it the 25th most popular city in the world, and the 6th in Europe, according to Euromonitor. The main patron of the congress is **DR. JÁNOS ÁDER**, President of the Republic.

GENERAL INFORMATION

Organizing committee

ÁCS Éva

BORICS Gábor

BUCZKÓ Krisztina

KISS Keve Tihamér

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PLENKOVIĆ MORAJ Anđelka

POULIČKOVA Aloisie

RIMET Frédéric

WOJTAL Agata

Symposium support group

BOLGOVICS Ágnes

DULEBA Mónika

FÖLDI Angéla

HIDAS András

POZDERKA Virág

TRÁBERT Zsuzsa

Organizing Agency

Weco Travel Ltd.

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E-mail: diatom2016@wecotravel.hu

Venue

Research Centre for Natural Sciences, Hungarian Academy of Sciences (MTA TTK)

Address: H-1117 Budapest, Magyar Tudósok körútja 2.

Registration fee	After 15 April
Participant	250 EUR
Student	120 EUR

Registration fees for participants include the entry to scientific programs and exhibition, conference materials, coffee breaks and lunches on 21 and 22 April and the dinner on 22 April.

Registration Desk

Opening hours:

20 April (Wednesday)	18:00 – 20:00
21 April (Thursday)	08:00 – 17:30
22 April (Friday)	08:30 – 16:00

Exhibitors

Exhibitors' stands will be on display throughout the conference.

Opening hours:

21 April (Thursday)	08:00 – 17:30
22 April (Friday)	08:30 – 16:00

Oral Presentation

Plenary lectures will take place in the conference hall. Please hand out your lecture (pen-drive, CD-ROM) to the technician in the conference room before the beginning of the actual session.

Poster Presentation

Posters will be presented in two sections, on Thursday and Friday respectively. Posters can be studied throughout the conference. Presenters of the posters are kindly asked to stay next to their posters providing the possibility for discussion. Pins for pinning up the posters will be provided. Please remove your poster on Friday at the end of the poster session!

Public Transport in Budapest

Public transport in the city is well-organized. Trams, buses and metro trains operate without conductors. Tickets must be purchased in advance at tobacco shops, newsstands, metro stations or at vendor machines at some tram and bus stops. Weekly and Tourist (valid for 3 day) passes allowing free travel on all means of transportation within the city limits can be bought at each metro station.

Taxis

Taxis are yellow in Budapest. We suggest that you use only taxis equipped with a taximeter, such as Főtaxi, City Taxi, Taxi5, TaxiPlus or Buda Taxi. Beware of private cabs, especially those without a taximeter.

Parking

Parking in the central districts of Budapest is available against a fee. You need to purchase a parking ticket from the vending machines on the streets. Only HUF coins are accepted.

Notice for Drivers (Zero Alcohol)

Drivers should be aware that there is a zero tolerance of blood alcohol level while driving in Hungary.

Insurance

The Organizing Committee cannot assume responsibility for injuries or losses occurring to persons or personal belongings during the Conference. Participants are therefore advised to travel with a valid insurance package.

DETAILED SCIENTIFIC PROGRAM

Wednesday 20. 04. 2016

18:00 - 19:00 *Registration*

19:00 - 19:30 Film in the conference hall: HUNGARICUM ON THE GREAT HUNGARIAN PLAIN SZOMOR ORGANIC FARM, 2014

19:30 - 21:30 Welcome party - tasting of products of Szomor Organic Farm

Thursday 21. 04. 2016

08:00 - 09:00 *Registration*

09:00 - 09:30 Opening ceremony

09:30 - 11:20 Section 1: Effect of climate change on aquatic ecosystems with special attention to diatoms
Chairs: *JAHN Regine, KISS Keve T.*

09:30 - 10:00 Keynote speaker: *SZÖLLŐSI-NAGY András*: Climate change impacts on the hydrological cycle and other niceties

10:00 – 10:10 *Short break*

10:10 - 10:30 *HOFF Ulrike, RASMUSSEN Tine L., EZAT Mohamed*: Subarctic marine diatom assemblages off the Faroe Islands

10:30 - 10:50 *VOSSSEL Hannah, LITT Thomas, REED Jane M.*: The diatom flora of Lake Kinneret (Israel) – New insights into Holocene climate change and human impact in the southeastern Mediterranean

10:50 - 11:10 *KRAHN Kim J., SCHWARZ Anja, DINIES Michèle*: Climate and environmental variability in northwestern Saudi Arabia during the early to mid-Holocene inferred from diatom analyses

11:10 - 11:30 *BUCZKÓ Krisztina, OGNJANOVA-RUMENOVA Nadja, ABONYI-KESZTE Barbara*: Use of diatoms in geology: Honours to Márta Hajós's activity (1916-2000)

11:30 - 11:50 *Coffee break*

11:50 - 13:20 **Section 2: Diatoms in biomonitoring**
Chairs: **ROTT Eugen, VAN DE VIJVER Bart**

11:50 - 12:20 Keynote speaker: MAKOVINSKÁ Jarmila, HLÚBIKOVÁ Dasa, FIDLEROVÁ Dana: Results of phytobenthos in the frame of Joint Danube Surveys

12:20 - 12:40 WETZEL Carlos E., ECTOR Luc, ANTONELLI Marta, PFISTER Laurent: Targeting eco-hydrological connectivity: Ecological and taxonomic studies of terrestrial diatoms and the search for linkages with river regimes

12:40 - 13:00 UHER Bohuslav: Does sediment grain size affect the distribution of diatoms?

13:00 - 13:20 OGNJANOVA-RUMENOVA Nadja, BOTEV Ivan, JÓNSSON Ingi R, CYPAITÉ Vaiva, ÓLAFSSON Jón S., FINGER David C., TRICHKOVA Teodora: *Didymosphenia geminata*: two case studies on occurrence and geographic expansion in the subarctic and in alpine areas of southern Europe

13:20 - 14:30 *Lunch break*

14:30 - 15:10 **Section 3: Diatoms in biomonitoring**
Chairs: **ECTOR Luc, SABBE Koen**

14:30 - 14:50 TAPOLCZAI Kálmán, BOUCHEZ Agnès, VASSELON Valentin, KECK François, STENGERKOVÁCS Csilla, PADISÁK Judit, RIMET Frédéric: Species- and trait-based quality evaluation methods for the rivers of Mayotte (France, Southeast Africa)

14:50 - 15:10 MORA HERNANDEZ Luis Demetrio, ABARCA Nélide, CARMONA Javier, ZIMMERMANN Jonas, JAHN Regine: Epilithic diatom diversity in streams from the Lerma-Chapala Basin, central Mexico

15:10 - 16:10 **Section 4: Molecular biology of diatoms**
Chairs: *KOCIOLEK J. Patrick, WOJTAL Agata*

15:10 - 15:30 *RIMET Frédéric, VASSELON Valentin, KECK François, CHARDON Cécile, TAPOLCZAI Kálmán, PIUZ André, BOUCHEZ Agnès*: Diatom DNA-barcoding databases: how to fill them quickly at low cost?

15:30 - 15:50 *KULIKOVSKIY Maxim, ANDREEVA Svetlana, ANNENKOVA Natalia, MALTSEV Evgenij, GUSEV Evgenij*: Molecular-genetic investigation of diatom genera *Diadismis* and *Humidophila*

15:50 - 16:10 *SCHOEFS Benoit, HEYDARIZADEH Parisa*: *Phaeodactylum* metabolism converges to phosphoenolpyruvate/pyruvate formation during growth under different light conditions

16:10 - 16:40 *Coffee break*

16:40 - 18:00 Poster session 1 (Effect of climate change on aquatic ecosystems with special attention to diatoms) and 2 (Diatoms in biomonitoring) – **P1 - P21**

Friday 22.04. 2016

09:00 - 10:50 **Section 5: Diatoms in extreme habitats**
Chairs: *LOWE Rex, BESZTERI Bánk*

09:00 - 09:30 Keynote speaker: *MÁRIALIGETI Károly, FELFÖLDI Tamás, BORSODI Andrea*: Extreme environments, ordinary microbes - Ordinary environments, extremophile microbes

09:30 - 09:50 *VAN DE VIJVER Bart, KOPALOVA Katerina, ZIDAROVA Ralitsa*: The *Psammothidium germainii* complex in the Antarctic Region

09:50 - 10:10 *BEAUGER Aude, WETZEL Carlos E., VOLDOIRE Olivier, GARREAU Alexandre, ECTOR Luc*: Diatoms in mineral springs of the Massif Central, France

- 10:10 - 10:30 MAJEWSKA Roksana, VAN DE VIJVER Bart, BOLAÑOS Federico, NASROLAHI Ali, AFKHAMI Majid, DE STEFANO Mario: Diatoms on sea turtles: recent findings and their implications
- 10:30 - 10:50 SZIGYÁRTÓ Irma-Lidia, RÁKOSSY I., BUCZKÓ Krisztina, URÁK István, ZSIGMOND Andreea-Rebeka: Distributional patterns in pond vs. stream inhabiting diatom assemblages in peat bogs from Transylvania and Bucovina (Romania)
- 10:50 - 11:20 *Coffee break*
- 11:20 - 13:30 Section 6: Taxonomy, floristics**
Chairs: *RIMET Frédéric*, *WETZEL Carlos E.*
- 11:20 - 11:50 Keynote speaker: BESZTERI Bánk, KAUER Gerhard, KLOSTER Michael: Towards automating image acquisition and analysis for diatom permanent slides: a case study with Southern Hemisphere species of the genus *Fragilariopsis*
- 11:50 - 12:10 LOWE Rex, KOCIOLEK J. Patrick, YOU Qingmin, WANG Quanzi, STEPANEK Joshua: Diversity of the diatom genus *Humidophila* in karst areas of Guizhou, China
- 12:10 - 12:30 KOCIOLEK J. Patrick, THERIOT C. Edward, ASHWORTH P. Matt, WILLIAMS M. David: Towards a natural classification for the diatoms
- 12:30 - 12:50 COCQUYT Christine, JAHN Regine: Re-investigation of historic diatom material from East Africa
- 12:50 - 13:10 MEJDANDŽIĆ Maja, BOSAK Suncica, ORLIĆ Sandi, LJUBEŠIĆ Zrinka: A new marine planktonic *Entomoneis* species from the Adriatic Sea
- 13:10 - 13:30 HERNÁNDEZ-BECERRIL David, PÉREZ-MENDOZA L. Aleli: Morphology of marine planktonic species of the diatom family Thalassionemataceae from the Mexican Pacific
- 13:30 - 14:30 *Lunch break*

- 14:30 - 15:10** **Section 7: Database, collection**
Chairs: KULIKOVSKIY Maxim, LEVKOV Zlatko
- 14:30 - 14:50 *KUSBER Wolf-Henning, GÜNTSCH Anton, BERENDSOHN Walter G., JAHN Regine: Biodiversity Information for Diatom Research: AnnoSys, BioCASE, GBIF, and name registration*
- 14:50 - 15:10 *ABONYI-KESZTE Barbara, BUCZKÓ Krisztina, POZDERKA Virág, ÁCS Éva: Getting along with Pantocsek after a century. Diatom research based on the collection of József PANTOCSEK (1846-1916)*
- 15:10 - 16:30 Poster session 3 (Molecular biology of diatoms), 4 (Diatoms in extreme habitats), 5 (Taxonomy, floristics) and 6 (Data base, collection) – **P22 - P39**
- Participants are kindly asked to take down their poster(s) at the end of the session!*
- 16:45 - 22:00 City tour and Gala dinner in Restaurant Borkatakomba („Wine Catacomb“)

Saturday 23. 04. 2016

- 08:00 - 18:00 Facultative excursion to Lake Balaton with visit to Tihany and Balaton Limnological Institute

KEYNOTE SPEAKERS

Towards automating image acquisition and analysis for diatom permanent slides: a case study with Southern Hemisphere species of the genus *Fragilariopsis*

Bánk Beszteri¹, Gerhard Kauer², Michael Kloster^{1,2}

¹*Hustedt Diatom Study Centre, Alfred Wegener Institute Helmholtz Centre for Polar and Marine Research, GERMANY* ²*University of Applied Sciences Emden/Leer, Emden, GERMANY*

Diatoms are everywhere but high latitude oceans are among those places where they are truly critical determinants of ecology and biogeochemical cycling of carbon and silicon. Our CO₂ load to the atmosphere is currently forcing the climate system and the carbon cycle beyond conditions typical of the last at least 2 million years, i.e., since the last large global cooling and the establishment of the “Quaternary Ice Age” with its glacial-interglacial cycles. In this talk I will give a short overview of the diverse habitat types of polar marine diatoms, introduce some diatom taxa which are perceived as having a special importance or are emerging as models for inhabitants of these. I will attempt to place them before a background of climatic history and speculate about their possible fates under our current climate change. Especially in the Southern Ocean, diatoms also represent an important link in biotic feedback to the climate system through changing efficiency of the carbon pump both locally and at lower latitudes through “silica leakage”. This setting has also given rise to a vigorous debate about possibilities and risks of large scale geoengineering (iron fertilization of the Southern Ocean) to mitigate atmospheric CO₂ rise. Diatoms of the different sea ice habitats, on the other hand, might have less climatic feedback potential but are possibly threatened by extinction with the retreat of polar sea ice cover.

Results of phytobenthos in the frame of Joint Danube Surveys

Makovinska Jarmila¹, Hlubikova Dasa¹, Fidlerova Dana¹

¹*Water Research Institute, Slovak National Water Reference Laboratory, Bratislava, SLOVAKIA*

Phytobenthos together with macrophytes are identified as Biological Quality Element under the European Water Framework Directive (2000/60/EC), and as such need to be monitored to identify anthropogenic influences on aquatic ecosystems. Especially in the rivers, phytobenthos is considered to be a suitable parameter to determine the impact of nutrient pollution. Organisms are generally sessile and therefore reflect to the nutrients enrichment as well as to the other pollution. In the Danube, nutrients have been identified as an important anthropogenic pressure threatening the quality

of the river water. In such conditions, benthic algae are an essential component for bio assessment studies.

The results of phytobenthos of three Joint Danube Survey organized by the International Commission for the Protection of the Danube River in the years 2001, 2007 and 2013 are presented. A river segment of with a suitable substrate was chosen at each sampling site of the Danube for sampling near left and right banks. Diatom and non-diatom community sampling was investigated from the point of view of species diversity, abundance and biomass. Obtained data were treated by statistical methods. Indication of ecological status has been done on selected index using the intercalibrated boundaries of the Slovak classification system.

The Danube phytobenthos was mainly composed of diatoms and cyanobacteria. All together around 400 species were identified. Based on the data from last survey (JDS3, 2013) both diatoms and non-diatoms in the Danube indicated that there is a strong environmental longitudinal gradient in the Danube profile related to natural changes in the river typology as well as to increasing anthropogenic disturbance. The algal biomass (concentration of chlorophyll-a) showed to slight increase in the upper and lower Danube and was influenced by phosphates and suspended solids. Among the diatom indices available, the GENRE, IPS and TID appeared to be the most appropriate for further application in the ecological status assessment of the Danube. The IPS-based indication of ecological status assessment of the Danube showed that the ecological status of the Upper Danube varied between high to good except too moderate sites in Germany. Sites downstream Budapest appeared consistently below the good/moderate boundary indicating that the ecological status of the middle and lower Danube might be moderate and worse.

Extreme environments, ordinary microbes - Ordinary environments, extremophile microbes

Márialigeti Károly¹, Felföldi Tamás¹, Borsodi Andrea¹

¹*Eötvös Loránd University, Department of Microbiology, Institute of Biology, Faculty of Science, Budapest, HUNGARY*

The Carpathian Basin is particularly rich in natural extreme aquatic habitats, like soda ponds, hot springs, mineral waters, acidic bogs, sulphurous pools, salt lakes, etc. This offers a unique possibility for the microbiologist to investigate the microbial consortia inhabiting these waters, and the activities of “all those” that live therein. Moreover one has the opportunity to investigate the microbiota of artificial extreme aquatic habitats, like high purity waters or sludge digesters, severely polluted ground waters, etc. In the last decades a vast array of investigations were made on such extreme environments at the Department of Microbiology.

Classical culture based analyses, SSU rRNA gene based molecular studies and NGS metagenome analyses were performed either. In a lot of cases we performed seasonal, or even more frequent samplings covering characteristic vertical (e.g. stratified waters) and horizontal (e.g. streams concerned) sampling points. Detailed water physico-chemical analyses were made parallel.

As a result of the species diversity investigations several new taxa (species, genus) were described. Species descriptions make the opportunity of the thorough investigation of the ecological tolerance parameters of the given microbe, and thus the assessment of their extremotrophic, extremophilic or „extremoduric” properties. There are characteristic differences in microbial counts, and community compositions of the same environments / samples as a result of the different methodologies applied. As the environment gets more extreme, the germ counts diminish even at the use of media mimicking the composition of the sample. Contrary to this there are cases when cell counts or biomass values have a maximum where germ counts are near zero. There were hardly such natural extreme environments, where only extremophiles could be detected, and contrary to this in ordinary natural environments even extremophiles could be detected. What concerns artificial extreme environments, ratios of extremophiles may increase under exaggerative conditions. Many of the “extremoduric” properties give enough advantage to dominate under several environmental extremes, where the ordinary microbes cannot grow any more. What concerns the new extremophile species described from such environments, extremity is mostly only connected to novelty. True extremotrophs are rather rare. Unfortunately we have to consider the biases of the detection methods applied. Some NGS metagenome technologies give seemingly unbiased information, but experiences are still rather meagre. However genes of “extremozymes” may be detected. Results get even more complicated in case we consider, that measured environmental parameters refer usually to macro scale; however microbes live in microhabitats, where the direct environment is deeply influenced by species level interactions. The questions will be discussed through examples on the microbiota of extreme environments.

Climate change impacts on the hydrological cycle and other incities

Szőllősi-Nagy András¹

¹Institute of Advanced Studies Kőszeg (iASK), Hungary; Governor, World Water Council, Kőszeg, HUNGARY

The presentation will overview the current global perspective on freshwater with a view identify major likely future challenges along with an outline of potential opportunities for solutions. Given the projected demands for water, and the likely impact of climate variability and change, the present water uses, including those in/of

rivers, are clearly not sustainable. Finally, the political recognition is born that freshwater is a major global issue. The presentation will attempt to identify the technical, social and ecological challenges that need to be addressed to establish sustainable river development and management practices for the future. It will look into the catchment scale hydrological impacts of various global change drivers. All these changes imply strong non-stationarity. It will be argued that the design methodologies, such as the concept of design floods, developed under the hypothesis of stationary hydrological processes, need to be revisited and updated. Potential impacts of climate change will also be outlined along with the likely increase in the occurrence of extreme events such as floods and droughts. Mitigation and adaptation measures will shortly be outlined. Of the later structural and non-structural measures will be shortly examined. The presentation will argue that the re-examination of some of the structural measures, such as the need for more water storage, the need for more intensive hydropower development and the need to further develop inland navigation, respectively, is a timely task. These measures will pose new social and ecological challenges but also offer new opportunities. Various hypotheses will be entertained as to the relative importance of the various global drivers at catchment scale. The big question is: are we really dealing with the most important issues? What is indeed the major driver that will determine how rivers will be managed two generations from now? In case of transboundary rivers, where nearly half of humanity leaves, who calls the shots? How effective international cooperation is? Why do we need that, to start with? Is river management an ethical and cultural issue or simple a matter of engineering by more structures? Isn't water just a matter of quick technical fixes by applying more technology? Is water a source of conflict or that of cooperation? Some of the potential responses to these questions will be outlined along with an assessment of new relevant global action initiatives of the UN system, notably the SDGs and their relevance to water related health, wealth and ecosystems.

'IN MEMORIAM' PRESENTATIONS

Getting along with Pantocsek after a century - Diatom research based on the collection of József Pantocsek (1846-1916)

Abonyi-Kesztes Barbara¹, Buczkó Krisztina², Pozderka Virág³, Ács Éva⁴

¹University of West Hungary, Kitaibel Pál Doctoral School of Environmental Science, Sopron, HUNGARY; ²Hungarian Natural History Museum, Department of Botany, Budapest, HUNGARY; ³Eötvös Loránd University, Doctoral School of Environmental Sciences, Budapest, HUNGARY; ⁴MTA Centre for Ecological Research, Danube Research Institute, Budapest, HUNGARY

Recently a new genus *Pantocsekiella* was erected and named after Pantocsek, dedicated for his 100th death anniversary.

József Pantocsek is regarded as one of the most prominent person of European diatom research. He described more than 1300 new taxa. Living in the 19th century, he published in Latin, German and Hungarian. With the appreciation of his lifework, the recently conducted diatom researches in regard to his legacy and the current status of his collection are presented.

Pantocsek is well known about his activity on fossil diatoms, as the author of book series, "Beiträge zur Kenntniss der fossilen Bacillarien Ungarns". The first part of his enormous work was published in 1886. It discusses the fossil diatoms of the Carpathians with generously illustrated works. As a well-known expert of fossil material, he received many samples from leading geologists of the region as well as from those in distant parts of the World; thus many of those samples were first examined by him, sometimes resulting in the first (and only) records of diatom taxa for science. He also attempted to correlate the occurring species with environmental conditions, mainly with regard to the age of the diatomite and the salinity of the deposits.

Later, as his interests turned to the extant diatom floras, he highly contributed to the knowledge of the Carpathian Basin's diatom flora. Several new taxa from Lake Balaton and Lake Fertő (Neusiedlersee) were described by him. Early in the 20th century there were plans to drain Lake Fertő for agricultural use. Pantocsek published a detailed list of the diatom flora of the lake. On the basis of the rich and unique diatom flora, he argued against the drainage and contributed to the abandonment of the plan, thus playing the role of an early conservation biologist.

His last published paper has dealt with the diatoms found in the boreholes drilled in Lake Balaton – that ground-breaking palaeolimnological approach showed that Pantocsek was an innovative diatomist leading the way to new approaches in science.

His experiments in microphotography were also successful and pioneering, and as a photographer he won awards with his diatom pictures in 1884 at the National Exhibition.

Pantocsek created a rich diatom collection; the value of the herbarium is famed by hundreds of type slides from localities all over the world. The Second World War, however, caused severe damage in the collection. A great part of his slides were completely destroyed and also the rest has suffered damage. Thanks to the cleaning and restoring operations of József Krenner, 1016 diatom slides have remained as legacy.

Pantocsek's diatom collection serves as the core of the Algological Collection owned by the Hungarian Natural History Museum in Budapest, which welcomes the visitors from all over the world. It is the subject of several recently conducted international researches, focusing on typifications, biogeography and correlation of diatom floras.

Use of diatoms in geology: Honours to Márta Hajós's activity (1916-2000)

Buczko Krisztina¹, Ognjanova-Rumenova Nadja², Abonyi-Keszte Barbara³

¹Hungarian Natural History Museum, Department of Botany, Budapest, HUNGARY; ²Bulgarian Academy of Sciences, Geological Institute, Department of Palaeontology, Stratigraphy and Sedimentology, Sofia, BULGARIA; ³University of West Hungary, Kitaibel Pál Doctoral School of Environmental Science, Sopron, HUNGARY

Diatoms are a group of eukaryotic oxygenic photoautotrophs characterized by an opaline silica frustule that can be preserved in the fossil record. The use of diatoms in geology is multifold, as we can follow the different fields via Márta Hajós activity.

She was born – exactly one hundred years ago – in 1916, and has worked for 32 years at the Hungarian Geological Institute from 1949, where she conducted paleontological, geological and industrial studies on diatoms. This was at a time when the country was undertaking the task of a comprehensive paleontological research and geological exploration. Based on more than 5500 samples examined, she provided a comprehensive and up-to-date picture of the fossil diatoms of Hungary. Besides the accompanying taxa of *Archaeomonas*, *Silicoflagellata*, *Ebriida*, *Phitolitharia* and *Porfera* she listed 678 diatom taxa in Miocene, and a stratigraphical overview was given about diatoms from the Eggenburgian to the Sarmatian. She made a classification of the Miocene biostratigraphical and silicoflagellate zones as follows: 1. zone of *Melosira hispanica*, 2. *Rhaphoneis subtilissima* zone 3. *Rhaphoneis parilis* zone 4. *Suriella costata* and *Coscinodiscus pannonicus* zone 5. *Actinocyclus ingens* zone 6. *Navicula pinnata* zone 7. *Anulus simplex* zone. She has contributed significantly to an understanding of the complex and interesting stratigraphy and paleogeography of the Central Paratethys and Pannonian Basin with particular regard to the depositional environments. From the beginning of her work, she used every opportunity to keep in

touch with the international scientific community, even in the fifties when international scientific cooperation for people „behind the Iron Curtain” was not easy. Great honour and success was her invitation to the team of Deep Sea Drilling Project (DSDP). She worked as diatom expert of the international team on the Glomar Challenger expedition. First, the material of Drilling No. 13 obtained by the Mediterranean Expedition was investigated, and after it, in 1973, she was the staff member of the expedition that worked at the coasts of New Zealand. This was the so called Leg 29 during which they made drillings numbered 275-284. Two new genera and 79 new taxa were described within the frame of DSDP Project.

From 80th her interest – and possibilities – turn to the diatom research of Quaternary research. A multi-proxy study was initiated for a comprehensive survey of the geology of Lake Balaton, the largest shallow lake in Central Europe, for better understanding of the lake ontogeny.

Altogether 258 new diatom taxa were described by Márta.

The diatom community is known her as the organizer the 6th International Diatom Symposium in Budapest. With 140 participants, and 76 articles submitted the meeting was a success in 1980.

ORAL PRESENTATIONS

Diatoms in mineral springs of the Massif Central, France

Beauger Aude¹, Wetzlar Carlos E.², Voldoire Olivier¹, Garreau Alexandre¹, Ector Luc²
¹GEOLAB UMR 6042, Clermont-Ferrand, FRANCE; ²Luxembourg Institute of Science and Technology, Department Environmental Research and Innovation, Belvaux, LUXEMBOURG

During a floristic survey of freshwater springs of the Massif Central (France), the diversity and composition of the diatom communities were studied. Sixteen springs were investigated including thermo-mineral ones and others influenced by superficial water inputs. The springs were situated along a longitudinal transect of 5 km on each bank of the Allier River, the main tributary to the Loire River. Among the several interesting described (e.g. *Navicula sanctamargaritae* Beauger) and non-described species that are still under investigation, a small species could not be identified using the current literature under LM. The new *Sellaphora* is formally described using light and scanning electron microscopy. This species presents a unique set of morphological characters including the structure of the central raphe endings, the striation pattern, the valve dimensions and outline, which allows their separation from similar taxa. The species richness in the studied springs ranged from 1 (presence of only *N. sanctamargaritae*) to 21 taxa. Using a Canonical Correspondence Analysis (CCA), the two springs influenced by superficial inputs, were separated from the others. They were characterized by the highest concentrations of nitrates and contained the new *Sellaphora* here discussed, along with *Planothidium frequentissimum* var. *minus* (P. Schulz) Lange-Bertalot, and *Planothidium lanceolatum* (Brébisson ex Kützing) Lange-Bertalot. The other springs were characterized by the highest conductivity and concentrations in calcium, chloride, magnesium, lithium, sodium and dominated by *Crenotia thermalis* (Rabenhorst) Wojtal, *Fragilaria famelica* (Kützing) Lange-Bertalot and *N. sanctamargaritae*. Finally, one spring, for which the sampling was taken from a drain, sheltered mainly thermal spring algae like *Pinnularia kuetzingii* Krammer.

A new marine planktonic Entomoneis species from the Adriatic Sea

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The genus *Entomoneis* Ehrenberg includes pennate diatoms with structurally complex frustules, characterized by bilobate raphe-bearing keel elevated from the valve body, the morphologically variable junction lines and numerous girdle bands. *Entomoneis* species are mostly epipelagic, found in brackish or marine sediments, with few

freshwater representatives. The systematics of the genus is still underexplored, as there are 45 recorded taxa of which only 18 are taxonomically accepted. Up to date, there are only three *Entomoneis* species recorded in the Adriatic Sea: *Entomoneis alata* (Ehrenberg) Ehrenberg, *Entomoneis paludosa* (W. Smith) Reimer and *Entomoneis pulchra* (Bailey) Reimer.

Here we propose a new diatom species belonging to the genus *Entomoneis* isolated during BIOTA (Bio-tracing Adriatic water masses) expedition conducted in February/March 2015 in the southeastern Adriatic Sea. The enigmatic taxon was found in the water samples in low abundances (up to 200 cells/L), and three monoclonal strains were established from plankton net samples. The description and the proposed taxonomic affiliation are based on both morphological observations (LM, SEM, TEM) and molecular analyses from cultivated strains. In addition to characteristic *Entomoneis* features such as panduriform cells often torsioned along the apical axis and raphe with simple/straight endings positioned on the sigmoid keel, we found several peculiar morphological characters for the newly proposed species: (1) cells are very small, being 11-22 μm long and 3-7 μm wide, (2) frustules are very lightly silicified with very delicate appearance and without striae or fibulae visible in LM, (3) striae structure appears smooth in SEM, but TEM observations reveal two parallel rows of marginal rectangular perforations, (4) valvocopulae are perforated by teardrop shaped areolae and (5) junction lines are straight to slightly arcuate.

According to our initial phylogenetic results, NJ tree based on rbcL gene sequence data places our isolates as a distinct subgroup in the *Entomoneis* clade negating close phylogenetic relation to any other recognized *Entomoneis* species. However, further analyses will give us the exact position of the adriatic species within the *Entomoneis* genus and a clearer picture of its relationship with other canal-raphe-bearing diatom genera.

Morphology of marine planktonic species of the diatom Family Thalassionemataceae from the Mexican Pacific

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This study is based on the study of net-phytoplankton (54 and 64 μm mesh) samples obtained during different oceanographic cruises (period 1986-2014) along coasts of the Mexican Pacific. The diatom composition of those samples, especially concerning species of the Family Thalassionemataceae, is the main purpose of this paper. Diatoms of this family are marine and planktonic forms, with a characteristic “needle shape” and extremely long cells, which may form chains (colonies) and may be abundant in polar, subpolar, and also in subtropical waters. Nine species belonging to three genera

of the Thalassionemataceae were identified, including five *Thalassionema* species, three *Lioloma* species and *Thalassiothrix lanceolata*. The species were studied by LM, SEM and TEM. Morphological details of most species are shown, such as valve symmetry or asymmetry, structure of the areolae, bubble-shaped structures, different ends (headpole and footpole), apical protrusions or spines and labiate processes.

Lioloma delicatulum, *L. elongatum*, *L. pacificum*, *Thalassionema frauenfeldii* and *T. nitzschioides* are widespread along the study area, whereas *Thalassionema bacillare*, *T. synedriforme* and *Thalassiothrix lanceolata* were more restricted to tropical to subtropical zones. In the Gulf of Tehuantepec, where winter/spring upwellings occur, high densities of *Lioloma* species were detected. A contemporary account of the family is provided here and new records are annotated.

Subarctic marine diatom assemblages off the Faroe Islands

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Sediment core JM11-FI-19PC (~11 m; water depth 1179 m) off the Faroe Islands is currently investigated for changes in dominance between cold (Polar) and warm (Atlantic) water masses during the past ~130 000 years. The study includes the investigation of long-term changes in summer sea surface temperatures (SST), palaeoproductivity, as well as sea-ice distribution in relation to natural variations in climate.

A combination of the results of the most commonly used marine biological proxies, diatoms and foraminifera, together with reconstructions of the relatively newly implemented biomarker IP25, is used to solve the general problem of extended gaps in marine records. The aim is to reconstruct the palaeoproductivity and palaeoceanography in the polar- and Nordic seas. In the polar marine environment, those gaps very often arise out of a poor preservation and a high degree of dissolution of both diatom frustules and foraminifera shells. Therefore, the presented study is based on diatom species determinations, quantitative temperatures and sea-ice distribution extracted from geochemical measurements of marine biomarkers (e.g., IP25), plus determination of palaeoproductivity of diatoms and silica. Special focus is put on the Eemian interglacial and the Holocene.

Re-investigation of historic diatom material from East Africa

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Algae material of the German “Nyassa-See- und Kinga-Gebirgs-Expedition” was discovered in the Botanical Museum Berlin-Dahlem in the 1990’s. It concerned samples belonging to the material from which Otto Müller described over 100 new East African diatom taxa (Müller 1903, 1904, 1905, 1910). Re-investigation of this material is needed not only to make Müller’s taxa described in German more accessible to the scientific community but also to evaluate possible new or endemic species and to solve taxonomic problems that have arisen since the renewed attention to African diatoms. As the original slides were destroyed, new permanent diatom slides have to be made and lectotypification to be done. The presence of unmounted original material has the advantage that an in-depth investigation of the taxa by scanning electron microscopy can be conducted. Taxa described by Müller from the genera *Surirella* (Cocquyt & Jahn 2005, 2007a, b, c, d) and *Cymatopleura* (Cocquyt & Jahn 2014) have been the subject of such re-investigations already as well as of *Encyonema* (Krammer 1997) and *Gomphonema* (Reichardt 2007). The re-investigation of the *Surirella* and *Cymatopleura* taxa had been the subject of a SYNTHESYS award to the first author in 2005. Ten years later another SYNTHESYS grant allows both authors to continue their joint work on the typification of Müller’s material. One of the genera to be studied is *Rhopalodia*, a genus Müller established and of which he described seventeen taxa (seven species, eight varieties and two formas). As for the *Surirella* species, *Rhopalodia* taxa are also typical components of the African diatom flora. Unfortunately, many of those taxa had been described from material of Egypt/Soudan, which was not rediscovered at the Botanical Museum. Nevertheless, light and scanning electron microscopy investigations were started on the East African material in which Müller had recorded those taxa.

Towards a natural classification for the Diatoms

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There have been many proposed classification schemes to organize the immense diversity seen in the diatoms. Some of these schemes or systems have been based on convenience, that is, to identify certain groups and distinguish them from others without an interest in representing evolutionary history. Other systems have attempted to produce 'natural' classifications, those systems reflecting the evolutionary history or phylogenetic relationships of the diatoms. Developing an understanding of the evolutionary history of the group has taken several quite different approaches. One approach has sought out a "Silver Bullet", a single feature around which a classification can be based. Examples of this approach have been focused on valve (e.g. symmetry), cytoplasmic (chloroplast number, morphology and orientation) or physiologic (type of sexual reproduction) characteristics. Other approaches have used multiple features (many of those listed above), but with informal argumentation (rather than formal analysis) about their importance in the development of the classification scheme. Formal analyses of molecular, morphological and / or both data types have become more common recently, providing insights into the phylogenetic relationships of diatoms. Some of these analyses support aspects of more traditional classifications, but many suggest the data are in direct conflict with many of the taxonomic groups, or have not been recognized in the most recent classification for diatoms (now some 25 years old). Analyses of morphological data of fossil taxa provide new insights into evolutionary relationships of exclusively extinct taxa, with similar challenges related to current classification schemes.

In this presentation, we review some of the history of classification systems for the diatoms and the concept of monophyly and its importance to creating natural groups. We highlight new data on the phylogenetic relationships of the major groups of diatoms, and show how these data are at odds with current classification schemes. We present a new classification system for the diatoms based on these phylogenetic relationships. We suggest to achieve a natural classification for the diatoms will necessitate major changes in the groups recognized, also requiring new ways to educate students about the classification system of the diatoms.

Climate and environmental variability in northwestern Saudi Arabia during the early to mid-Holocene inferred from diatom analyses

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Sediment cores from a paleolake near the oasis of Tayma, northwestern Saudi Arabia, provide an excellent archive for reconstructing environmental change during the early to mid-Holocene in this nowadays arid to hyperarid region. An interdisciplinary project was initiated to investigate abrupt and gradual climatic changes within this sensitive region which is important to understand landscape change, prehistoric human migration and historical settlement patterns. Diatom analyses were conducted to get more detailed information about the characteristics of the paleolake and its development which helps to understand the underlying climate mechanisms. Distinct changes in diatom assemblages, concentrations and taxa dominances (*Cyclotella* sp., *Nitzschia* sp., *Halamphora* sp., *Hyalosynedra* sp.) imply highly variable conditions over the analyzed time period (9200-4800 cal BP). A more humid phase with the presence of a perennial lake is indicated by continuously high abundances of planktonic taxa around 8300-8000 cal BP. Following this period, diatom concentrations and plankton/benthos-ratios hint at a shallower, periodically appearing water body. The diatom data implies strong fluctuations in salinity and points to brackish to saline phases (*Chaetoceros* sp., *Ardissonia* sp.).

Molecular-Genetic investigation of Diatom Genera *Diadesmis* and *Humidophila*

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Phylogenetic position of diatom taxa *Diadesmis* Kützing and *Humidophila* Lowe et al. was studied using barcoding subregion V4 (18S rDNA gene) and rbcL markers. Molecular data confirms splitting off genus *Humidophila* from *Diadesmis*. These two genera are not close related and they belong to different diatom families. We discuss morphology of *Diadesmis* and *Humidophila* taxa collected from different parts of the World: Holarctic (Russia, Mongolia) and Tropics (Vietnam, Indonesia). Morphology of pore occlusions as a most important feature for diatom taxonomy is discussed. The publication is based on research carried out with financial support provided the RFBR (14-04-01406-a) and Russian Science Foundation (14-14-00555).

Biodiversity Information for Diatom Research: AnnoSys, BioCASE, GBIF, and name registration

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The Global Biodiversity Information Facility (GBIF, <http://www.gbif.org/>) and BioCASE (Biological Collection Access Service of Europe, <http://www.biocase.org>) give access to primary biodiversity data (e.g. specimen and species occurrence data). Data portals such as the GBIF.DE Data Portal for Algae and Protozoa (<http://protists.gbif.de/protists>) serve as a single access point to diverse biodiversity information from different institutions, collections, and initiatives. If the data are complete and ideally documented by multimedia files, the portal user is able to study a virtual diatom collection. Detection of nomenclatural types, discovery of misidentifications, revision of material, addition to or correction of gathering events might be the result of the portal user's investigation. To give a qualified feedback to the portal user's peers as well as to collection managers the Botanic Garden and Botanical Museum implemented AnnoSys, a virtual annotation system consisting of an user interface to annotate specimen data, an interface to an increasing numbers of data portals, and a data repository for the storage of original records and their annotations (for details see Tschöpe et al. 2013 in *Taxon* 62: 1248-1258, <https://annosys.bgbm.fu-berlin.de>). Currently, illustrated records of specimens of e.g. C.G. Ehrenberg, F. Hustedt, R. Jahn, G. Krasske, L. Medlin, O. Müller, and H. Lange-Bertalot can be accessed and annotated.

Special attention is given to diatom names. Scientific names are the main search criterion to obtain information on diatom morphology, molecular identity, occurrences of taxa, and relevance of indicator species for the European Water Framework Directive. Thus, data networks need robust and complete name backbones for good accessibility of information. Using the example of Bacillariophyta, we will give an overview of different initiatives that are curating diatom name and taxon data including the strong and weak points of the different approaches. Finally we will give an outlook on diatom name registration in future.

AnnoSys is funded by the German Research Foundation (DFG). The project title is "Internationalisation and realisation of the comprehensive online annotation system AnnoSys – application potential in terms of disciplines and standards" (BE 2283/4-2).

Diversity of the diatom genus *Humidophila* in karst areas of Guizhou, China.

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On a recent research expedition to Guizhou Province in southeast China we collected over 100 samples of diatoms from rivers, lakes, wetlands, caves and wetwalls. The area is rich in karst formations which provided the opportunity to collect from many moist subaerial habitats. Samples were cleaned and mounted for light microscopy at Shanghai Normal University by standard methods. A portion of the cleaned diatom material was further prepared for scanning electron microscopy at the University of Colorado, Boulder, Colorado, USA. This talk will focus on the subaerial diatom community and specifically on the genus *Humidophila* (Grunow) Lowe, Kociolek, J.R.Johansen, Van de Vijver, Lange-Bertalot & Kopalová. We have documented over ten species of *Humidophila* thus far from the collections. One cosmopolitan species, *Humidophila contenta* (Grunow) Lowe, Kociolek, J.R. Johansen, Van de Vijver, Lange-Bertalot & Kopalová was abundant in many collections. But we also documented several other species that appear to be new to science. This talk will focus on these new species and their morphological relationship to other species in the genus.

Diatoms on sea turtles: recent findings and their implications

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Although the macro-epibiotic communities of sea turtles are relatively well studied, very little is known about their micro-epibiotic counterparts. Recently interest in sea turtle epibiosis has grown, and only last year a direct evidence that sea turtles host abundant and unique diatom communities was provided. Here, we present the most recent findings from our studies on sea turtle diatoms. Using Scanning Electron

Microscopy and techniques involving Critical Point Drying, we examined carapace samples from multiple individuals of green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), loggerhead (*Caretta caretta*), and olive ridley (*Lepidochelys olivacea*) turtles collected in Costa Rica (from both Pacific and Atlantic coasts), Iran (Persian Gulf, Indian Ocean), and Turkey (Mediterranean Sea). Although diatom communities differed largely in terms of abundances, their growth form structure appeared to be similar with attached erect taxa (*Achnanthes* spp., *Poulinea* spp., *Chelonicola* spp.) and motile (*Navicula* spp., *Nitzschia* spp.) forms prevailing. Diatom cells were usually surrounded by large amounts of exopolymeric matrix, which may act as protective coating preventing the excessive desiccation of both diatom cell and turtle carapace during the longer periods out of water. Interestingly, some of the diatom species were observed in samples collected from different turtle species and even from different ocean basins. This suggests that typical epizoic diatoms may be found comprehensively on sea turtles throughout their range and may further indicate an important co-evolutionary relationship between these taxa and sea turtles. Only recently two new diatom genera, *Chelonicola* and *Poulinea* have been described from the olive ridley carapace and we predict that many more previously undescribed taxa will be discovered with continued research. Investigation of sea turtle associated diatom communities may open many new avenues for further research into diatom evolution and biogeography, their physiological ability to colonize various (extreme) habitats, as well as their capacity to function as ecological indicators of sea turtles' behaviour.

Epilithic diatom diversity in streams from the Lerma-Chapala Basin, central Mexico
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Stream diatom diversity is controlled by heterogeneous ecological and biological factors related to multiple spatial and temporal scales; however, the mechanisms that explain diversity and distribution are scarcely known. The present investigation was conducted to characterize the diatom diversity and its relation to environmental factors in mountain streams in Central Mexico. The Lerma-Chapala Basin is a geological and climatic heterogeneous area of 52,500 square kilometers. It is considered the most economically important basin in the country, boasting a population of more than 15 million people.

The 14 sampling sites studied are located at elevations ranging from 2,017 to 2,410 meters above sea level. Samples were taken during September-October 2013 (rainy

season), February 2014 (dry season) and September 2014 (rainy season). Epilithon samples were scrapped from 5 cobbles at each site to make composite samples. Water physicochemical parameters were measured in situ (pH, temperature, specific conductivity, dissolved oxygen, water flow) as well as in the laboratory (nutrients). Diatom samples were studied under both light and scanning electron microscopy. A total of 170 diatom taxa (species and varieties) belonging to 45 genera have been identified, including new records for the country belonging to the genus *Achnantheidium*, *Cymboplectra*, *Navicula* and *Nupela*. The most species rich genera were *Nitzschia*, *Navicula* and *Gomphonema*. Around 60 taxa haven't been identified down the species level, some of which are to be described as new species according to morphological and molecular evidence. Ordination analyses show water flow and nutrients as the factors determining the three groups of sites observed. Our results highlight the importance of having a solid taxonomical and ecological baseline for future prospects such as the use of diatoms as indicators of environmental changes.

***Didymosphenia geminata*: two case studies on occurrence and geographic expansion in the subarctic and in alpine areas of southern Europe**

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In recent decades aquatic and terrestrial alien species have been spreading across Europe and many of these species are potentially dangerous to European biodiversity, economy and human health. Anthropogenic activities are the main cause for the enhanced spreading of alien species in environments. However, changing climatic conditions may facilitate the spreading of alien species due to changing environmental conditions, e.g. warmer temperatures. Effective policy making and management relies on a solid knowledge base which largely depends on the availability and quality of information and the tools needed to share it between scientists, decision makers and managers. This is particularly true for complex phenomena as invasive alien species (IAS). Therefore, networking and cooperation at different levels in Europe are crucial for IAS management.

Didymosphenia geminata (Didymo) is a freshwater diatom which has historically been found in cool, oligotrophic waters of northern Europe and northern North America. Since the mid-1980s it has increasingly been observed in new area, e.g. New Zealand, Iceland and high elevation Alpine areas. Recently, the species has also been recorded

in high-mountain areas in Southern Europe. Although *Didymo* does not present a significant human health risk it can form massive blooms and have negative impacts on stream habitats, hampering fishery and degrading the recreational value of streams.

As part of the project The East and South European Network for Invasive Alien Species – a tool to support the management of alien species in Bulgaria (ESENIAS-TOOLS), we present two case studies:

- Elliðaál River and its tributaries, located in subarctic Iceland: Our findings confirm the expansion of non-indigenous *Didymosphenia geminata*;
- Rila Mountains, Bulgaria: The preliminary results in the high mountains, including both fossil and recent records, confirm that the occurrence of *Didymosphenia geminata* is restricted to the Lake Bliznaka, Cirque ‘Sedemte Ezera’.

Acknowledgement: This study is part of ESENIAS – The East and South European network for invasive alien species, funded by the European Economic Area Financial Mechanism 2009-2014, within the ESENIAS-TOOLS project.

Diatom DNA-barcoding databases: how to fill them quickly at low cost?

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Diatoms are excellent indicators of freshwater pollution currently used to monitor ecological quality in rivers. Standardized methodologies are based on microscopic determinations which are time consuming and prone to identification uncertainties.

Use of metabarcoding is a way to avoid these flaws. High-throughput sequencing (HTS) now offers the opportunity to spread this approach at the scale of regular biomonitoring networks. To carry out identifications with such technologies, a curated DNA-barcoding database dedicated to diatoms such as R-Syst::diatom -an open-access database- is necessary. Nevertheless, even if this database covers a large taxonomic diversity and is updated every six months with new sequences, it still suffers from incompleteness for some genera and species regularly observed in rivers and which are important for ecological monitoring.

The historical way to complete a DNA-barcoding database is to isolate a cell from an environmental sample, to culture it and when enough biomass is available, to both sequence it and analyze it under microscope. This first possibility is unfortunately manpower consuming and many species are difficult or even impossible to culture.

We propose a complementary way, which is to select environmental samples with low diversity, dominated by a few number of species, to identify the species under microscope and to sequence this sample with HTS. We show that in some cases, the

link between the HTS sequences and the morphological identification can be done with a high certainty and that such data can be used to fill the DNA-barcoding database.

***Phaeodactylum* metabolism converges to phosphoenolpyruvate/pyruvate formation during growth under different light condition**

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Gigatons of CO₂ are yearly converted into organic compounds by photosynthetic organisms. Diatoms are among the most important contributor in this process. Both the capacity of carbon fixation and the fate of fixed carbon are strongly impacted by the environmental factors. Because light can constitute a stressful factor when present in nonadequate amount, photosynthetic organisms have developed various acclimation mechanisms. Diatoms adapt very efficiently to changing irradiance.

Molecular mechanisms behind light acclimation in diatoms are largely unknown. To obtain further information on these mechanisms, the impacts of different growth photon flux densities (GPDF) (30 (LL), 300 (ML), 1000 (HL) $\mu\text{mol m}^{-2} \text{s}^{-1}$) were studied at the physiological, biochemical and molecular levels in the model diatom *Phaeodactylum tricornutum*. Growth rate calculation indicates that under LL, algae suffered from photon deficiency and thus increased their content in photosynthetic pigments to insure their photon requirement with only partial success. The additional photons provided under HL vs ML were not improving growth but an increase of the energy dissipation mechanisms. Thus LL and HL were constituting stress conditions for *P. tricornutum*. The integrated results indicate that the impact of ML and HL on diatom cells were similar but quite different from LL. In addition of light, growth phase and could affect pigments concentration and primary metabolites. The trends? of gene expression coding enzymes in central carbon metabolism pathways differed under LL, but the orientation of the metabolisms was toward either PEP or pyruvate formation in all three light intensities. LL provided a condition for cells to accumulate chrysolaminarin and lipids, while ML mostly stimulated lipid synthesis. A significant increase in the amount of proteins was observed under HL. We concluded that PEP and pyruvate are key intermediates in diatom to synthesis valuable compounds such as lipids, proteins, aromatic amino acids and polyphenolics.

Distributional patterns in pond vs. stream inhabiting diatom assemblages in peat bogs from Transylvania and Bucovina (Romania)

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In terms of biological diversity great importance is attributed worldwide to peat bogs. As in many other countries, in Romania the peat bogs are mostly treated as nature reserves, based primarily on the presence of rare vascular plants. However, the diatom assemblages of such extreme habitats in Romania, such as peat bogs, are poorly known, although some studies have been conducted in the '70–80s regarding the most important peat bog areas.

Therefore our aim was to study the species composition and distribution of the peat inhabiting diatom assemblages, especially in relation with environmental factors (pH, conductivity, concentration of certain chemical elements) that contribute to the extreme character of such habitats. Since the environmental factors differ significantly between ponds and streams in the same peat bog area, we focused on the significant differences between the two types of diatom assemblages as well.

The study was conducted based on benthic samples collected in the summer of 2014 and 2015, both from ponds and small streams in several peat bogs in Transylvania (Eastern Carpathians, Apuseni Mountains, Maramureş region) and Bucovina. Results suggest a significantly higher number of diatom species and varieties than expected, around 300, including some, which need further clarifications in the taxonomic identification. The differences are significant between pond and stream inhabiting diatom assemblages both on species richness/diversity and composition level: for example, while in the ponds the *Eunotia* and *Pinnularia* species are dominant, usually with relative abundances above 80%, indicating the more extreme, acidic and oligotrophic character of the peat ponds, the assemblages inhabiting the peat streams are richer, more diverse, with many oligosaprobic, less acidophilic and aerophilic or more tolerant diatoms, in correlation with the somewhat less extreme environmental conditions. It should be also mentioned that species and varieties, never or rarely mentioned before in the Romanian algal flora, constitute almost 50% of the total number of identified diatoms in the samples.

Although results lead to the conclusion that especially the streams in the peat bogs contribute to the high microbiological/algological biodiversity value of the larger area, due to their overall extreme character, peat bogs can be considered special ecological systems, which deserve elevated scientific and conservational interest in Romania.

Species- and trait-based quality evaluation methods for the rivers of Mayotte (France, Southeast Africa)

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Mayotte, one of the French oversea departments, is composed by two small islands (area= 374 km²) located on the Indian Ocean, between northwestern Madagascar and Mozambique (12°50'35"S 45°08'18"E), geographically as the part of the Comoro Archipelago. The change in its legal status in 2011 requires the application of the European Water Framework Directive.

After the more or less regular monitoring of the rivers of the "Grande Terre" of Mayotte since 2008, new networks have been designated besides the regular surveillance network (RCS), with reference and polluted sites. Analyses of physico-chemical parameters and on diatom communities have been carried out and show unusual gradients for some parameters.

Mayotte represent a unique environmental milieu compared to Europe with a particular diatom flora. A classical water quality index based on the Zelinka-Marvan equation (1961) has been developed based on the diatom community. Although the index works successfully on independent database too, it has the withdraws arising from its species based approach.

We compare here the assessment performances of this species based index to trait-based approaches for which it is hypothesised to give more robust assessment results in a context where diatom flora is less well-known than in the European continent.

Does sediment grain size affect the distribution of diatoms?

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Small sized sediments support a diverse group of eukaryotic and prokaryotic organisms though the role of the sediment for the functioning of the diatoms remains largely unknown. The present study aimed to test the effect of sediment grain size on the distribution of diatoms. This study based on standard representative samples of river diatom populations of biomonitoring in Austria, which integrated the size of sediment particles detected in river basins and other parameters of each sample, seems to have been significant for the specific subgroups of diatom populations in Austrian rivers.

The assessment of sediment mixture effects must address the fact that some diatom subgroups/populations are significantly distributed by mixtures made of small grain size sediment at both low and high concentrations.

The *Psammothidium germainii*-complex in the Antarctic Region

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Psammothidium germainii (Manguin) Sabbe is a widespread freshwater monoraphid diatom species in the Antarctic Region. The species was originally described by Manguin in 1954 from the sub-Antarctic Iles Kerguelen (Bourrelly & Manguin 1954) and later found in almost all investigated localities of the Antarctic Region (including the Antarctic Continent, Maritime Antarctica and the sub-Antarctic Islands) (Kellogg & Kellogg 2002). It is a typical aerophilic diatom, mainly found in wet to semi-dry soils and dry mosses but lacking in aquatic conditions.

Detailed analysis of the *P. germainii* populations in the different parts of the Antarctic Region showed a highly variable morphology, most likely reflecting the presence of several taxa that were lumped under the name *germainii*. In order to unravel the correct identity of *P. germainii*, the type material of both *Achnanthes germainii* Manguin and the apparently closely related *Achnanthes ninckei* Guerneer & Manguin has been investigated. Together with the morphological analysis of all Antarctic *germainii* populations, this type material analysis allowed a better morphological delimitation of both taxa and a better characterization of the new taxa. Two new taxa are proposed: a first new taxon has typical rostrate apices and a rather distantly spaced stria pattern whereas the second new species was formerly identified as *Achnanthes ninckei*. Both new taxa are illustrated using light and scanning electron micrographs and are compared with similar taxa worldwide. Additionally, two populations of *Psammothidium germainii* lacking a raphe on both valves are illustrated and discussed.

References

BOURELLY, P. & MANGUIN, E. (1954): Contribution a la Flore Algale d'eau Douce des Iles Kerguelen. – Memoires de l'Institut Scientifique de Madagascar, Séries B., Vol. V, 5–58 +11 pls.

KELLOGG, T.B. & KELLOGG, D.E. (2002): Non-marine and littoral diatoms from Antarctic and Subantarctic regions. Distribution and updated taxonomy. – Diatom Monographs 1: 1–795.

The diatom flora of Lake Kinneret (Israel) – New insights into Holocene climate change and human impact in the southeastern Mediterranean

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The Mediterranean basin is a region of highly complex topography and climatic variability, such that our understanding of the past environmental variability is still limited. Diatoms have a well-recognised potential to generate high-quality paleolimnological data, because they are often well preserved in lacustrine sediment records, which provide excellent high-resolution terrestrial paleoarchives. As diatoms remain one of the least-exploited proxies in palaeo-climate research in the Mediterranean region, we would like to present a new detailed diatom analysis of an 18 m sediment sequence from Lake Kinneret (Israel) as part of a multi-proxy study of Holocene climate change and human impact in the southern Levant (<http://www.sfb806.uni-koeln.de>). Results are compared with other proxy data including pollen, geochemical data and with output data from regional climate modelling, to strengthen interpretation of environmental change during the Holocene. 98% of the diatom taxa can be classified as oligohalobous-indifferent and as alkaliphilous, as is typical of freshwater, alkaline lakes of open hydrology in limestone, karst-dominated catchments. Remarkable shifts in the diatom flora over the last ca. 9,000 years can be mainly interpreted in terms of productivity shifts, with a clear trend from oligotrophic at the base to hypereutrophic in the modern lake. The eutrophication trend accelerates after ca. 3,000 cal. yrs. BP, indicating the influence of increased human activity in the catchment, identified previously by analysis of the vegetational history (Schiebel, 2013).

The diatom data also provide some evidence for lake-level fluctuations, as a proxy for shifts in moisture availability. Low lake-level stands are characterized by low diatom concentration and increased relative abundance of littoral taxa. High lake-level stands are marked by the clear dominance of planktonic species, such as *Cyclotella ocellata* Pantocsek and *Cyclotella paleo-ocellata* Vossel & van de Vijver (a newly described centric diatom which may be endemic; Vossel et al., 2015), in phases of high diatom concentration. Such inferred lake-level oscillations correlate well with the output from the climatic models from the Levant region, representing changes in moisture availability (Litt et al., 2012), although the signal is obscured in the last 3,000 years by the effects of anthropogenic eutrophication.

References

Litt, T.; Ohlwein, C.; Neumann, F. H.; Hense, A. & Stein, M. (2012): Holocene climate variability in the Levant from the Dead Sea pollen record. – Quat. Sci. Rev., 49: 95-105.

Schiebel, V. (2013): Vegetation and climate history of the southern Levant during the last 30,000 years based on palynological investigation. – Unpublished PhD thesis.
Vossel, H.; Reed, J. M.; Houk, V.; Cvetkoska, A. & Van de Vijver, B. (2015): *Cyclotella paleo-ocellata*, a new centric diatom (Bacillariophyta) from Lake Kinneret (Israel). *Fottea*, 15 (1), 63-75.

Targeting eco-hydrological connectivity: Ecological and taxonomic studies of terrestrial diatoms and the search for linkages with river regimes

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Soils are home to a vast and still poorly known diversity of diatom species. Terrestrial communities (as freshwater) also respond to and can reflect ecological gradients and perturbations, including direct and indirect human impacts, mainly consisting of farming activities. The dynamics of these communities can be related to the hydrological connectivity between different landscape units. Surface water flow paths from the hillslope, through the riparian zone to the stream can be traced via these terrestrial species. The latter are flushed in considerable amounts to the stream during rainfall events. Hydrological connectivity is often strongly non-linear and controls runoff response and stream chemistry and tracer applications are often limited in scale or by the number of available tracers. Due to these limitations fast flow path connectivity in the hillslope-riparian-stream HRS continuum is still difficult to decipher. In order to assess the full potential for aerial diatoms to serve as tracers of hydrological connectivity, there is a pressing need for characterizing these diatoms, along the development of extraction methods and in-depth taxonomic analysis to study the ecology of soil diatoms. We intend to generate detailed diatom habitat descriptions for linking the occurrence of individual species to representative source areas – paving the way for species assembly dynamics modelling. This in turn, will help to investigate how terrestrial diatoms can qualify as a potential tracer for overcoming the spatial limitation that most conventional geochemical and isotopic tracers are currently constrained by.

POSTER PRESENTATIONS

P14 - Diatoms in biomonitoring

Diversity of centric diatoms in different Hungarian standing waters

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We studied 169 different Hungarian standing waters between 2009 and 2013. The aim of the study was to describe the diversity of centric diatoms in various Hungarian standing waters (spring-pools, natural freshwater lakes, soda ponds, pit lakes, reservoirs, fish ponds, oxbows) and to improve understanding of their ecology and related distribution patterns, thus contributing to their use in bioindication. Overall 32 centric diatom species were identified. Their relationship with the surface area of the standing water, turbidity, pH, dissolved oxygen, electric conductivity, temperature, p-alkalinity, m-alkalinity, carbonate, hydrogen-carbonate, calcium, magnesium, chloride, phosphate-phosphorous, total phosphorous, nitrate-nitrogen, ammonium-nitrogen and chlorophyll-a concentration was also analysed.

Number of species was the lowest in spring-pools and the highest in the eutrophic fish ponds and the oxbows, including a side arm of the Danube River, the Ráckeve-Soroksár Danube (RSD) that is classified into standing waters according to Water Framework Directive (WFD). The water level of RSD is regulated with lock at the beginning and at the end of the side arm, its water originates from the Danube River that explains its richness in species.

Relationship between the size of the standing water and the number of species was found only in the case of natural freshwater lakes and oxbows, where the species number increased with the lake surface. In the case of the artificial lakes (pit lakes, reservoirs, fish ponds) and soda ponds we could not detect such correlation. The most frequent species were: *Stephanodiscus minutulus* (Kützing) Cleve et J. D. Möller (58%), *Cyclotella meneghiniana* Kützing (51%), *Pantocsekiella ocellata* (Pantocsek) K.T. Kiss & Ács in Ács et al. (48%), *Cyclostephanos dubius* (Fricke) Round in Theriot et al. (44%) and *Discostella pseudostelligera* (Hustedt) Houk et Klee (40%). *Chaetoceros muelleri* Lemmermann occurs only in water bodies with high conductivity (mean: 2600 $\mu\text{S cm}^{-2}$), the majority of the *Aulacoseira* species and *Melosira varians* C. Agardh appear solely in low (<1500 $\mu\text{S cm}^{-2}$) conductivity waters (mean: 6-800 $\mu\text{S cm}^{-2}$). The *Thalassiosira* s.l. species (*T. duostra* C. Pienaar in Pienaar and Pieterse, *T. lacustris*

(Grunow) Hasle in Hasle et Fryxell, *Conticribra weissflogii* (Grunow) Stachura-Suchoples et D.M. Williams) prefer waters with higher phosphorous content (mean: 3-400 µg L⁻¹).

Redundancy analysis (RDA) was used to assess the influence of environmental variables on the relative abundance of centric diatoms. The results indicate the trophic state gradient is the major driver of the centric diatoms distribution in our data set.

P17 - Diatoms in biomonitoring

Changes of diatom assemblages in basins of Lake Tisza (Kisköre Reservoir) – seasonality and water-use strategy

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Lake Tisza (Kisköre Reservoir) is the largest artificial lake in Hungary, which is the part of the UNESCO World Heritage program. Lake Tisza consists of four basins with different water-use strategies: there are both strictly protected areas and also recreation areas. Despite of the economic and conservation significance of this Lake, there are no studies about the spatial and temporal distribution of diatom assemblages in the different basins.

The main aim of this study was to ascertain that seasonality or water-use strategy have the key role affecting the taxonomical and eco-morphological structure of basins' diatom assemblages.

Our results showed that seasonality is more important than water-use strategy in development of diatom assemblages. The diatom assemblages in the basins with different water-use strategies were characterized by medium sized motile (*Navicula cryptotenella*, *Nitzschia dissipata* and *Ni. perminuta* – MS2, MS3 and MS4 combined eco-morphological functional groups) and different sized planktic diatom taxa in early summer. In contrast, the smallest and largest sized motile and low profile guild taxa (*Epithemia sorex*, *Nitzschia inconspicua* – MS1 and MS5; *Amphora pediculus*, *Cocconeis placentula* s.l. – LS1 and LS5) were predominant in late summer independently the type of water-use strategy of the basins.

These results highlighted that even in the case of an artificial lake, seasonality could be the most important factor in organization of diatom assemblages instead of anthropogenic impacts so appropriate water-use strategy can help to preserve the ecological balance among basins with different functions.

P18 - Diatoms in biomonitoring

Benthic diatom-based lake types in Hungary

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Hydromorphological and chemical attributes of water bodies have pronounced influence on the occurrence and distribution of biological elements in the aquatic ecosystems. Based on series of abiotic characteristics 17 lake types were established in Hungary for management purposes. Ecological assessment of the lakes, however, needs the biological validation of these types, therefore, benthic diatom communities were studied in the various types of standing waters in Hungary. Species composition and abundance of the occurring taxa were analysed. The results enabled us to distinguish 5 basic lake types: 2 calcareous lake types which differ in size and in their trophic characteristics, and 3 types of the high salinity saline lakes. In this latter group astatic and perennial lakes showed considerable differences, and lake size appeared to be also important descriptor variable. These results have considerable practical importance, because biological validation of the hydromorphological lake types is the first step during evaluation of the ecological state of water bodies.

P5 - Effect of climate change on aquatic ecosystems with special attention to diatoms **Diatoms and environmental changes (13 and 5 ka BP) in the Eastern Slovakia based on lake sediment analyses**

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The main aim of this study was to reconstruct local environmental conditions and processes such as lake productivity, water level changes and the development of lake vegetation using diatoms. We analysed a 7 m long sequence of lake deposits from a site named Hypkaňa, located in the westernmost part of the Eastern Carpathians, in the Vihorlat Mts in eastern Slovakia (Central-East Europe; 820 m a.s.l.; 48°54.787' N, 22°09.814' E). Chironomid head capsules were used to reconstruct mean July temperature (TJuly) and pollen were used to reveal changes in the development of surrounding vegetation. Combination of results from such different disciplines could create the frame of environmental history of the study site and reveal considerable

variation in environmental conditions during latest Glacial and Early Holocene. A total of 201 diatom taxa representing 65 genera were recorded from the sediment samples, consisting predominantly of benthic, periphytic and benthic-tychoplanktonic species. 125 diatom species from the fossil data, which were present also in the calibration datasets, were used to infer epilimnetic total phosphorus (TP) concentrations using diatom-water chemistry transfer functions based on a combined European diatom data-base (EDDI; <http://craticula.ncl.ac.uk/Eddi/jsp>). The research was financed by the grant project of the Czech Science Foundation (P504/11/0429) and by institutional supports of Masaryk University and Czech Academy of Sciences (RVO 67985939).

P34 - Taxonomy, floristics

A new *Afrocybella* species (Bacillariophyta) from a small deep East African crater lake

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A new diatom species belonging to the genus *Afrocybella* was found in Lake Challa, a small deep crater lake at the border of Kenya and Tanzania. This lake located at the foot of Mount Kilimanjaro is the object of extensive multidisciplinary studies in the frame of climate changes in East Africa (Verschuren et al. 2009, Barker et al. 2013). The new *Afrocybella* taxon has a length between 11.9 and 63.8 μm and a width between 8.2 and 13.7 μm . Its valve morphology is discussed based on light and scanning electron microscopic observations. *Afrocybella* is a small genus with only twelve known species and a distribution restricted to the African Rift. Taxa belonging to this genus are heteropolar and are characterized by dorsiventral valves curved along the pervalvar axis and the presence of small pseudosepta and septa on the open girdle bands. Information on the seasonal succession of the new species was obtained thanks to a monthly survey of the phytoplankton in Lake Challa. The new *Afrocybella* species was especially observed as dominant taxon in the plankton during the dry and windy season, corresponding to the northern hemisphere summer, when the upwelling of deeper nutrient-rich water from the hypolimnion of Lake Challa occurs. In spite of the presence of an apical pore field at the foot pole, suggesting an attached way of living, the new taxon was observed free living in the water column.

P3 - Effect of climate change on aquatic ecosystems with special attention to diatoms
Quaternary climate change in ancient lakes Ohrid and Prespa; high lake's resilience prevents catastrophic ecosystems collapses: the diatom evidence

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Quaternary climate variations have triggered constant structural and functional ecosystem changes at different spatial and temporal scales. These regime changes have either led to ecosystem reorganizations or, in extreme cases, complete collapses, characterized by species extinctions and loss of ecosystem's functionality. Such rather catastrophic events are archived in the sediment records from many long-lived lakes worldwide. A well-known example is the ecological collapse of ancient Lake Baikal prompted by the glacial episodes throughout the Pleistocene. The ecosystems resilience is intrinsically related to the lakes' adaptive capacity, and, therefore, understanding past species adaptability and regimes is important for predicting the future responses to external climate, geologic and environmental forcing.

Balkan "sister" lakes Ohrid and Prespa are the oldest and most diverse permanent lakes in Europe. The lakes share an underground hydrological connection via a karstic system in Mt. Galicica, but differ substantially in their physical and chemical properties. Recent studies presumed that the much shallower and nutrient-rich Lake Prespa can potentially affect the nutrient availability and endemic biodiversity of the deep and oligotrophic Lake Ohrid. Hence, the lake's Quaternary sedimentary records offer a unique opportunity for parallel analysis of the past regime changes and potential interdependence between the lakes. We carried out a multi-proxy data analysis and compared the diatom with the bio(geochemical) record from both lakes. The sediment sequence from Lake Ohrid was recovered as part of the international project "Scientific Collaboration on Past Speciation Conditions on Lake Ohrid", ICDP deep drilling campaign and the results presented cover only the past ca. 92.0 ka of the >1.2 million years old sediment record. Lake Prespa's dynamics are inferred from a sediment core spanning ca. 92.0 ka, Co1215, retrieved from the northern central part of the lake. We used the eco-stratigraphic changes in the diatom communities to assess the ecosystems resilience and test the link between the lakes.

Driven by the last glacial-interglacial climate change, the lakes show synchronous patterns of regime shifts, but different inferred amplitudes of variation. While Lake Ohrid shifted between ultraoligo- and oligotrophic regimes, the relatively shallow Lake Prespa, changed from (oligo-) mesotrophic to eutrophic conditions. The diatom data are outstanding in demonstrating both lakes' high resilience to external forcing, and Lake Ohrid's higher capacity to buffer climatic, geologic and environmental disturbances than Lake Prespa. Regime shifts of Lake Ohrid due to the hydrological connectivity with Lake Prespa are not evident for the period studied. The continuous presence of the diatom communities and the complete lack of catastrophic events in both lakes during the last 92.0 ka may be further related to their high resilience to external forcing.

P37 - Collections

Cryopreservation of marine diatom cells in Ege University Microalgae Culture Collection (EGEMACC)

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Cryopreservation at subzero temperatures in liquid nitrogen (-196°C) is the method of the long-term conservation for diatom. The preservation of organisms without change in their morphological, physiological, biochemical and genetic properties is a first function of culture collections. In addition, a second function is a significant amount of research on the fundamental cause of cryopreservation induced injuries in diatom.

This study investigates the applicability of cryoprotective strategy for marine diatom in Ege Microalgae Culture Collection (EGEMACC). The cryopreservation of marine diatom algae (*Amphora cf. capitellata* (EGEMACC 2), *Cylindrotheca closterium* (EGEMACC 45), *Nanofrustulum shiloi* (EGEMACC 44), *Nitzschia* sp. (EGEMACC 49)) using the passive freezing system procedure was studied. Investigation into the cause of the freezing injury at the cellular level was made at different salt concentrations. All off spesices were incubated in 100 ml flask containing 50 ml of F/2 medium at 22°C under 20 µmolphotonsm⁻²s⁻¹ for 15 days. Liquid cultures were concentrated and the supernatant was decanted. Diatom cells were transferred to cryovials containing in sea salts liquid F/2 media at the percentage of 1%, 2% and cryoprotectant of 10% DMSO, cryopreserved in liquied nitrogen at -196°Cfor 30 and 90 days.

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P25 - Diatoms in extreme habitats

Epiphytic diatom communities of the Dehtář fishpond (South Bohemia, Czech Republic)

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Within this work were studied epiphytic diatom communities living on submerged macrophytes in the Dehtář fishpond (South Bohemia, Czech Republic). The Dehtář fishpond is a large hypertrophic reservoir near České Budějovice with fluctuations of oxygen and fast changes in stratification of main physical and chemical parameters of water. These changes are recorded by several sensors placed on three stations at different parts of the pond providing high-frequency monitoring. This monitoring system takes part in a complex study conducted within the NETLAKE – COST action including also observation of phytoplankton, zooplankton and vegetation. Twenty one samples of twelve species of macrophytes were collected on three places near the stations with sensors in June 2015. Diatom diversity, species composition and ecological preferences were investigated using semi-quantitative evaluation (400 individuals were counted in each permanent slide) and multivariate statistical analyses. Altogether 126 diatom taxa were identified. Species composition is adequate to alkaline pH (about 8.5). Most abundant were representatives of genera *Fragilaria* (mainly *F. brevistriata*, *F. elliptica* and *F. leptostauron*), *Gomphonema* (mainly *G. parvulum*), *Navicula* (mainly *N. capitatoradiata*, *N. cryptocephala* and *N. trivialis*) and *Nitzschia* (mainly *N. archibaldii* and *N. palea*). Found were several species of the genus *Placoneis* (*P. anglica*, *clementis*, *clementioides*, *elginensis*, *minor*, *paraelginensis* and *placentula*). Surprisingly, some of the genera typical for epiphyton such as *Achnanthes* s.l., *Amphora*, *Cocconeis* or *Cymbella* were present only marginally (in low abundances) which shows developed succession of assemblages represented also by larger forms (such as *Surirella* spp.) having advantage in the „fight“ for light. Found were several interesting diatom taxa: *Diploneis parva*, *Gomphonema innocens*, *Navicula erifuga*, *Navicula lacuum* and *Stauroneis leguminopsis*. Samples also contained planktonic (e.g. *Aulacoseira granulata* and *Cyclotella balatonis*) and epipelagic (e.g. *Craticula* and *Gyrosigma*) taxa. There was found no significant difference between the samples. Most different were diatom assemblages from *Chara braunii* with low diversity (20 and 24 taxa per sample and almost total lack of the genus *Nitzschia*) probably caused by encrustation of its surface by travertine. Most diverse were diatom communities on *Elatine hydropiper* (42 to 46 taxa per samples) and *Zanichellia palustis* (33 to 37 taxa per sample).

P8 - Effect of climate change on aquatic ecosystems with special attention to diatoms

Modelling spring bloom dynamics between dinoflagellates and diatoms

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The objective of this study was to investigate the interactions of the two members of phytoplankton key groups, a diatom species, *Stephanodiscus minutulus* and a dinoflagellate species, *Palatinus apiculatus*. Both, diatom and dinoflagellate species can dominate the spring bloom. It is unclear under which conditions which group dominates. Based on insights of a mesocosm study, initial concentrations seem to be decisive while environmental conditions seem to play a rather minor role in spring season. In particular, the overall dominant species in spring can be linked to the abundances of the resting stages and the temperature in spring that relatively high abundances of diatoms in winter lead to a diatom-dominated spring bloom. High abundances of dinoflagellates in winter lead to a dinoflagellate-dominated year if the spring temperature slowly increasing favour a spring bloom of dinoflagellates before encystment begins. Otherwise, if temperature rapidly increases in spring diatoms become dominant despite high abundances of dinoflagellate cysts.

P15 - Diatoms in biomonitoring

Early spring bloom of centric diatoms in the Danube River (Hungary)

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The species composition and abundance of the phytoplankton was investigated weekly in the main arm of the Danube River above Budapest at Göd (1669 river km) between February and May in 2014 and 2015. Scanning electron microscopy investigations were accomplished focusing to centric diatom species. The species composition was studied in detail and the biomass was estimated, and it was correlated with the chemical and physical parameters to understand the phenomenon of spring bloom.

Very few of the previous studies were done specifically to investigate the phytoplankton composition in large rivers in winter and early spring. Usually in these

cold-water seasons the large rivers are characterised by low species number and biomass. It is a wrong idea, that small or few organisms are less important. Due to the global warming the winter and spring studies on various phytoplankton communities became more and more valuable. During our study the centric diatoms (*Cyclostephanos*, *Cyclotella*, *Stephanodiscus* spp.) represented the dominant group. These species were constituted almost 80% of the Danube' phytoplankton.

Our results were compared to earlier studies, because similar water blooms occurred already several times at the investigated section in the main arm of the Danube River during last decades. The phenomenon of late winter-early spring blooms were registered at the first time in a side-arm of the Danube at Göd and Soroksári-Duna. The ecological factors influencing this phenomenon are the followings: the sufficient amount of nutrients (N, P), the low water discharge, the low current of river and the high water transparency. The only limiting factors are the low water temperature and the short day length.

The literature data show the phytoplankton (especially the centric diatoms) can tolerate the relatively high current flow (1-1.5 ms⁻¹), the turbulence and the poor light conditions in the large rivers. *Cyclostephanos*, *Cyclotella* and *Stephanodiscus* species can adapt to these conditions; their photosynthesis is more efficient at low temperature than that of other algal species. The centric bloom start to develop in low water period when the current is low, the transparency is high and it drops during a flood. After the flood the biomass of centric diatoms increases again quickly.

P12 - Diatoms in biomonitoring

Biodiversity of benthic diatoms in the headwaters of the Volga River

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Within the research expedition "Upper Volga 2005" an assessment of hydrological, limnochemical and biological parameters was carried out in the uppermost stretch of the Volga River upstream of Tver, including the main river as well as its major tributaries. This assessment showed that the headwaters of the Volga River represent conditions which are either clean reference or least disturbed situations what stimulated the establishment of the monitoring programme "REFCOND_VOLGA", which is in operation since 2006 and includes free flowing stretches along the Volga River (Rzhev, Staritsa, Tver) as well as along the tributary Tudovka (see Schletterer et al. 2011, 2014).

The biological assessment included benthic diatoms sampled from both stony substrates and soft sediments. Within the first 20 samples we identified >200 diatom

taxa with the richest taxa complexes around *Navicula* spp. (26 species), followed by *Nitzschia* (22), *Fragilaria* (15) and *Achnanthes* (14). Within the most upstream areas several samples were especially species rich (up to 80 species) and comprised mostly benthic diatom taxa but also some planktonic centric forms (e.g. *Aulacoseira*). We will demonstrate them by LM figures identified on the basis of the recent taxonomic literature.

Diatom data will be related to environmental characteristics with the main objective to assess longitudinal changes in the diatom communities and diversity to describe the ecological condition of this large river system.

The authors would be glad for useful hints for identification of difficult taxa within the frame of this meeting.

P2 - Effect of climate change on aquatic ecosystems with special attention to diatoms Resilience to environmental disturbances: insights into driving forces shaping diatom diversity in ancient lakes Ohrid and Prespa

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Ancient lakes Ohrid and Prespa, two renowned “biodiversity hotspots”, hold an extraordinary diversity and endemism in various groups of organisms. Yet, the processes governing this unique biodiversity are poorly understood. With the aim to study, among others, the influence of major geological and environmental events on the evolution of endemic taxa, the scientific project “Scientific Collaboration on Past Speciation Conditions in Lake Ohrid” (SCOPSCO) was initiated. First results revealed that the lake experienced a number of environmental disturbances during its > 1.2 million year long history. These include long lasting disturbances (“press events”), such as glacial-interglacial cycles and Heinrich events, and sudden and short disturbances (“pulse events”), like landslides, earthquakes, and volcanic ash depositions. The latter include one of the most severe volcanic episodes during the Late Pleistocene; the eruption of the Campanian Ignimbrite (Y-5 tephra layer) from the Campi Flegrei caldera in Italy, dated at 39.6±0.1 thousand years ago. The event is recorded by the deposition of a ca. 15 cm thick tephra layer in the sediment cores of lakes Ohrid (DEEP-5045-1) and Prespa (Co1204). Coincidentally, this pulse event is superimposed by the Heinrich H4-press event, dated at 40.1–38.1 thousand years ago.

Here, we used the diatom community data as a proxy to compare the responses of these lakes to the Y-5 (pulse) and the H4 (press) disturbances. We tested potential irreversible regime shifts, and if those were rejected, the extent of potential recovery periods. Our results show little evidence that diatom community compositions in either lake significantly responded to the H4 event. However, the Y-5 influx caused clear and rapid diatom community changes in both lakes, but more importantly, without any evidence for extinction events. Moreover, the lakes returned to their pre-disturbance conditions, indicating that neither lake underwent a regime shift. The combined evidence from these findings suggests that lakes Ohrid and Prespa have a high resilience to environmental disturbances. Yet, the estimated recovery times indicate that Lake Ohrid is more resilient than Lake Prespa, ca. 1,100 years vs. ca. 4,000 years, which might be related to differences in their geology, limnology, and lake age. These findings provide new insights into the responses of ancient lakes to (multiple) environmental disturbances. We highlight how a highly resilient ecosystem may mitigate such disturbances, resulting in reduced extinction and consequently in the maintenance of its endemic biodiversity.

P32 - Taxonomy, floristics

A new chain-forming *Pinnularia* (section *Distantes*) from James Ross Island and Vega Island (Maritime Antarctic)

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Recently, a detailed survey of the Maritime Antarctic diatom using a fine-grained taxonomy resulted in the description of many new species belonging to the diatom genus *Pinnularia* in general and the section *Distantes*, including the *P. borealis* species complex, in particular (Van de Vijver & Zidarova 2011). Recent DNA-based studies of the *P. borealis* complex revealed that molecular phylogenies are highly useful for species discovery and delimitation, suggesting that many more species need to be discovered and described within this complex (Souffreau et al. 2013). During a survey of the freshwater littoral diatom flora of James Ross Island and Vega Island (Ulu Peninsula, Maritime Antarctic) an unknown chain-forming *Distantes* taxon belonging to the *P. borealis* species complex was observed. Several cultures of the new species were established from four different localities. Molecular phylogenies based on D1-D3 LSU rDNA and rbcL revealed that all cultures belong to a distinct highly supported

lineage in the *P. borealis* species complex. *Pinnularia catenaborealis* sp. nov. is morphologically characterized by the presence of small spines located on a raised, thin silica ridge that almost entirely surrounds the valve face near the valve face/mantle junction and the presence of small silica plates near the apices. In culture, *P. catenaborealis* forms chains of several tens of cells and in oxidized natural material, chains up to seven frustules have been observed. *Pinnularia catenaborealis* is described from the littoral zone of freshwater Black Lake in James Ross Island. Although *P. borealis* is generally regarded as a semi-terrestrial diatom complex which is mainly occurring in (moist) soils and mosses, *P. catenaborealis* seems confined to freshwater habitats with an alkaline pH and low conductivity values.

References

- Souffreau C., Vanormelingen P., Van de Vijver B., Isheva T., Verleyen E., Sabbe K. & Vyverman W. (2013) Molecular evidence for distinct Antarctic lineages in the cosmopolitan terrestrial diatoms *Pinnularia borealis* and *Hantzschia amphioxys*. *Protist* 164: 101–115.
- Van de Vijver B. & Zidarova R. (2011) Five new taxa in the genus *Pinnularia* sectio *Distantes* (Bacillariophyta) from Livingston Island (South Shetland Islands). *Phytotaxa* 24: 39–50.

P38 – Collections

Opening up diatom collections to the public via Europeana

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Europeana is the world's largest collection of Europe's cultural and scientific heritage. So far, more than 3,000 museums, libraries, and archives connected their digital collections to the platform in order to make, inter alia, digitized specimens and other collection objects globally available. Biodiversity primary data such as natural history specimens are part of our cultural heritage. The OpenUp! network (<http://open-up.eu/en>) was built up in 2011 to contribute natural history content to the Europeana data portal (<http://www.europeana.eu/portal>). Whereas science-orientated data networks like Global Biodiversity Information Facility (<http://www.gbif.org/>) and BioCASE (Biological Collection Access Service for Europe, <http://www.biocase.org>) give access to primary biodiversity data (such as specimen and occurrence data) occasionally complemented by multimedia files, Europeana focusses on multimedia content including its descriptive metadata. Europeana's audience is not restricted to scientists, Europeana offers data providers direct outreach to a wide variety of users interested in nature and culture.

Beside the scientific value of diatoms and their underrepresentation in Europeana, there are two main reasons why images of diatoms perfectly fit into the Europeana context. Diatom frustules including their fine structures are most beautiful, so they often served as models and inspiration for art work and handcraft. Diatom fine structures have even been used in bionic research to create light weight constructions in architecture, aircraft and car industry. For all kind of diatom research, publicly available diatom collections are key resources. After publishing printed collection catalogues for decades, diatom collections nowadays apply different strategies to disseminate specimen information. Data and multimedia items are increasingly being digitized and published on the Internet. In order to share this digital information as widely as possible with the scientific and a growing non-scientific community, collection holders are encouraged to connect diatom collection data via the BioCASE provider software to GBIF and via the OpenUp! aggregator to Europeana.

Using Europeana as a platform to promote diatom research, data providers will benefit from reaching new audiences and increasing web traffic to their institutional websites. In practice, it appears that Europeana partners gain better visibility towards research funding organizations and within society.

P24 - Diatoms in extreme habitats

New diatom species from extreme habitats of Macedonia

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Diatom flora of Macedonia is object of intensive research in the last few decades. There has been intensive study on diatoms on Lakes Ohrid and Prespa during the last 15 years and more than 100 new species have been described. However, during the last few years, special attention was paid on so called "extreme" habitats like mining lakes, saline soils, wet rocks, caves. Such habitats frequently are inhabited by species adapted to prolonged period of desiccation.

In this study six new species are presented: three from the genus *Luticola*, two *Mastogloia* and one *Stauroneis* species. All *Luticola* species have been observed in a single sample from saline wet soils in Central Macedonia. Two of the species have undulated margins and appear similar to *L. quinquenodis* and *L. nivalis*, while third species is characterized by capitate apices and convex margin in the mid-valve, and appear similar to *L. ventricosa* and *L. ventriconfusa*. Two species of *Muelleria* were

observed from temporal pond on Shara Mountain, Western Macedonia. The first species appears similar to *M. regigeorgiensis*, but differences can be observed in the structure of areola foramina. The second *Muelleria* species have comparable valve outline to *M. kristinae*, but it differs by the shape of central and axial area and stria density. *Stauroneis* sp. 1 belongs to the species complex around *S. smithii*. From the latter species it can be easily differentiated by the shape of the valve (rhombic-elliptical) and not pronounced undulations of the valve margin. This species was observed from dry mosses on Kozuf and Shara Mountains.

P7 - Effect of climate change on aquatic ecosystems with special attention to diatoms

An investigation on the distribution of diatom flora in Lake Hazar sediment (Diatom Paleolimnology)

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Sediment core samples (H002, H003, H005 and H006) recovered from the basin of Lake Hazar located in the South East Region of Turkey. Core samples were collected from the four sampling stations by UWITEC corer to determine diatom flora distribution in Lake Hazar. Diatom counts and identifications were made from the sediments sampled at 1-2 cm intervals. Total of 142 species of diatoms were recorded, most of them were pennate diatoms. *Ulnaria ulna*, *Nitzschia gracilis*, *Synedra nana*, and *Cyclotella ocellata* dominated the assemblage in the sampling points. Our objective was to investigate the environmental history of Lake Hazar, and to recover diatom microfossil profiles using paleolimnological techniques.

P6 - Effect of climate change on aquatic ecosystems with special attention to diatoms
Diatom evidences for holocene climate change in central Europe from lake Balaton, Hungary for assessing its reference state

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Climatic and environmental changes were studied using diatoms in Lake Balaton, the largest shallow lake of Central Europe. A 112 cm long core was obtained in 2006 from the Eastern basin of the Lake and high resolution diatom analyses were carried out together with loss-on-ignition and geochemical measurements. Previously Cladocera remains of the core were also studied. The core spans ca. 7400 years, according to the radiocarbon dating. In some layers the diatom preservation was poor; even some barren sections between 112-106 cm and 94-92 cm referred to the lowering of lake level. Altogether 150 taxa were distinguished; *Amphora pediculus* (KÜTZING) GRUNOW EX A.SCHMIDT, *Cocconeis neothumensis* KRAMMER, *Fragilaria brevistriata* GRUNOW IN VAN HEURCK and *Karayevia clevei* (GRUNOW) ROUND & BUKHTIYAROVA were frequent and permanent members of diatom assemblages. Lake level fluctuation is reconstructed on the basis of changes in the ratio of different life forms of diatoms. Fragilaroid taxa were dominant through the core in the shallow Lake Balaton, but high ratio of planktonic forms referred to the higher lake level than today. *Lindavia balatonis* (PANTOCSEK) T.NAKOV ET AL. and *Lindavia radiosa* (GRUNOW) DE TONI & FORTI were the dominant planktonic species between 82-56 cm. In these layers *Aulacoseira granulata* (EHRENBERG) SIMONSEN were also frequent, but it showed a peak between 56-52 cm. At 46-38 cm the planktonic *Pantocsekiella ocellata* (PANTOCSEK) KISS & ÁCS had higher abundance. This data indicated that Lake Balaton had a higher lake level between ca. 4400-6300 cal yr BP. The diatom-based reconstruction was in accord with geochemical and zoological records. The other interesting data was about *Belonastrum berolinensis* (LEMMERMANN) ROUND & MAIDANA with stable presence in the last 6000 years. Between 46-22 cm (ca. 3000-2000 cal yr BP) small celled (<10 µm) diatom taxa prevailed, referring decreasing lake level. *Sellaphora rotunda* (HUSTEDT) C.E.WETZEL, L.ECTOR, B.VAN DE VIJVER, P.COMPÈRE & D.G.MANN, *Sellaphora nigri* (DE NOTARIS) C.E.WETZEL & L.ECTOR IN WETZEL ET AL., *Navicula seminuloides* HUST. and *Sellaphora utermoehlii* (HUST) C.E. WETZEL & D.G. MANN IN WETZEL ET AL. have been so far identified from the assemblages. Comparing the type materials in the Hustedt collection in Bremerhaven, it was prevailed that these diverse diatom communities required a more detailed

study. One of the main aims of our study was to define the ecological reference state for Lake Balaton, which we considered at the 22-16 cm layers. The main objective of the Water Framework Directive (WFD) is to achieve good ecological status for surface waters in Europe. The ecological status has to be defined based on near-natural reference conditions which is hard in the case of Lake Balaton, because due to its unique features it is the only representative of this lake type in Hungary.

P33 - Taxonomy, floristics

A proposal for a new diatom genus *Clepsydra* gen. nov. (Bacillariophyta) based on *Amphora* subgenera *Amblyamphora* Cleve and *Psammamphora* Cleve

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It has been recognized for a long time that the diatom genus *Amphora* forms a heterogeneous consortium of taxa which are all characterized by the typical amphoroid valve and frustule shape but differ in many other respects such as plastid morphology, raphe and areolar structure. Both Cleve (1895) and Mereschkowsky (1903) proposed a (slightly different) division of the genus in different subgenera or types, but refrained from recognizing these at the genus level. To date, of these only *Halamphora* has been raised to genus level (Levkov 2009). Ongoing studies based on morphological and molecular data (Stepanek & Kociolek 2014, in review) confirm that the old genus *Amphora* is indeed polyphyletic and needs to be split. Here we argue for the establishment of a new genus *Clepsydra* to accommodate representatives belonging to Cleve's subgenera *Amblyamphora* and *Psammamphora*. The genus seems to comprise both marine and freshwater representatives. We will present a summary morphological and cytological description of the proposed genus, and provide molecular evidence for its phylogenetic position separate from other amphoroid clades.

P39 – Collections

The BCCM-DCG Diatom collection

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The BCCM/DCG collection forms part of the Belgian Coordinated Collections of Microorganisms and is hosted by the Laboratory for Protistology & Aquatic Ecology (PAE) from Ghent University (Belgium). The collection currently consists of 434 strains belonging to 43 species most of which are cryopreserved. All strains are living monoclonal cultures that can be grown in standard liquid culture media. The selection of strains for the culture collection is based on their ease of use for experimental manipulation. Knowledge of the life cycle is vital for the long-term maintenance of diatom cultures. Therefore, information on mating system, cardinal points in the life cycle and valve measurements is present for each of the strains, making the PAE diatom culture collection unique in its kind. The purpose of the culture collection is to make diatom and other microalgal strains available for both academic and industrial partners to conduct fundamental and applied research. As such, the strains/taxa are or have been intensively used in the PAE lab and elsewhere for diatom genomics research, cell and life cycle investigations, determination and comparison of (eco)physiological properties, studies of ecological interactions, and research on diatom population genetics, evolution and diversity. The collection accepts public deposits of diatoms which will be visible in the BCCM/DCG diatom catalogue. For more information, see <http://bccm.belspo.be/about-us/bccm-dcg>.

P13 - Diatoms in biomonitoring

Primary Study of the Non-Marine Epilithic Diatom Communities in Malta and Gozo

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Non-marine epilithic diatom communities of two major Maltese islands, Malta & Gozo, were investigated for the first time. Forty four samples were collected from eleven stations, from different springs and spring-fed streams distributed over the two islands. A total number of 51 taxa belonging to 23 genera were identified. The most represented genera were *Nitzschia*, *Amphora*, *Surirella*, *Luticola* & *Navicula*. The most represented species were *Gomphonema parvulum*, *Hantzschia amphioxioxy*, *Nitzschia palea* & *Amphora ovalis*. Most of the identified taxa show moderate to strong

association with pollution, and show potential for certain applications such as forensic science and environmental assessment. More studies will be carried out.

P22 - Molecular biology and diatoms

Re-orientation of the carbon metabolism in the diatom *Phaeodactylum tricornutum*: the impact of CO₂ supply

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Atmospheric carbon dioxide is expected to rise from current levels of ~ 400 μatm to 700-1000 μatm by the end of this century, beyond the levels of the past 800,000 years of glacial-interglacial periods. Additional CO₂ into seawater could perturb the physiological processes of marine phytoplankton, including growth, photosynthesis and metabolic re-allocations. In particular, diatoms are biogeochemically important because they contribute up to 40% of the marine primary production and show relatively high carbon sequestration. The goal of this study was to evaluate the impact of the CO₂ supply on the marine diatom *Phaeodactylum tricornutum* using a home-made turbidostat photobioreactor (V: 1.4 L, 300 $\mu\text{mol m}^{-2} \text{s}^{-1}$). Two different pCO₂ levels, 400 μatm (C-) and 1000 μatm (C+) were applied during a transition C+/C-/C+ of 60 days during which physiological (growth, photosynthesis, respiration, pigmentation) and molecular (RNAseq, qPCR) responses were followed. During the whole study, the culture was kept axenic. Growth rate was significantly higher in C+. The amount of Chl c was slightly increased in C+ without affecting the photosynthetic activity. Interestingly, the respiration activity was circa twice more active in C+. The reduction of the carbon availability created a stress that was slightly affecting the actual quantum yield of PSII while enhancing the mechanisms of thermal dissipation of the excess of energy (NPQ) through an activation of the xanthophyll cycle. RNAseq analyses indicate that 534 genes are up-regulated while 377 down-regulated in the C- condition compared to the C+ condition. Carbon acquisition is particularly reinforced in C- through the activation of the CO₂ concentration mechanism with 17 transcripts upregulated (among them carbonic anhydrase and HCO₃⁻ transporters) and the activation of photorespiration. Also several transcripts coding for proteins involved in cell cycle regulation and fatty acids biosynthesis were highlighted. The quantity of carbon accumulated in cells during the experiment seems to reflect a tendency to restore the initial equilibrium.

P19 - Diatoms in biomonitoring

Why is quality assurance in diatom analysis important? – Results of the 2nd German intercalibration exercise benthic diatoms

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Intercalibration exercises provide a considerable contribution to quality assurance in the implementation of the EU Water Framework Directive (WFD), as they verify the quality of assessment of the participating laboratories and additionally allow a validation of the applied procedure or method.

Building on the experience of the first German intercalibration exercise benthic diatoms in 2011/2012, a second exercise was conducted in 2014/15. The aim was to improve the assessment accuracy in applying the German implementation of EU WFD for running waters and lakes, the intercalibration of the taxonomy and a fundamental verification of diatom counting results.

Each participant received prepared slides from one running water sample and one lake sample from the North German Lowlands. Species identification and recording were carried out according to the German instruction protocol for implementing the EU WFD. The 40 participants and three auditors of this exercise came from a total of 15 countries and included freelancer, state technicians and scientists.

The results of the participants varied largely in terms of determination accuracy and identification depth. Both, the counting results and a two-day workshop, where the results were discussed, identified the following taxa as difficult to identify: Taxa of *Achnantheidium minutissimum* aggregate, *Encyonopsis minuta/subminuta*, *Cocconeis placentula*, *Nitzschia paleacea/palea* and *Cymbella vulgata*. Recommendations on how to facilitate these taxa identification and for improving the German instruction protocols (report 2016) allow a validation and possibly an improvement of the assessment system, which contributes to the quality assurance and quality control of diatom counting results in the implementation of the EU WFD.

P4 - Effect of climate change on aquatic ecosystems with special attention to diatoms **The Diatoms as the Indicators of the North Atlantic Paleoenvironment during the last 28 ky**

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The project is a part and continuation of the Atlantic Branch (the city of Kaliningrad) of the P.P.Shirshov Institute of Oceanology Research funded by Russian Fund for Basic Research (grant No. 15-35-50948-mol_nr).

The main goal of the project was to receive new data and document information about the ocean circulation changes; oceanic temperature variability and productivity in the North Atlantic during the last climatic cycles based on the diatom assemblages preserved in the deep marine sediments and correlate this data with modern oceanic patterns.

The investigated material consists of one high-resolution sediment core (360 cm long) which were recovered from the north-east part of the West European trough (Site AMK-4520). During the project the author performed quantitative and qualitative diatom analyses, the data was paired with existing datasets of planktonic foraminifera and isotope stratigraphy of the sediments.

Results from the study indicate a division of the last 28 ky into three periods with the different diatom assemblages' dominant species: the Last Glacial Maximum (LGM), Deglaciation with Bolling-Alered (B-A) and Holocene. LGM sediments mainly consist of *Actinocyclus curvatulus* Jan. + *Th. trifulta* G. Fryxell (up to 60%), *Th. anguste-lineata* (Grun.) Pr.-Lavr. (13%). B-A is characterized by the dominance of *Rh. styliformis* Bright. The Holocene dominated by *Chaetoceros* spp. (80%).

The project was supported by the Russian Fund for Basic Research (grant №15-35-50948 mol_nr).

P35 - Taxonomy, floristics

The Cymbelloid Diatoms of Yalova Streams

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Cymbelloid diatoms, especially *Cymbella* genus (41 species, approximately 5 %), is one of the highest number while *Reimeria* (2 species) is one of the lowest number diatoms in Turkish waters. Regarding to distribution of the species, *Cymbella lanceolata*, *C. tumida*, *Encyonema auerswaldii*, *E. minutum*, *E. prostratum*, *E. silesiacum*, *Encyonopsis*

microcephala and *Reimeria sinuata* are common species while, *Encyonema ventricosum* and *Reimeria uniseriata* are rare species for Turkish waters.

In this study, the samples were collected in August-2009 from 25 stations from different running waters (Kocadere, Korudere, Gökçedere, Samanlıdere, Safrandere, Havuzdere, Balkandere streams) in Yalova. As a result, 17 cymbelloid diatoms were totally identified in the sampling stations. Among the species, *Cymbella excisa*, *C. excisa* var. *procera*, *Encyonopsis minuta*, *E. subminuta* and *Reimeria fontinalis* were new records for Turkish freshwater diatom flora.

P9 - Diatoms in biomonitoring

Centric Diatoms from Different River Catchments in Turkey

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The diatoms are considered key organisms in ecological quality analyses of water courses and have been applied in Europe. Although Turkey has great potential of inland water, relatively is known about the flora. However, it is necessary to study the flora of Turkey as part of the biological monitoring requested by the European Water Framework Directive and also the investigation of the freshwater algal flora. According to the last checklist, altogether 44 centric diatoms have been found in lentic and lotic systems in Turkey. It means that 5 % of the identified species were centric diatoms. Regarding to the distribution in lakes and rivers, *Stephanodiscus hantzschii* are common in lakes while, *Aulacoseira granulata*, *Cyclotella meneghiniana*, *Lindavia radiosa*, *Melosira varians*, and *Pantocsekiella ocellata* are common both in lakes and rivers in Turkey.

This study includes some river catchments in Western (Marmara and Meriç-Ergene river catchment-1.33 billion m³ in Mamara region and Akarçay-0.49 billion m³, Küçük Menderes-1.19 billion m³, Gediz-1.95 billion m³, Susurluk-5.43 billion m³ and Sakarya-6.40 billion m³ in Aegean region) and Central Anatolia (Kızılırmak river catchment-6.48 billion m³ and Konya closed basin-4.52 billion m³). Among them, Akarçay and Gediz are some of the smallest and rarely investigated ones by diatoms in Turkey. The samples have been collecting since 2009 from different habitats (epilithic and epipellic) in Marmara, Aegean and Central Anatolia regions. As a results, 42 taxa were totally found and 16 of them were “new record” for freshwater diatom flora of Turkey. Regarding to the statistical analysis, Marmarean, Sakarya and Susurluk river catchments were compared by Principal Coordinates Analyses (PCoA) and there are significantly

differences between the regions (Marmarean and the others) even in the centric diatoms.

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P10 - Diatoms in biomonitoring

Water quality assessment of the Pazarsuyu Stream based on epilithic diatom communities

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Diatoms are one of the most commonly used organisms in water quality assessment studies. Trophic Diatom Index (TDI) and Biological Diatom Index (BDI) provide information about trophic levels of the aquatic ecosystem. Also pollution tolerance index (PTI) and saprobic index (S) determine the pollution by using diatoms to assess the health of aquatic ecosystems such as stream. Therefore, to assess water quality using Diatom Assemblage Index to BDI, TDI, PTI and S, the epilithic diatoms were monthly collected from four stations between June 2014 and May 2015 along Pazarsuyu Stream (Giresun, Turkey). A total of 36 taxa were identified belonging to division of Bacillariophyta. The reference site was affected by domestic waste that were dominated by saprophilous taxa such as *Synedra ulna* and *Encyonema minutum* abundant in waters with alkaline characteristics. The water quality of the site had BDI values ranging between 11-17.3 and TDI values between 37-65.8, both indices indicate mesotrophic environment. According to S indice value, however, the studied site was moderately polluted (β -mesosaprobity), PTI values showed that the site was heavily polluted (α -mesosaprobic) during the study period.

P1 - Effect of climate change on aquatic ecosystems with special attention to diatoms

Diatom-based reconstruction of paleoenvironmental conditions in Badaogou, Changbai Mountains, NE China (Neogene) - preliminary results

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The Neogene history of China was studied since almost a century; nevertheless, paleogeographic and paleoclimatic reconstructions still remain patchy because of the large extent of the country, which covers many vegetation and climatic zones. In this study we focus on the Changbai Mountains (Changbaishan, Jilin Province, NE China)

along the border to North Korea. The plant-bearing diatomite sequence of Badaogou belongs to one of fossiliferous localities known in basalt complexes. So far it was reported as at ~13.4 Ma (around the Middle Miocene) (see also Stachura-Suchoples & Jahn, 2009), however, according to the new Argon-Argon dating the deposition of the Badaogou diatomite took place in around 2.5 Ma, possibly spanning a time frame crossing the Plio–Pleistocene boundary (Kern et al. 2016).

During a field trip in 2013 samples for diatom analysis were collected along the Badaogou valley, near to Xidapo village. The diatom flora from Badaogou consisted of both extant and extinct species. Overall the species diversity was low, oscillating between 8-16 species. The most abundant were planktonic, freshwater species (96-98%), in particular *Stephanodiscus minutulus* (abundance above 80%) and *Pliocaenicus (Lindavia) changbaiensis* (abundance up to 18%). The non-planktonic diatoms reached from 2 to 4% only. Our preliminary diatom-based reconstruction from Badaogou indicated a freshwater system. The dominance of planktonic species indicated deep water basin. The waters were relatively nutrient rich with a suggested pH of ≥ 7 . Changes in abundance of *P. changbaiensis* along the sections might suggest respond to slightly changes of pH and/or nutrient conditions, which could be also climatically-driven factors.

Additionally, the paleoclimatic leaf- and pollen-based reconstructions suggested mean annual temperature 11.5–15.7°C, with coldest month mean temperature –0.3–9.6°C, and warmest month mean temperature 23.0–27.8°C. Suggested rainfall values a mean annual precipitation was of 843–1577 mm (see also Kern et al. 2016).

References:

Kern, A.K., Kovar-Eder, J., Stachura-Suchoples, K., Wang, W-M., Wang, P. 2016. Radiometric dating re-evaluating the paleoenvironment and paleoclimate around the Plio–Pleistocene boundary in NE China (Changbai Mountains). *Rev. Palaeobot. Palynol.*, 224: 134-145.

Stachura-Suchoples, K. & Jahn, R. 2009. Middle Miocene record of *Pliocaenicus changbaiensis* sp.nov. from Changbai (Jilian Province, China), *Acta Bot. Croat.*, 68: 211-220.

P11 - Diatoms in biomonitoring

Diatom composition in a eutrophic estuary of the Sea of Marmara

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Diatom composition was investigated along with physical and chemical factors at bi-weekly and weekly intervals during one year in a eutrophic estuary (Golden Horn) of the Sea of Marmara. Temperature and nutrient values increased from the lower to the upper estuary, while salinity, Secchi depth, DO and pH values decreased gradually. A

total of 66 diatom taxa (50 centrics and 16 pennates) were identified in all water and net samples taken from the study area. The most common species were *Chaetoceros affinis*, *Proboscia alata* and *Rhizosolenia hebetata* from centric diatoms; *Pseudonitzschia* sp. from pennate diatoms. Diatom composition showed temporal and spatial distribution in the study area. The abundance of diatoms increased from the lower to the upper estuary, but their contribution to the phytoplankton abundance decreased from 60% to 26%. On the other hand, the diatom diversity decreased considerably towards upper estuary, but their contribution to the phytoplankton was always over 50%. Diatom blooms occurred between May and August and the highest abundance reached 39×10^6 cells L⁻¹ in June during the bloom of *Skeletonema* cf. *marinoi*. Statistical tests showed that diatom abundance significantly correlated with temperature ($p < 0.001$) and silicate ($p < 0.05$). Moreover, there was a highly positive correlation ($p < 0.001$) between diatom diversity and salinity, Secchi depth, DO, while negative correlation with temperature ($p < 0.05$) and phosphate ($p < 0.001$). The results showed that low light availability and highly variable salinity may limit the distribution and diversity of diatoms.

P26 - Taxonomy, floristics

New fossil *Cyclotella* (Kützing) Brébisson species from Lake Ohrid, Macedonia/Albania

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Located in a north-west trending tectonic graben in southern Balkan, Lake Ohrid is the oldest existing lake in Europe. The geochemical data of core sequence recovered in the spring of 2013, indicate continuous existence of Lake Ohrid for about 2.0 Ma. The observation on samples from the 569 m long core DEEP 5045-1, revealed that diatoms were preserved throughout the uppermost 480 m of the sediment sequence. Due to the deep-water coring location (ca. 249 m), planktonic species are dominant, especially within the genus *Cyclotella* sensu lato. The ongoing work shows presence of at least nine different species complexes in the sequence, with major shifts of species occurring at several depths (430 m, 320 m, 230 m and 80 m blf). In this study we are presenting six of them.

Cyclotella sp. 1 is characterized by round to elliptical valves with large elliptical and tangentially undulated central area with 1–3 papillae on the elevated side. Central fultoportulae are absent. Internally, the marginal fultoportulae are located on slightly depressed costae, with short tube openings with two satellite pores surrounded by cowlings, while a single rimoportula is situated in the marginal area with a sessile labium. *Cyclotella* sp. 2 has elliptical valves with small elliptical and tangentially undulated central area bearing four papillae on the elevated side and two on the recessed side. The shape and the position of fultoportulae and rimoportula are similar to *Cyclotella* sp. 1. *Cyclotella* sp. 3 possess round valves with radially undulated central area, ornamented with 4–6 papillae and as much depressions which do not penetrate the valve interior. Internally, *Cyclotella* sp. 3 has similar morphological features as previous two species. The valves of *Cyclotella* sp. 4 are round with convex or concave central area, which is uneven and colliculate with papillae and granules. The central fultoportulae are present and variable in number (9–21), internally with short tube openings with two satellite pores. The rimoportula is located in the marginal area with a sessile labium variably orientated. Interestingly, *Cyclotella* sp. 5 is characterized by heterovalval frustules and round valves. One of the valve has flat central area, while the opposite valve has colliculate, slightly convex or concave central area. *Cyclotella* sp. 5 morphologically resembles *Cyclotella* sp. 4 mainly in the internal structure of the central and marginal fultoportulae and in the position of the rimoportula, but differs from the latter by the shape, size and ornamentation of the central area. *Cyclotella* sp. 6 possess unique set of morphological characters compared to the above mentioned species. The valves are round in shape, with flat, round central area. The central fultoportulae are present in small number (2-3). The ring of marginal fultoportulae is placed on the valve mantle above the costa. The stalked rimoportula is placed on the valve mantle, within the ring of marginal fultoportulae.

P16 - Diatoms in biomonitoring

Robustness of metrics used for the ecological status assessment of large rivers: a case study on River Danube (Hungary)

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According to EU WFD the phytobenthos is one of the most often used group of organisms for the ecological status assessment. There is a high require for the metrics chosen to the assessment to be stress specific and robust enough. It is also important to separate the reactions of the metrics to the anthropogenic impacts from the responses to environmental changes that are more or less independent from human activity. For the assessment of the ecological status of River Danube the Specific

Pollution Sensitivity Index (IPS) is the most often used metric. Our main goal was to investigate the robustness of this index. Furthermore, we tested if diatom ecological guilds might really be useful tools for ecological water assessment in the future as it can be read in some studies (e.g. Passy 2007, Rimet 2011, 2012). To separate human and natural impacts we tested metrics in three different type of study. First, we investigated the temporal changes of metrics calculated for benthic diatom samples taken at the same sampling site, from the same substrate type, in different physico-chemical and hydrological situation, every month (“temporary” study). Second, we studied the effect of different light and flow conditions on metrics of samples taken along a cross-section of River Danube in three years. Finally, both physico-chemical and hydrological circumstances were the same, there were some differences only in the physical properties of the substrate (“shell study”). According to our results only the motile and planktic guilds had significant connections with phosphate concentration. High profile taxa did not show considerable correlations either with nutrient concentration or with water discharge. However, the higher proportions the low profile guild reached the lower the values of the IPS index were. The motile guild was proved to be sensitive to the substrate type while the IPS index appeared to be less sensitive. The latter is important because the same substrate cannot be found along the whole stretch of such a large river as the Danube. Furthermore, the index is not so sensitive to changes in water depth and light intensity. That is considerable in a river with water level changing greatly and quickly when periphyton exist in different light conditions in shorter or longer periods. Our results show that it is doubtful that diatom ecological guilds may be really useful tools for assessing trophic levels of large rivers, but the IPS is robust enough to be able to a suitable index for the ecological water quality assessment in case of large rivers.

P20 - Diatoms in biomonitoring

Does new species concepts effects counting protocols and ecological assessments

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In recent years much has changed in diatom taxonomy. New species are described, species complexes are investigated and split in two or more separate species. These changes in the taxonomy have the effect that nowadays more species are found in a sample. One can presume that these changes in taxonomy has an effect on the ecological assessment of surfacewaters. For that different questions arise. In order to answer at least some of those questions we performed an experiment which is carried out at this moment.

Five diatom samples were selected from different sites and watertypes. The samples were taken and analysed 18 years ago in 1996 and 1997. These samples were reanalysed with the current taxonomical and ecological knowledge.

Two different counting protocols were used. The first protocol was the same as used in 1996-1997. The second protocol was a counting of 1000 valves. The number of valves was noted for each field of view in order to perform statistical processing. In this counting the observations of every separate field of view was noted. All sites were resampled in 2014. The sampling took place in the same period (September) and also the same plant material was collected. The counting protocols were the same as the ones used for the 1996-1997 samples.

From the counting of 1000 valves several countings of 200, 300, 400 and 500 valves were compiled for further statistical analysis in combination with various ecological parameters. This in order to answer questions such as: Is the current counting strategy still sufficient? Do rare diatom species have a greater impact on the ecological assessment than has been assumed today? Should the impact of rare species on the ecological assessment be valued differently?

In this poster presentation some of the preliminary conclusions will be presented.

P31 - Taxonomy, floristics

Interesting *Navicula* Bory de Saint-Vincent species from Serbia

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The genus *Navicula* was originally described in 1822 by Bory de St. Vincent. The concept of *Navicula* has changed from extremely heterogeneous collective genus to a narrowly defined, apparently homogeneous genus. The group *Navicula* sensu stricto involves 250-300 species and the great majority of them live in fresh, inland waters, and few inhabit brackish waters (Lange-Bertalot 2001).

Knowledge about diatom biodiversity increase as a result of a more detail morphometric analysis of the frustula by light (LM) and scanning electron microscopy (SEM).

Navicula splendicula was described by Van Landingham (1975). According to Lange-Bertalot (2001) it is known to inhabit southern and central Europe, with certainty. Distribution of *N. splendicula* from 2001 till today become wider, but in published papers SEM micrographs, as well as the dimensions of frustula, were not given and specified. LM and SEM observation of species from Serbia (Rasina and Mlava rivers) showed a variation from literature data regarding dimensions of frustula and variability of the ultrastructure of the central raphe ends.

The poster illustrates all differentiating characters with brief notes on the ecology of the *N. splendida* from two rivers in Serbia.

References:

Lange-Bertalot H. (2001). *Navicula* sensu stricto. 10 genera separated from *Navicula* sensu lato. Frustulia. In: Lange-Bertalot H. (ed.), Diatoms of Europe: diatoms of the European inland waters and comparable habitats. Vol. 2. Ruggell: A.R.G. GantnerVerlag. K.G., pp. 1-526.

P21 - Diatoms in biomonitoring

Land use control on terrestrial diatom communities: can indices based on aquatic diatoms be applied to soils?

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Aquatic diatoms are commonly employed in the assessment of water bodies' ecological status due to their well-known sensitivity to many environmental factors (i.e. eutrophication level, organic and inorganic pollution, pH and salinity). Water quality indices such as the IPS (Specific Pollution Sensitivity Index), the TDI (Trophic Diatom Index) and the BDI (Biological Diatom Index) are commonly used. For this reason, aquatic diatoms are widely studied and their ecology is well characterised. Studies on terrestrial diatoms are less common. Recent studies highlighted the difficulty in identifying which environmental factors can directly affect soil diatom communities' composition and species distribution. The main objective of this study is to provide additional information about the ecology of soil diatom species investigating the environmental controls on communities. Moreover, since soil diatom communities seem to be characterised by species belonging to different soil moisture categories, we investigate (1) if quality indices developed exclusively for aquatic diatom communities can be applied to soil communities and (2) if they can provide information about the quality status of terrestrial sites.

The present study was carried out at the Attert basin (outlet in Useldange, 245 km², Grand Duchy of Luxembourg). Diatom samples were collected at the soil surface in 34 locations during three sampling campaigns (August 2014, November 2014 and March 2015). Sampling points were chosen in order to optimize the relative representation of geology, soil type (schist, marl and sandstone) and land use (forest, grassland and agriculture) that are characteristic for this basin. Soil samples were collected during all three campaigns at the same locations and analysed for electrical conductivity, pH,

carbon, nitrogen and hydrogen content. Precipitation, air and soil temperature, global radiation and air humidity were obtained from local meteorological stations.

Land use, soil pH and electrical conductivity have been identified as the main environmental factors influencing the variability of soil diatom communities. The same factors define the quality status of the sampling sites with better IPS index values for samples from forested areas with low pH and poorest IPS values for samples from agricultural and pasture areas. Preliminary results also show a modulatory effect of seasonality on the soil communities, translated into different species dominance and abundances in samples during the three seasons. Overall, this study demonstrated that soil diatom communities are directly influenced by land use and soil characteristics and are likely to contain information about soil quality translated into distinct diatom indices values. Further research currently focuses at differences and variability of distinct farming practices and the development of a soil quality index based on diatom communities.

P27 - Taxonomy, floristics

A rare register of a well-known diatom name: *Fragilaria capucina* Desmazières

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Fragilaria capucina Desmazières is one of the most common diatom names found in modern and ancient diatom literature. A non-exhaustive search using internet engines promptly shows us a profusion of citations all over the world. It is widely used (included its varieties) along with other “popular” species such as *Achnantheidium minutissimum* Kützing, *Gomphonema parvulum* Kützing and *Nitzschia palea* W. Smith. However most of these records are based on Desmazières’s drifted concepts from what he originally described from France in 1830.

The *Fragilaria capucina/pectinalis/rumpens/vaucheriae* species complex was recently revised by A. Tuji and D.M. Williams based on the exsiccata n° 453 of “Plantes Cryptogames du Nord de la France”. Based on the publication of Tuji & Williams (2006) we could finally observe a population of *Fragilaria capucina* after years of intensive search for it in European rivers without success. The population found in the locality of Helfent (Luxembourg) present the same morphological descriptors as the one provided for the lectotype: i.e. valves with striae not opposite each other relative to the sternum, linking spines, open girdle bands including the ‘atypical’ presence of a rimoportula at each apex, which was not part of the revised definition of this genus. The valves are linear, with a rectangular to rhombic central area and weakly rostrate valve apices. The valves have linking spines and form ribbon like colonies.

P28 - Taxonomy, floristics

A new widespread and abundant stalk-forming Neotropical *Eunotia* from the Rio Negro basin (Amazon) and critical revision of life-forms in the genus

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A new stalk-forming diatom was observed with high relative abundances on periphytic samples collected in the Rio Negro basin (Brazilian Amazon), and is here characterized morphologically and ecologically. The dominant stalk-forming species during the flooding seasons of 2013 and 2014. The species has been found close to the city of Manaus (Brazil) in oligotrophic and pristine ecosystems as well as in anthropogenic impacted areas with heavy loads of organic pollution. In a set of 96 periphytic samples the species occurred in all of them, reaching up to 88% of relative abundance. The species was in general sub-dominant along with *Eunotia intricans* Metzeltin & Lange-Bertalot and *Eunotia rabenhorstiana* (Grunow) Hustedt on all sampling sites. Based on physico-chemical characteristics of water measured at the sampling stations we can define a species as having preferences for oligotrophic acid environments with low electrolyte contents. Lowest mean relative abundance values were obtained where the highest conductivity was found and a strong degree of organic pollution detected, as observed using the IPS index. The most similar species found in the literature is *Eunotia souzae* Metzeltin & Lange-Bertalot which is narrower and have lower striae density. Another important observation is that in *E. souzae* large and small specimens have narrower 'set off' apices. We could not find in the literature species with overall similarity that could point to conspecificity with this new Neotropical *Eunotia*. Furthermore, the most striking feature of the new species is the ability to form long stalks (cymbello-gomphonemoid). The genus *Eunotia* is usually mentioned to be found as "mobile", "fixed by pads" or yet "without structures of fixation" (i.e. colonial and mobile). Current classification concerning the diatom life-forms of European *Eunotia* species (33) classifies them as having the same way of life, i.e. mobile (colonial) species. Strong conclusions in the literature like "biological traits could be used instead species-based diatom bioassessment" or "traits could be used for monitoring changes in streams produced by afforestation" should be taken more carefully. Generic assumptions based in robust statistically methods may simply distort reality. This is even more serious when working in regions outside Europe where the observance of diatom live materials is much less established and known. Rather than claiming the replacement of the diatom identification to some sort of biological traits as a biological tool for water quality assessment (in Europe or abroad), one must first observe which

biological traits are available and adequate to the region to avoid the misuse of such classifications. As demonstrated, this classification cannot be applied in the Rio Negro basin, and must probably be avoided in the Amazonian region.

P29 - Taxonomy, floristics

Type analysis of *Achnantheidium macrocephalum* Hustedt and description of two new small capitated *Achnantheidium* species from Europe the Himalaya

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Two new benthic diatom species belonging to the genus *Achnantheidium* Kützing found in French and Nepalese freshwater habitats are described and compared to the type material of *Achnantheidium macrocephalum* Hustedt. The species are very similar in size and valve outline, but differ from each other in some ultrastructural aspects such as terminal raphe endings and areolae pattern. Both new species are described using light and scanning electron microscopy observations. *Achnantheidium* sp. 1 (from the Himalaya) belong to the group of species with clearly hooked terminal raphe endings while *Achnantheidium* sp. 2 (from Bourgogne, France) has variable terminal raphe endings which are straight to slightly bent. Despite widely mentioned in the literature, *A. macrocephalum* has never been illustrated outside its type locality (Java, Indonesia). Data on the ecology and distribution of the three species are also presented.

P30 - Taxonomy, floristics

Type analysis of Neotropical *Cosmioneis* species

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Cosmioneis D.G. Mann & Stickle in Round et al. is a small genus commonly found in coastal waters, but also in alkaline and aerophilic environments worldwide. Currently, fourteen taxa have been ascribed to the genus that includes in its majority species from Holarctic region. From South America very few are the records of *Cosmioneis* species, mainly due to the fact that they are still recognized in the scientific literature as *Navicula* sensu lato. *Cymbella brasiliiana* Cleve was described in the late 19th century from Brazil and since then few records in the literature have been found, already as *Navicula brasiliiana* (Cleve) Cleve. Despite being barely mentioned in the

modern literature, two varieties described by Frenguelli (var. *platensis*) and Manguin in Bourrelly & Manguin (var. *guadalupensis*) are more often found in works related to fossil or saline environments in Neotropical and Paleotropical regions. In this paper we analyse the type materials of J.Frenguelli and E.Manguin using light and scanning electron microscopy and propose the transfer of these varieties into the genus *Cosmioneis*. A thorough search in the literature also highlights the presence of this species-complex in the African continent, although no photographic registers allows us to confirm these records. A map of distribution of the taxa is as also provided.

P23 - Diatoms in extreme habitats

Diatoms, chrysophyte stomatocysts and rotifers in mosses of King George Island (Southern Shetlands, Antarctica)

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Microorganisms play a crucial role in the terrestrial ecosystems of the Maritime Antarctica. Grasses and mosses affect and modify the soil, which they overgrown, in many ways. Aquatic environments of this area were in the focus of the vast majority of algae and invertebrate studies.

In this study soil samples overgrown by grass *Deschampsia antarctica* (locality 1), *D. antarctica* and moss *Sanionia uncinata* (locality 2) and moss *Warnstorfia laculosa* (locality 3) and samples of these plants were considered. The structure of communities of diatoms (Bacillariophyta), chrysophytes (Chrysophyceae sensu lato) and rotifers (Rotatoria) in soil habitat and in neighboring layers of plants were compared. In the soil of locality 1 with the lowest total nitrogen content and the highest (5.0) pH value, accompanied by the highest Zn and Pb ion concentrations only few individuals of one rotifer species *Macrotrachela insolita* were observed. At this locality the highest diatom diversity (25 species) was recorded. The most abundant was *Staurosira pottiezii*. Contrastingly, in the plant cover (*D. antarctica*) only 15 diatom species and few individuals of rotifer *Keratella cochlearis* were found.

In the material collected from plant layer overgrown by *D. antarctica* (50%) and *S. uncinata* (50%) four rotifer species and ten diatom ones were observed. *Eunotia pseudopaludosa* dominated (49%) here, but was rare (less than 1%) in soil. The most abundant in the soil was *Staurosira pottiezii*, the diatom known from alkaline waters. In the soil of locality 3 overgrown by moss *W. laculosa* the highest concentrations of total carbon, total nitrogen and Cu ions and the lowest (4.0) pH value were noted. The

most abundant diatoms in soil were *Eunotia pseudopaludosa* and *Pinnularia subantarctica* var. *elongata*. The last one is common in habitats rich in biogenes, especially in ornitogenic soils. The highest diversity of the chrysophyte stomatocysts, including one stomatocyst new for science and four rotifer species were observed here. In the mosses overgrowing the soil at this locality seven rotifer species were recorded, which were very abundant here. The most numerous among diatoms were *Staurosira pottiezii* and *Navicula gregaria*. The last one is an eutrphentic diatom, common also in the terrestrial mosses. It is worth mentioning that *N. gregaria* was very rare in the soil beneath the moss cover.

P36 - Taxonomy, floristics

Diversity and biogeography of taxa in the genus *Stauroneis* Ehrenberg (Bacillariophyta) in glacial lakes in R. Macedonia

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Glacial lakes are characterized with high diversity of diatoms. The number of observed taxa in these lakes often reaches more than 200 species. As most diverse genus in these habitats is *Stauroneis* Ehrenberg. According to the present data, more than 50 taxa are known for the territory of R. Macedonia. During field campaigns organized by the Biology students' research society (BSRS) in the period between 1995 and 2011, a large number of samples have been collected from different localities, including and glacial lakes. Preliminary investigations have been performed on samples from Large and Small Salakovo Lake on Jakupica Mountain, Dobsuski, Karanikolicki Lakes, Crno, Krivoshijsko, Belo, Vracanski, Dedelbeshko Lake on Shara Mountain, Vevcansko, Podgorecko and Labunishki Lakes on Mt. Jablanica and Large and Small Pelister Lakes on Mt. Baba. During the investigation more than 30 *Stauroneis* taxa have been identified. Highest diversity has been observed in Podgorecko, Crno and Selakovi Lakes. Most of the observed taxa are found in benthic communities, on organic or inorganic substrate.

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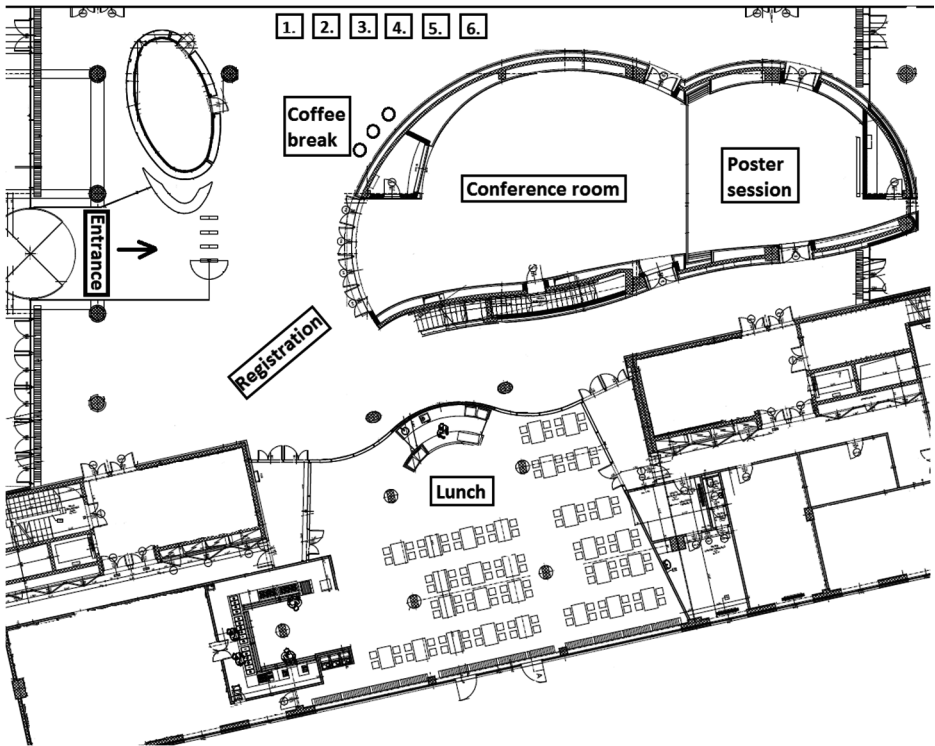
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