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Elbe Estuary - Germany
Photo: Ken Schoutens

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With thanks to all contributors.

Instructions to Authors

The ECSA Bulletin is issued in JANUARY and JULY. Articles, reviews, notices of forthcoming meetings, news of personal and joint research projects, etc. are invited and should be sent to the Editor. Closing dates for submission of copy (news, articles, notices, reports, etc.) for the relevant numbers are 15 November and 15 May. These dates will be strictly adhered to in order to expedite publication. Articles must be submitted at least 5 weeks before these dates in order to be edited and revised in time for the next issue of the Bulletin; otherwise they may appear in a subsequent issue. Authors are encouraged to consult an earlier issue of the Bulletin and adhere to the style of the publication.

Suggested word limits are as follows: obituaries (1500 words); articles (3000/4000 words); reports on meetings (2000 words); reports on ECSA grants (1000 words); reviews (1500 words); letters to the Editor (500 words); abstracts (500 words). Authors are requested to submit their work electronically as Word for Windows documents (no other software is to be used). Figures and photographs must be sent as separate copies in JPEG format. Articles in the series “Estuaries in Focus” should present current and planned research on a specific site which will be introduced by text and photographs. The suggested format for these articles is as follows: (1) Site characteristics, (2) current research, (3) future developments. Papers for “Introducing institutions” should be fully illustrated with (as a minimum) a photograph of the building and people at work in the field and in the lab. They should emphasise the expertise of the organisation and give full details with address, telephone number, e-mail, website, etc.

All papers and correspondence to:

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VIEW
FROM THE CHAIR

January 2018

This is my last 'view from the chair' and in April 2018, I'll be handing over the gauntlet to Professor Axel Miller, a marine biogeochemist and until recently, acting director of the Scottish Association for Marine Science. The last three years have seen some very significant changes in the way that ECSA interacts with its members and the wider global estuarine and coastal community. After many years of providing a hard copy Bulletin which we posted around the world we have gone electronic and accompanied this with a serious upgrade to our website. Thanks go to Ross Brown and other council members for getting this off the ground and we apologize for any teething problems. This has meant that we can re-direct more of your membership fees to supporting and nurturing our early career members. We've provided help to cover travel and registration costs for more than 20 student members to attend ECSA55 in London and ECSA56 in Bremen. In addition, through the Charles Boyden Award, we provided funds to 24 PhD students and early career scientists to support fieldwork critical to their research in locations ranging from Vietnam to British Columbia, to support laboratory visits to e.g., the Netherlands and Singapore for specialist training and networking, and to support conference attendance beyond ECSA. Throughout this time, ECSA has also extended its global reach with focused, specialist and/or co-sponsored meetings in France, Belgium, Latvia and China, international symposia in London, Bremen and Perth (September 2018) and we have launched our international Ambassador initiative welcoming Dr Salom Gnana Thanga Vincent from the University of Kerala, India earlier this year – if you are interested in becoming an ambassador and promoting ECSA please contact us. We've also launched our first photography competition and we're looking forward to announcing the winner (yes, there's a prize!) over the coming weeks. We've also show-cased excellent research from our early career members and you can read about award-winning work from ECSA members Dr Peter Mueller, Dr Rebecca Morris and Dr Jonathan Dale in this issue.

I've thoroughly enjoyed my time as President, and hope to continue working alongside ECSA council colleagues for the next few years and supporting our new president.

Kate Spencer
Queen Mary University of London

HOW IMPORTANT ARE BACTERIA FOR SUBTROPICAL ESTUARIES?

Morgana Tagliarolo

Post-doctoral fellow
- School of life sciences, University of KwaZulu-Natal, South Africa
- South African Institute for Aquatic Biodiversity, Grahamstown, South Africa

Supervisors: Ursula Scharler and Francesca Porri

Heterotrophic bacteria are ubiquitous and abundant in marine and estuarine systems (Robinson 2008). They contribute significantly to the food web and biogeochemical cycles and can even exceed phytoplankton production (del Giorgio et al. 1997). Not only do bacteria constitute an important source of food for the higher tropic levels, but they also support and promote primary producers by remineralizing organic matter (Schapira et al. 2009).
Despite the contribution of bacteria for the ecosystem functioning being widely recognized, very few studies focused on the quantification of the respiratory rates of estuarine bacterial communities. Bacterial respiration has been considered as the biggest gap in carbon cycling studies and most aquatic carbon models only employed indirect estimations that can differ by almost nine fold from the measured one (del Giorgio et al. 1997; Alonso-Sáez et al. 2008).

Fig. 1 - Mdloti Estuary

My post-doctoral research project focuses on the quantification of carbon budgets for South African subtropical estuaries. Laboratory and in-situ experiments have been performed in order to quantify the respiration and primary production rates of the different estuarine taxa. Results will constitute a fundamental part for performing ecosystem network analysis and quantifying the contribution of the different communities to the global carbon fluxes.

In order to account for the extreme variability in estuarine areas, two estuaries with contrasting characteristics were chosen; the temporarily open/closed Mdloti Estuary (Fig.1), which is subjected to strong anthropic pressure and the permanently open Mlalazi Estuary (Fig.2), located in a natural reserve.

Fig. 2 - Mlalazi Estuary

Fig.3 - PreSens Sensor Dish setting with 4ml incubation chambers immersed in a water bath to control temperature (credits Seshnee Reddy).

Thanks to the ECSA small grant, I was able to develop a collaboration between two research institutes and perform four sets of experiments on bacterial respiration and bacteria abundances by using up to date equipment. The quantification of respiratory oxygen fluxes were performed with high-precision optical oxygen sensors provided by the Aquatic Ecophysiology Research Platform (AERP) at the South African Institute for Biodiversity (SAIAB), Grahamstown. After the respirometer experiments, the samples were analysed at the University of KwaZulu-Natal where an epifluorescence microscope is available.

Water samples were collected at the mouth and upstream sites in both Mlalazi and Mdloti estuaries. Respiration rates were measured over 10h in both filtered and unfiltered water in order to estimate the contribution of bacteria to the respiration rates of the entire planktonic community. The PreSens Sensor Dish Reader allowed a continuous monitoring system of oxygen in small volume containers (Fig. 3).

At the end of the respirometer experiments, the samples were analysed on an epifluorescence microscope for the determination of bacterial abundance and biomass. Cells were stained by employing a DNA fluorochrome (DAPI) and pictures were analysed for bacterial size and numbers (Fig. 4). Cell volume was estimated from cell sizes and the biomass was calculated

Results showed that on average, the bacterial community contributed to 57% of the overall planktonic respiration, but in Mdloti, bacteria could account for up to 100% the total fluxes. This fist estimation of bacterial respiration fluxes suggests that the bacterial community represent an important component for the functioning of the estuarine ecosystem.
The results obtained from these experiments will now be integrated into a food web model to better understand the role of those communities for the functioning of estuarine carbon cycles.

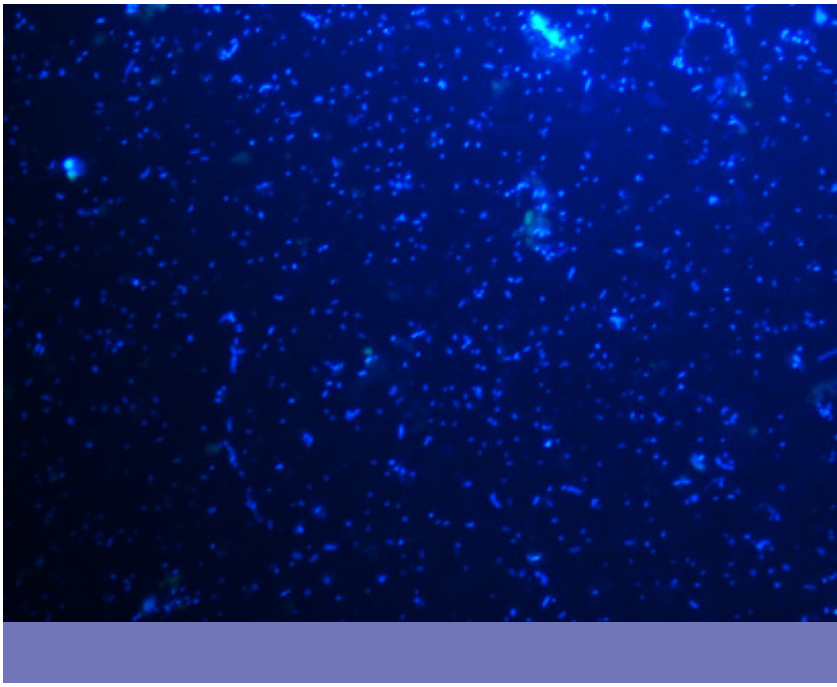
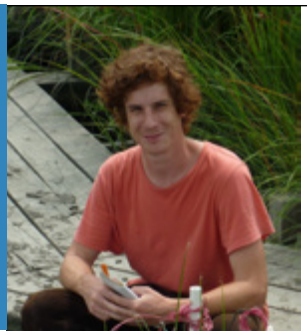


Fig. 4 - Example of the image obtained with the epifluorescence microscope after staining the bacterial cells with DAPI



PLANTS MEDIATE SOIL ORGANIC MATTER DECOMPOSITION IN RESPONSE TO SEA LEVEL RISE

Peter Mueller

is a post-doc researcher at the University of Hamburg

In 2012, after finishing my undergraduate studies at my current home institution, University of Hamburg, Germany, I decided to gain some more real work experience and went for a research internship to the Smithsonian Environmental Research Center Center (SERC) in Maryland, US. My project in the biogeochemistry lab wasn't planned to run much longer than a few weeks. However, methodological issues and interesting, yet hardly interpretable patterns in the first data set forced me to return to SERC in 2013 and the whole thing became my master-thesis project. Eventually, together with my current PhD advisor, Kai Jensen, and my advisor at SERC, Pat Megonigal, I had the whole story worked up and accepted for publication in 2015.

The study was conducted to assess the impact of accelerated sea-level rise (SLR) on the decomposition of soil organic matter (SOM) in tidal wetlands. Tidal wetlands such as mangroves and salt marshes are increasingly recognized as important long-term carbon sinks, sequestering organic matter and thus carbon dioxide at rates exceeding those of most other ecosystem types. The organic carbon sequestered in these ecosystems has been termed blue carbon. Knowledge on the plant and microbial processes that create blue carbon stocks and dynamics has important implications for management policies and may ultimately help to protect these ecosystems. Furthermore, organic matter sequestration is a primary

How does marsh SOM respond to accelerating sea level rise? – a particularly relevant question for many coastal and estuarine marshes worldwide, such as this Spartina alterniflora marsh on Hog Island (Virginia, USA) during a high spring tide.

Photo by Stijn Temmerman

Core of organic-rich marsh soil, Blackwater marshes, Chesapeake bay (Maryland, USA)

Photo by Stijn Temmerman

process by which tidal wetlands gain elevation over time, decreasing their vulnerability to accelerated SLR.

Accelerated SLR is expected to alter the accumulation and cycling of SOM in tidal wetlands, with important consequences for tidal wetland stability and ecosystem services such as carbon sequestration. Plant production and microbial decomposition are the two most important factors that control the accumulation of SOM in tidal wetlands, a process that stabilizes wetlands against accelerated rates of SLR and contributes to high rates of blue carbon sequestration by coastal marine ecosystems. State-of-the-art models successfully forecast century-scale changes in plant growth, but we understand far less about the effects of accelerated SLR on microbial decomposition of SOM. As a consequence, several widely used tidal wetland elevation models treat SOM decomposition differently and none incorporate feedbacks between SLR and decomposition rates.

In this study, I quantified the effects of flooding depth and duration on SOM decomposition by exposing planted and unplanted field-based mesocosms to experimentally manipulated sea level. A major reason for the lack of knowledge on SLR effects on microbial decomposition is that measuring decomposition in the presence of plants is extremely difficult. I quantified SOM decomposition as CO2 and CH4 efflux.

A key innovation I used was to separate the CO2 plant respiration of photosynthate and microbial respiration of SOM using carbon stable isotopes via δ13CO2. Despite the dominant paradigm that SOM decomposition rates are inversely related to flooding (i.e. they should decline with SLR), SOM decomposition in the absence of plants did not change with flooding depth and duration. The presence of plants had a dramatic effect on SOM decomposition, increasing SOM-derived CO2 flux by >100% compared to unplanted controls in both seasons. Furthermore, SOM decomposition was strongly and positively related to plant biomass, suggesting that plants are controlling the rates of this important microbial process. Finally, because a limited amount of increased flooding can stimulate wetland plant growth, my data suggest that accelerated SLR may actually increase (rather than decrease) SOM decomposition. I concluded that SOM decomposition rates are not directly controlled by relative sea level and its effect on oxygen diffusion through soil, but indirectly by plant responses to relative sea level. If this result applies more generally to tidal wetlands, it has important implications for models of SOM accumulation and surface elevation change in response to accelerated SLR, and thus will help forecast the vulnerability and carbon-sequestration capacity of these ecosystems.

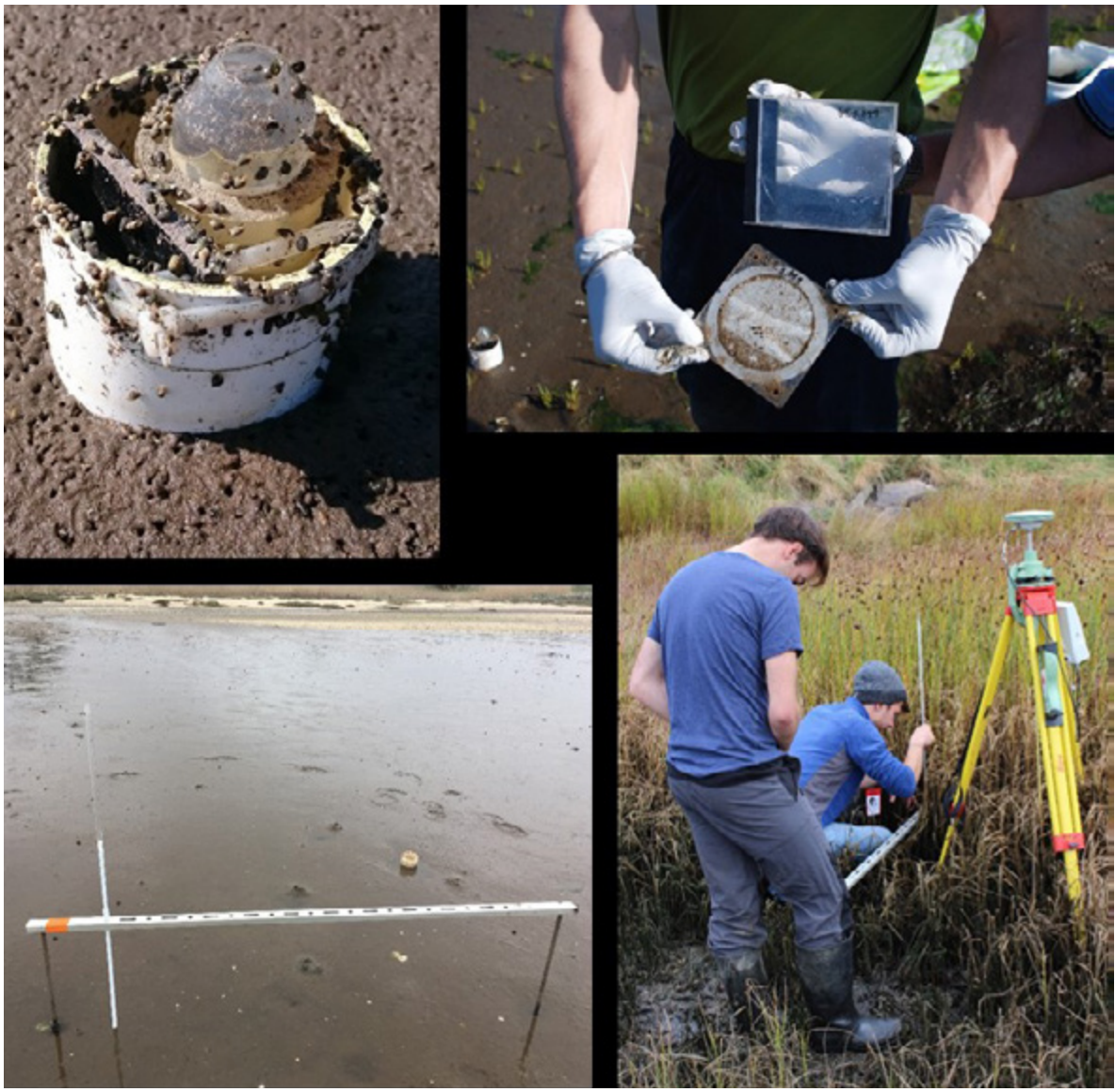
ATTENDING THE EUROPEAN GEOSCIENCE UNION GENERAL ASSEMBLY 2017

Ben Taylor

is a PhD student at the Sediment Ecology Research Group of the University of St. Andrews

April for the past two years has been EGU for me (the European Geoscience Union General Assembly). This brings together a whole host of scientists from all over the world to discuss current research in fields ranging from space soils to coastal dynamics to deep ocean processes. This is one of the 'big' geoscience meetings on the calendar and the sheer size of it is daunting; at last count over 14,000 attendees, all engaged in animated discussion of various science. The scale of the meeting can make it difficult to figure out just how exactly you and your research fit within the mass of science taking place. This was especially so at EGU 2016 being my first international conference and not knowing anyone attending. This year, however, I knew what to expect; the size was less daunting and, helpfully, I knew various people who would be going (and some I knew but didn't know where going to be there).
I attended the conference to present my research, further my academic network and engage with the current work being done in the field of geoscience. My PhD project investigates the potential impact saltmarsh restoration has on carbon storage in estuaries and if this (potentially) enhanced service could provide subsidisation for conservation. I gave a talk in a session titled 'Biogeochemistry of coastal seas and continental shelves' of the Biogeosciences group. I presented part of my research into how sediment dynamics differ within an estuarine environment; comparing natural saltmarsh, restored saltmarsh and mudflats. The study illustrated how deposition is lower in highly vegetated areas but the retention of the material is significant and importantly high in carbon content; aiming to highlight the beneficial influence of restoration on sedimentary carbon storage. This platform facilitated discussion with various researchers and has led to the finalisation of some field research that had been discussed at a previous meeting in the Scottish Highlands a few months previous.

My initial small network of colleagues I already knew quickly led to various other contacts being made. This led to conversations being had that wouldn't necessarily have taken place, resulting in potential collaborations being planned and connections made that will prove helpful for various sample processing in the future. The EGU General Assembly 2017 proved to be much more enjoyable and beneficial than my previous experience. I increased my academic network effectively and have gained, hopefully, important contacts whom could help in my coming planned research. I also, again hopefully, felt I increased the 'impact' of my research, a vital feature heading into the final year of my PhD. Furthermore, and importantly so, I re-connected with early career scientist colleagues from various universities; cementing friendships that will be highly valuable in the future.



Examples of the field research being carried out, the data from wich I presented at EGU 2017. Clockwise from top left: A sediment trap invaded by Hydrobia sp, post exposure; Sediment deposition trap post exposure with 'high-tech' transport case; Measuring changes in elevation using installed Sediment Elevation Tables and obtaining high-accuracy positioning for the sample point; Sediment Elevation Table of a point on the mudflat and sediment settlement trap support tube beside it.

REPORT ON THE 46TH ANNUAL BENTHIC ECOLOGY MEETING

WITH DETAILS ABOUT MY PRESENTATIONS

ECSA funding allowed me to present some of my PhD research on ecological engineering of coastal infrastructure at the 46th Annual Benthic Ecology Meeting in Myrtle Beach, South Carolina, USA this past April. This conference was an information-packed 4 days covering topics under the theme, "Sustainable oceans in theory and practice." This year, topics ranged from living shorelines using oysters and cordgrass to chemical ecology of corals and sponges. It was exciting to see how my research fit in with others', and it was especially encouraging to exchange ideas with like-minded folks from across the globe over coffee.

My oral presentation was titled: "Eco-engineering of coastal infrastructure: a design for life," and focused on my PhD research to date in Plymouth Sound. I presented in the "Habitat Sustainability and Restoration" session, which I also chaired. The position as session chair allowed me to meet and welcome speakers to the stage, and ask questions after they spoke. After my talk, I generated much interest in the topic of eco-engineering both during the Q&A session and throughout the remainder of the meeting. I have strong ties with universities in the Carolinas, and it showed when I saw many familiar faces from my past at my presentation (which was quite reassuring!)

I was also invited to present a poster, titled: "Ecosystem restoration along the Grand Strand, South Carolina: the Coastal Oyster Recycling and Restoration Initiative (CORRI)," which summed up much of the work I did with oyster reef restoration techniques in South Carolina. Many of the folks I worked with on this project were present at the conference – including the conference organiser – and it was lovely to catch up with them over a glass of wine at the poster session.

I completed my master's degree in Myrtle Beach, SC, and thus have many professional and personal contacts in the area. Coming back to the area was beneficial to my career, as I was able to inform old colleagues about my current research and learn about their recent endeavours. I walked away from the conference knowing that I contributed knowledge, and maintained and formed links across the ocean.

I would not have been able to attend the Benthic Ecology Meeting if it were not for the funding generously provided by the Estuarine and Coastal Sciences Association. I want to say a very sincere "thank you" to the folks at the ECSA!

Kathryn O'Shaughnessy

is a teaching and support assistent at the School of Geography, Earth and Environmental Sciences of the Plymouth University

Photo cred: Louise Firth

Photo cred: Madeline Gillis

K O'Shaughnessy oral presentation about eco-engineering and the World Harbour Project in Plymouth Sound at the Benthic Ecology Meeting. Presented in the "Habitat, Sustainability and Restoration" session.

Katie & the Plymouth/World Harbour Project crew at the 46th Annual Benthic Ecology Meeting banquet in the US this April.

My nomination for the best presentation at the 46th annual Benthic Ecology Meeting may be slightly biased because, (1) it was of great interest to me, and (2) the presenter is a current member of the lab I used to work in at the Center for Marine Sciences at the University of North Carolina Wilmington, USA. The oral presentation, "Seasonal recruitment of epibenthic organisms on the hard bottom at Five Mile Ledge in Onslow Bay, North Carolina," by master's student Melissa LeCroce particularly interested me because it touched on an area in which I used to frequently SCUBA dive. Melissa presented 2 years of disturbance data for the spring, summer and fall from rocky outcrops on hard bottom reefs off the coast of North Carolina. She found that for most of the year, natural relationships of succession existed between algae and invertebrate grazers. This has always been a topic of interest to divers and scientists in the area because seasonal hurricanes tend to destroy patches of hard bottom reef habitat off the coast of the Carolinas. Commercial and recreational fishing and SCUBA diving bring in large amounts of money to the local areas, so unnatural or incomplete recolonisation on hard bottom reefs have economic consequences to the immediate area. I was impressed with the amount of work she completed in such a short time, and very much enjoyed the way she presented the data – very concise and enthusiastic.

Picture of myself at Whitsand Bay in Cornwall, collecting mussels for the World Harbour Project intertidal tile experiment, which was part of the talk I gave at the Benthic Ecology Meeting.

Both photos are from the Waties Island field trip before the Benthic Ecology Meeting officially kicked off. Waties Island is a privately-owned barrier island in northern South Carolina restricted to Coastal Carolina University for research and education. The island boasts nearly 4 km of sandy beach, a rich maritime forest and large expanses of salt marsh and oyster reef habitat.

Photo cred: Madeline Gillis

YOUMARES 7 - A SUMMARY

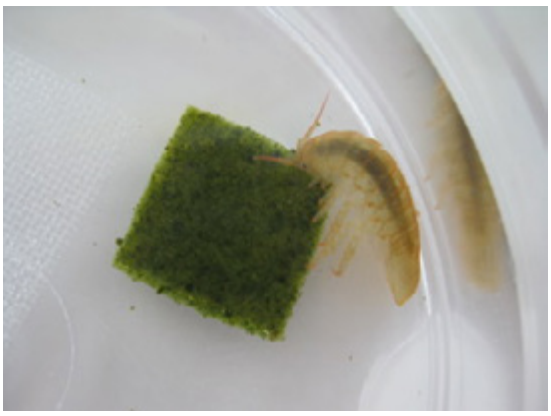
Špela Korez

is a researcher at the Helmholtz Zentrum for Polar and Marine research

YouMaRes is a convention for young marine researchers that is held annually in Germany. Over the years it has evolved from a local students' events to a recognized international meeting of young experts. **YouMaRes 7** was held in the city of Hamburg and hosted more than 100 attendees. The topics included fish ecology, dissolved organic matter, eutrophication, deep sea and polar regions, invasive species, adaptation of species, management and conservation, phytoplankton, interactions between societies and world's oceans and coast, coral reefs, and coastal and marine pollution. Whether heavy metals, pesticides, pharmaceuticals or plastics, the anthropogenic pollution of marine and coastal environment represents an ongoing problem as it is directly affecting us. Plastics are especially daunting as their continuous fragmentation to microplastics make such particles available to the smallest organisms existing and additionally through degradation increase the occurrence and amount of such particles in the environment.

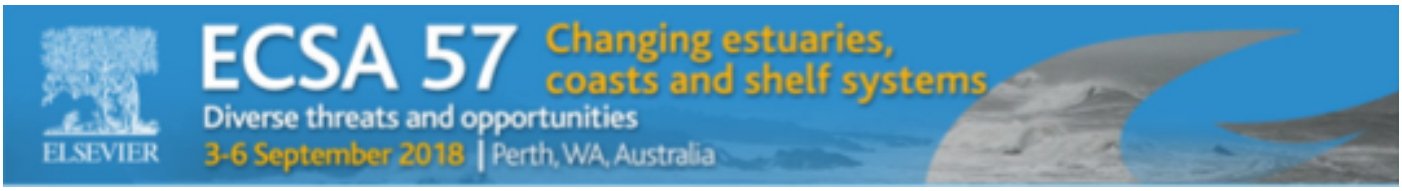
At **YouMaRes 7** I presented the results of my master thesis, addressing the effects that microplastic have on the physiology of subtidal marine isopods, *Idotea emarginata*. This work was performed at the Alfred Wegener Institute in Bremerhaven, Germany under the supervision of Dr Reinhard Saborowski and Dr Lars Gutow. Previous study showed that *I. emarginata readily* accepts food which is blended with microplastics. Individuals were not distinguishing between microplastics embedded foods and foods without microplastics, nor were they showing preference for impaired or normal food (Hämer et al., 2014, Environmental Science & Technology 48: 13451-13458). However, the effects on physiological processes, and the nutritional state upon microplastic ingestion were not investigated. For my research, I prepared four different food treatments: fresh brown algae *Fucus vesiculosus* and in agarose embedded dried brown algae, each without and with supplements of microplastics. After eight days of feeding the animals were dissected. The midgut gland and the gut were individually homogenised to prepare extracts for digestive enzyme assays. Microplastic showed suppression and enhancement of specific enzymes in both the midgut gland and the gut. However, no consistent patterns were observed. The results indicate that microplastics may differently affect digestive processes of marine isopods. Further research is needed to verify whether these alterations affect nutrient assimilation and nutritional health of the isopods.

As it became an important topic of societal concern in recent years, microplastic is increasing the awareness of scientists. It comprises the quantification of microplastic particles in water or sediment samples, observations on the trophic transfer of microplastics or investigations on physiological effects in the organisms. Nevertheless, microplastic pollution is a fairly new topic and still widely unexplored. Since it has been observed that anthropogenic pollution differently affects organisms, more research needs to be done in this field to better assess the risks for animals, ecosystems and, finally, for humans.



Idotea feeding on dried brown algae embedded in agarose

Welcome to ECSA's next major symposium, ECSA 57



Changing estuaries, coasts and shelf systems

Diverse threats and opportunities

which will take place from the **3-6 September 2018**
in Pan Pacific Perth, Perth, WA, Australia.

The structure and functioning of our estuaries and seas are shifting due to diverse drivers from local to global scales. The resulting threats to these systems are often all too apparent, yet such changes can also present new opportunities.
The challenge is to harness these opportunities through new ways of thinking, scientific developments, innovative technology and more effective integration of science and management.

You are invited to submit your contributions within a broad range of topics, covering the diversity of threats and opportunities facing estuarine, coastal and marine ecosystems and the people they support.
The deadline for abstracts is 9th March 2018.

More information can be found on the conference website:
http://www.estuarinecoastalconference.com/

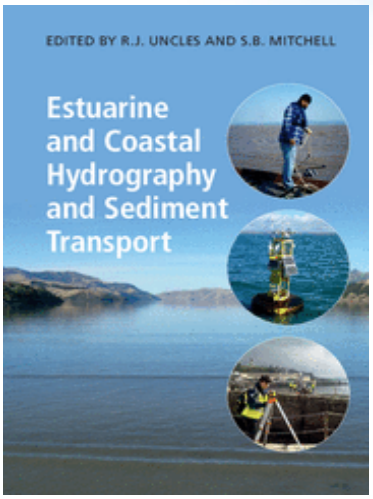
Estuarine and Coastal Hydrography and Sediment Transport

Edited by R. J. Uncles

Plymouth Marine Laboratory

and S. B. Mitchell

University of Portsmouth



A practical guide to the latest remote and in situ techniques used to measure sediments, quantify seabed characteristics, and understand physical properties of water and sediments and transport mechanisms in estuaries and coastal waters. Covering a broad range of topics from global reference frames and bathymetric surveying methods to the use of remote sensing for determining surface-water variables, enough background is included to explain how each technology functions. The advantages and disadvantages of each technology are explained, and a review of recent fieldwork experiments demonstrates how modern methods apply in real-life estuarine and coastal campaigns. Clear explanations of physical processes show links between different disciplines, making the book ideal for students and researchers in the environmental sciences, marine biology, chemistry and geology, whose work relies on an understanding of the physical environment and the way it is changing as a result of climate change, engineering and other influences.

July 2017

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