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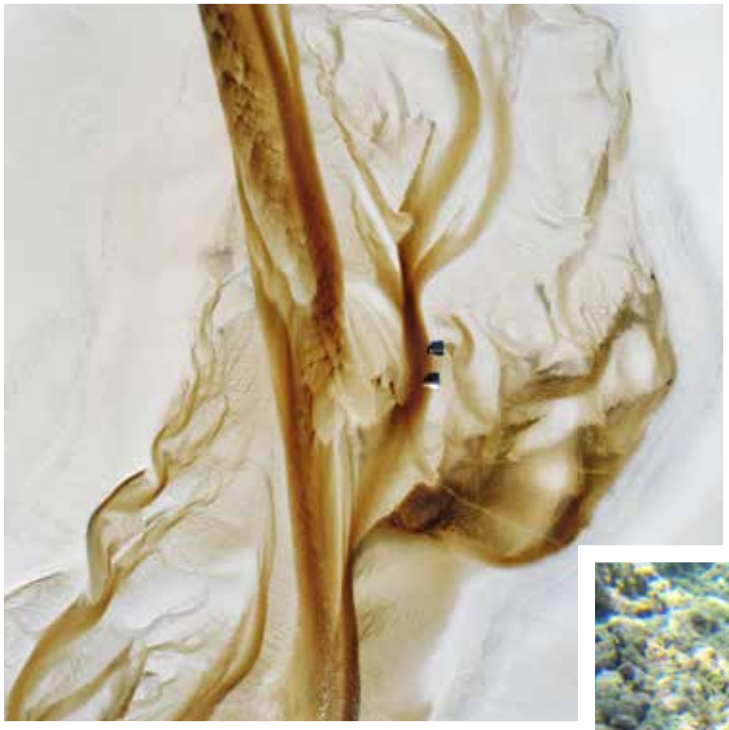
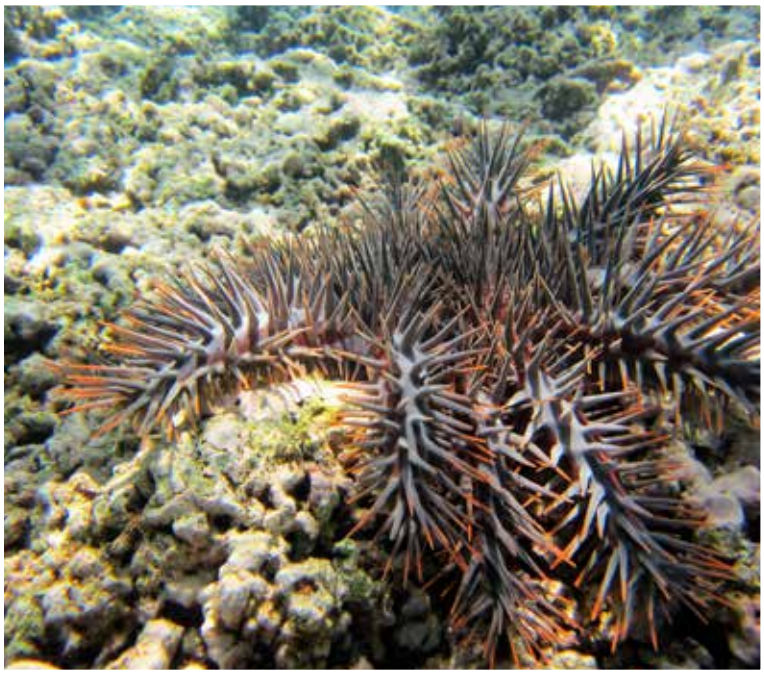


The Draw of Freshwater at Low Tide by Helene Burningham



Villainous Crown by Michaela Larson

Bulletin of the Estuarine & Coastal Sciences Association

ECSA Bulletin

N°68

This newsletter was edited by
prof. dr. Patrick Meire and prof. dr. Stijn Temmerman
University of Antwerp
Researchgroup of Ecosystem Management
T +33 03 265 22 64
patrick.meire@uantwerpen.be
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:

prof. dr. Patrick Meire, editor
patrick.meire@uantwerpen.be

prof. dr. Stijn Temmerman, co-editor
stijn.temmerman@uantwerpen.be

VIEW
FROM THE CHAIR

October 2018

This is my first 'view from the chair'. I am writing whilst about 13km above the Indian Ocean, flying back from the invigorating ECSA 57 conference: an amazing start to my time as President. I took over from Professor Kate Spencer at the Council AGM in April 2018, having been ECSA Councillor since 1999. It is a tremendous privilege to lead the Association.

All change on ECSA Council…

I must begin here by acknowledging the inspiring work of a number of fellow councillors over recent years. As President, Kate has steered the Association through a period of very significant change. She has achieved this with great finesse and integrity, establishing a new benchmark for those of us who follow. [I am delighted to report that Kate has agreed to stay on ECSA Council, where she now carries lead responsibility for our social media presence.]

Strangely, my first act as President was to recognise the long and multi-faceted contribution of Professor Mike Elliott to ECSA, as he stood down from Council. Mike has been an ECSA Councillor for some 27 years: including a terms as President (2005-09), Sponsor Representative, and as Editor in Chief of 'the ECSA journal', Estuarine, Coastal & Shelf Science.
Finally, I should like to pay tribute to the work of Dr Sally Little, as Conference Coordinator. Sally has undertaken this highly demanding role for five years. During that time she has been instrumental in redefining the ECSA approach to meetings, firmly establishing our biennial 'numbered' international conferences, as ECSA Coordinator for very successful meetings in London, Bremen and Perth. I am delighted to say that Sally remains on Council, becoming President Elect. [Dr Tim Jennerjahn takes over as Conference Co-ordinator, and is already spearheading ECSA's involvement in 'ECSA 58', to be held in Kinston upon Hull, UK in 2020]. Finally, on the Council front, we welcomed Professor John Humphreys who brings a wealth of experience in managing academic organisations.

ECSA 57 - Perth, Australia

With around 500 participants from all over the world (Asia, North America, South America, Australia, Arabia, North America and Europe), ECSA 57 was a tremendous success. [More to come on that in the next Bulletin, I hope]. For now, thanks to our strengthened financial position over the last few years, we have been able to provide increasing numbers of student travel grants. Our thanks go to the local conference chairs: Fiona Valesini and Chris Hallett (Murdoch University) and Matt Hipsey (University of Western Australia).

Awards

For ECSA 57 we awarded our highest number to date, supporting 33 students from 11 countries, over five continents, to engage in this inspiring international community. In addition, the Charlie Boyden scholarships have supported students undertaking fieldwork overseas and participating in non-ECSA conferences. Such small grants are a keystone benefit for our student and 'early career' members: we aim to increase their scope and volume over the coming years.

Photo Competition

But, we also want ECSA to be fun. During 2017, I floated the idea of a Photo Competition to colleagues on Council, hoping that this would - in time - contribute significantly to raising our profile through social media, and providing yet another tangible, informal benefit to our members. The 2018 winning entry came from Benjamin Taylor, a PhD student at the University of St. Andrews, UK. And, I am delighted to report that this has already become part of our annual calendar, with the second round currently live.

What else shall I bring…

My current role is Deputy Director at the Scottish Association for Marine Science, based in Oban, on the glorious, although slightly damp, west coast of Scotland. I have held previous roles as Dean of graduate schools for the University of the Highlands and Islands (www.uhi.ac.uk), and for the Marine Alliance for Science and Technology for Scotland (www.masts.ac.uk): in both cases bringing together students from institutions and campuses across wide geographical areas. I hope to draw upon both strands of experience to continue the modernisation of the Association; to ensure secure financial health; and further develop our focused activities around PhD students and early career researchers.

Prof. Axel Miller

THE MASTERPLAN FOR THE EMS
A 35-year program to restore an estuary

Vera Sandel and Beatrice Claus, WWF Germany

The Ems estuary

The Ems Estuary is a partially mixed meso-tidal estuary characterised by semidiurnal tides (Papenmeier et al. 2012; van Leussen 2011). The hydrodynamics in the Lower Ems are governed by a combination of tidal and fluvial processes whereas wave processes do not play a role. The estuary is located in the border area between the Netherlands and Germany and forms part of the 600-km-long European Wadden Sea (Fig. 1: Overview map of the Ems estuary). The estuary stretches from the island of Borkum, a barrier island that separates the Wadden Sea from the North Sea, to the tidal weir at Herbrum, the landward limit of the tidal influence since its construction in 1899 (Schoemans 2013; Jonge et al. 2014).

The Lower Ems is the dominant source of fresh water input and long-term, mean, annual, freshwater discharge amounts to approx. 80 -110 m3 /s varying between 20 m3/s in summer and 400 m3/s in winter (Papenmeier et al. 2012; Oberrecht und Wurpts 2014; van Leussen 2011).

The length of the estuary, including the tidal river, is approximately 100 km (Jonge et al. 2014). The tidal river is channel-like along the upper river section and funnel-shaped along the lower section. However, present-day river geometry is strongly anthropogenically influenced by repeated deepening, ongoing maintenance, and constructional works in and along the navigation channels (Papenmeier et al. 2012).

Fig. 1 : Overview map of the Ems estuary between Borkum and Herbrum.

Tidal channel in the mudflats close to Petkum. At low tide tidal creeks often dry to a muddy channel with little or no flow.

Trajectory of anthropogenic change

The Ems estuary has a long history of anthropogenic interventions during the past decades to centuries. Land reclamations, diking and artificial meander cut-offs carried out in the past 500 years have greatly reduced the intertidal area resulting in increasingly less natural sinks for sediment to accumulate (van Maren et al. 2015; Schoemans 2013; Jonge et al. 2014).

Deepening of the Emden fairway and of the lower Ems have started as early as the beginning of the 20th century(Schoemans 2013). The impact of human activities is most pronounced in the Lower Ems, where water depth increased from 4 m below MHW (circa 1960) up to 7.5 m below MHW (present day) (van Maren et al. 2015). In the period between 1984 and 1994 the Lower Ems was deepened four times for the transfer of large cruise ships that are being built at a shipyard in Papenburg 40km distance off the deep coastal waters (Lange 2006). Simultaneously with the substantial deepening of the lower Ems River in 1994 the extraction strategy in the port of Emden that comprehended the extraction of ~5 million m3 of sediment changed (van Maren et al. 2015). In 2002 the construction of the Ems barrier at Gandersum was completed. Ems

damming allows the transfer of cruise liners with a depth of 8.5 meters since then. Environmental regulations on the period and duration of its closure are supposed to guarantee the compliance with relevant oxygen and salinity thresholds and thereby limit the damage to the ecosystem (Bez.-Reg. Weser-Ems 1998)

The substantial dredging and deepening activities over the past decades have caused significant changes in the hydro- and sediment dynamics (Jonge et al. 2014). Strongly increased tidal asymmetry is present causing short, but strong periods of flood flow in combination with weaker ebb flow over longer durations (Oberrecht und Wurpts 2014). While in the beginnings of the 20th century the tidal range was 1.3 m near Papenburg and 0.4 m at the weir in Herbrum, it has increased by more than 2 m and over 2.5 m respectively (Jonge et al. 2014). Concurrently, the location of the largest tidal range has shifted from Emden/ Pogum to Papenburg (Schoemans 2013) and the aspect of the estuarine turbidity maximum (ETM) has changed drastically (NLWKN 2016).

In the 1950s maximum suspended particulate matter (SPM) concentrations were measured near Gandersum reaching values of about of about 200 mg/L (NLWKN 2016). Today theETM has moved upstream by up to 25 km and has broadened into a zone 30 km in length which extends into the freshwater tidal river (Jonge et al. 2014). Annual mean concentrations in the ETM have increased 25- to 50-fold reaching concentrations of 5.000 to 10.000 mg/L around Weener (NLWKN 2016).

The present-day lower Ems River can be seen as a hyperconcentrated system that is characterized by a muddy bed and thick fluid mud deposits (Fig. 2: Illustrative distribution of fluid mud deposits along the Ems at an average freshwater discharge rate (Oberrecht, D., Franz, B., Wurpts, A. 2016)). The system has undergone a major regime shift. During situations with low discharge the fluid mud layer may reach thicknesses of up to several meters (two third of the water column) and extend throughout the whole tidally influenced reach up to the most downstream located weir (Papenmeier et al. 2012; Oberrecht und Wurpts 2014; Oberrecht, D., Franz, B., Wurpts, A. 2016). Fine sediments and fluid mud layers reduce the effective hydraulic drag of a river creating a feedback loop that further alters tidal characteristics and a self -maintaining snowball process may be initiated. This hyper-turbid state is energetically favourable and can be referred to as an alternative steady state (Winterwerp und Wang 2013; Jonge et al. 2014).

This alternative state has important ecological ramifications: A decrease in light penetration by increased SPM negatively influences primary production and thus oxygen production. Microbial degradation of organic material fixed in the SPM further aggravates the oxygen deficit (Oberrecht und Wurpts 2014; van Maren et al. 2015). Critical oxygen concentrations for fish are regularly undershot in summer. Not long ago still, the Ems sustained abundant fish populations and was rated one of the ecologically most valuable estuaries in Germany (WWF 2014).

A Masterplan for the Ems

Because of the catastrophic situation the federal and state governments, the county of Leer and Emsland, the municipality of Emden, the Meyer Werft and the environmental NGOs WWF, NABU and BUND have agreed to reconcile economic and ecological interests at the Ems. In 2015 the partners signed the Masterplan Ems 2050 (MP Ems), a 35 year-Program on environmental measures to be implemented in order to improve the ecological state of the Ems and to implement the goals of the European WFD and FFH-Directive. The MP Ems was Lower Saxony`s last resort to prevent an EU infringement procedure it was facing due to deficient implementation of several nature conservation directives (Habitats Directive, Birds Directive, Water Framework Directive and Marine Strategy Framework Directive) (MU 2018).

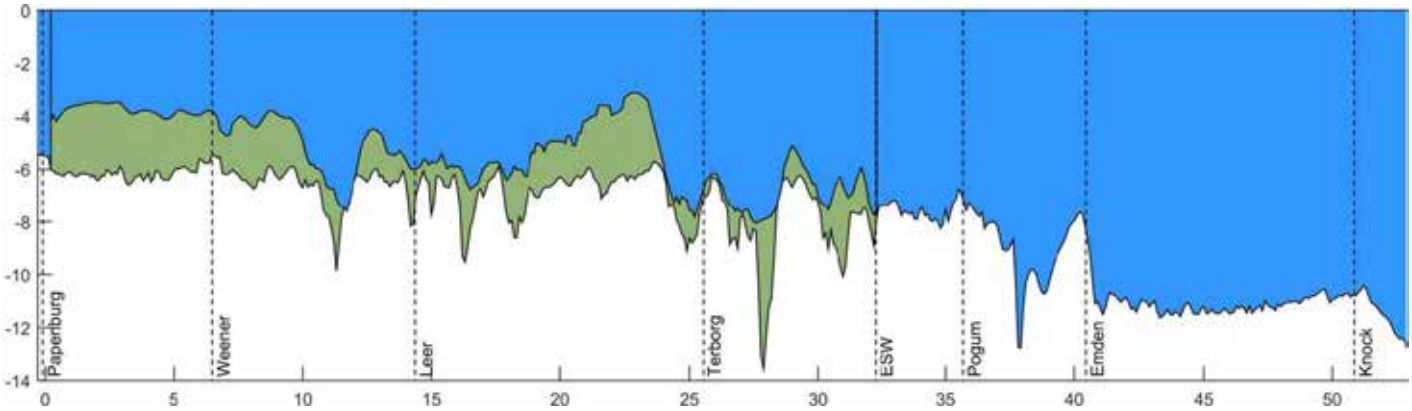


Fig. 2: Illustrative distribution of fluid mud deposits along the Ems at an average freshwater discharge rate(~65m3/s) (Oberrecht, D., Franz, B., Wurpts, A. 2016)

The defined goals of the MP Ems are (Geschäftsstelle MP Ems 2018):

- Improve the water quality and solve the fluid mud problem
- Create and enhance estuarine habitats
- Protect birds and their habitats
- Maintain a functional federal waterway
- Secure the economic development of the region.

A key measure of the plan is the modified use of the Ems river barrage to influence tidal wave propagation and reduce tidal asymmetry and solve the fluid mud problem as well as to improve the water quality (Fig. 3: Schematic representation of the gate control) . Model results indicate that the measure is suitable to reduce upstream sediment transport as well as turbidity and increase dissolved oxygen concentrations in the lower Ems (Oberrecht und Wurpts 2014).

In total 530 ha of hitherto agriculturally used land will be connected to the natural tide to stimulate the development of tidal habitats like tidal riparian forest, reeds, sand and silt flats and shallow water zones. By increasing tidal capacity these tidal polders further mitigate tidal asymmetry. Wherever it is possible without jeopardising coastal protection and the function of the federal waterway massive stone embankments are to be reshaped to allow near-nature bank zoning with shallow water areas, reeds and riparian woodlands. An area of 200 ha inland is destined to be developed into meadow bird (lapwings, black-tailed godwits, redshanks, large curlews, etc.) habitats. Furthermore a series of activities at pumping stations, sluices and the weir in Herbrum are set to promote fish migration and connectivity (Geschäftsstellle MP Ems).

The Ems estuary is an important resting site for wild geese, swans and wading birds. In spring time it has a special importance as breeding site for rare meadow birds.

Shore areas and river banks are progressively silting up in the lower Ems obstructing the water flow and deteriorating spawning conditions for fish.

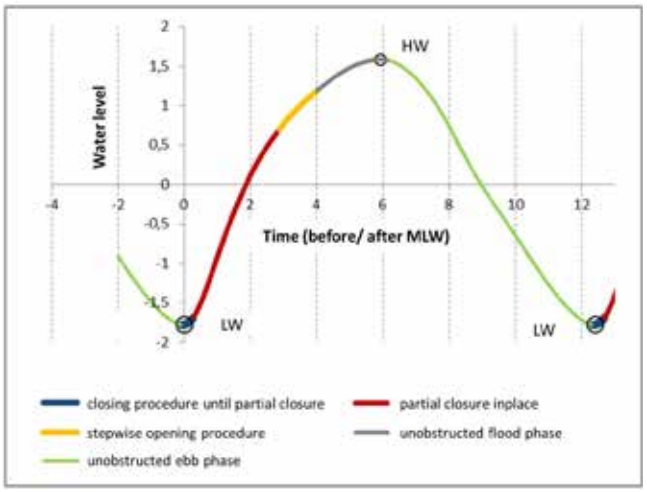


Fig. 3: Schematic representation of the gate control: The general operating principle will last about four hours each tide and is divided into several phases. HT: High tide; LW: Low tide (modified from NLWKN 2016).

Outlook

The completion of the MP Ems is scheduled for a timeframe of 35 years to allow for the spatial management and land acquisitions to take place. Compulsory measures to implement and steps to complete are defined in 10 year intervals. The flexible tidal control is expected to start in 2022 with immediate effects on SPM concentrations.

The MP Ems is a blueprint for the compensation between ecological and economic interests by means of relevant environmental European directives. It combines measures to improve the ecological potential with measures to secure the economic significance of the region.

By 2050, a natural environment with typical flora and fauna and that is able to sustain economic, environmental and recreational activities shall be re-established.

On the basis of the MP Ems 2050 the German environmental non-governmental organizations BUND, NABU and WWF initiated the joint project "Zukunftsperspektive Tideems" (engl: Perspective for the future of the tidal Ems) in 2017. The project will last until 2020 with its main focus on the improvement of the ecolological situation of the Ems estuary. By means of the concept of ecosystem services the project aims at creating awareness and raising consciousness for the value of estuarine ecosystem services (e.g. carbon storage, nutrient retention and recreation). Thereby, the approval and support of the local communities and stakeholders for the extensive restoration measures shall be gained.

Photo's: © Jarek Godlewski.

In its pristine state the Ems estuary was characterized by tributaries, tidal inlets, tidal flats and ponds, standing and shallow water bodies, tidal forests and reeds.

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Gillian Glegg | Associate Head of the Institute of Marine Sciences | University of Plymouth

GRANT REPORT ECSA AND SEA CHANGE

In a rapidly changing world, human populations are increasingly settling and urbanising coastlines, a process termed ocean sprawl due to the proliferation of artificial structures in the marine environment. Additionally, artificial structures typically support lower biodiversity and a greater abundance of non-native species than analogous natural habitats. This is partly due to the fact that the majority of coastal and marine development is made of concrete, which is considered an unfavorable material for biotic recruitment due to its high surface alkalinity. With increasing recognition of the importance of ecological engineering, scientists and manufacturers are now developing special "environmentally friendly" concretes that encourage the colonization of marine life.

Using experimental concrete tiles that mimic the structure of seawalls, my project investigates the influence of lower pH concrete (pH of 8 on the scale) on biotic colonisation over 12 months. The results of this project will determine whether species richness and abundance will be higher on lower pH concrete, if lower pH concrete reduces non-native species richness and abundance and how low pH concrete may affect primary productivity of the species recruited on the tiles.

This project is a unique collaboration with Dr Louise Firth (Plymouth University) and Drs Peter Todd and Lynette Loke (National University of Singapore). Working in Singapore has provided a unique insight into how different ecosystems could potentially affect the success of enhancing biodiversity. Moreover, the majority of eco-engineering trials have been conducted in temperate regions with comparatively little research being carried out in the tropics, where most major coastal developments are happening. My project will compare results between the UK and Singapore, thus representing one of the first cross-regional ecological engineering studies.

Ultimately, I hope the results of my study may provide a valuable insight into the factors affecting biodiversity in artificial habitats, and possibly improve our understanding for mitigating the environmental damage caused by urbanization in coastal and marine habitats.

Human populations around the world are transforming coastlines through the spread of urbanised areas across marine and coastal environments. Artificial structures typically support reduced biodiversity and a greater amount of non-native species. Moreover, the primary construction material of artificial structures is concrete, which makes up over half of coastal and marine developments. Even if biotic communities will colonise concrete substrates, it is considered a poor material for recruitment due to its high surface alkalinity.

Using experimental tiles, my project explores the implications of low pH concrete on biotic colonization over 12 months. Lower pH concrete is expected to support greater species richness as well as abundance and reduce the number of invasive species, while also providing greater productivity than higher pH concrete.

This project is conducted in both Singapore and Plymouth, and results will provide a unique insight into the differences affecting eco-engineering strategies in different environments. Indeed, this study represents one of the first cross-regional ecological engineering studies with Drs Louise Firth (Plymouth University), Peter Todd and Lynette Loke (National University of Singapore), and ultimately aims to improve our understanding of how to best mitigate the damage caused by urban development in temperate as well as tropical coastal ecosystems.

These custom-made ecological tiles are designed to support higher biodiversity on artificial seawalls through the addition of complexity features as well as reducing the pH level of the concrete itself. Tiles were then deployed at several locations in Plymouth and Singapore.

Juliet Sefton | Department of Geography | Durham University

Foto: Richard Selwyn Jones

ECSA CHARLIE BOYDEN AWARD FIELD REPORT

Juliet Sefton is a PhD student at Durham University. She is interested in sedimentary records of past sea-level changes and the modern processes that form them. Her PhD is focusing on better understanding the modern processes at play during the creation of mangrove sedimentary sequences. Mangrove sedimentary archives are important records of sea-level changes in relatively undersampled low-latitude locations and provide important constraints on ice-sheet changes over the last few millennia. Juliet's research is aiming to improve the utility of mangrove records for high resolution, quantitative sea-level reconstructions. Mangrove records are notoriously difficult to date using radiocarbon, and in addition, fossil preservation (e.g. foraminifera and diatoms) is poor due to high temperatures and acidic sediments. A better understanding of mangrove sedimentation is required, and new proxies and dating methods explored.

A primary objective is to identify what features in mangrove sediments can be best linked to mean sea level, by applying a multi-proxy approach; analysing pollen and organic geochemistry composition (bulk sediment stable δ13C isotopes and biomarkers). A second objective is to identify what components in mangrove sediments are best suited for radiocarbon dating. The Indian Ocean archipelago of Seychelles hosts diverse mangroves, is tectonically stable and has a microtidal range, which is ideal for such a study. In July 2017, Juliet investigated two mangrove sites on the west coast of Mahé island. She deployed pollen traps and sediment marker horizons to quantify sediment accumulation rates and pollen transport processes. She also collected surface sediments to gain a better understanding of the spatial and elevational patterns of mangrove sedimentation. She anticipates that such a multi-proxy study of mangrove sediments (along with their modern environmental variables) will allow palaeo sea level to be more accurately and precisely reconstructed in the low-latitudes into the future.

With the help of the ECSA Charlie Boyden Award Juliet was able to extend her study to another mangrove field site on a different island (Curieuse) during her July 2018 field season. Extending this study has been vital, as it allows her to test whether mangrove sediments are responding to the same environmental variables in contrasting wave/wind climate to her main field sites on the main island of Mahé.

Sampling mangrove surface sediments, Barbarons mangrove, Seychelles.

Photo by Richard Selwyn Jones

Fatemeh Ghaderiardakani | University of Birmingham

THE SOCIETY FOR EXPERIMENTAL BIOLOGY (SEB) ANNUAL MEETING | Florence-Italy, 3-6 July 2018

I am currently a fourth-year PhD student in the University of Birmingham under the supervision of Dr. Juliet Coates. Thanks to the travel award of the Estuarine and Coastal Sciences Association, I was able to attend the annual meeting of Society for Experimental Biology (SEB) at the Firenze Fiera Congress and Exhibition Centre in Florence, Italy. The event started on Tuesday 3th July with nine parallel scientific sessions covering a large variety of research projects about animal, plant and cell biology.

Considering my research interest which is "algal morphogenesis and development", my personal highlight was a session called "Morphogenesis in non-flowering plants". It was organised by Dr. John Bothwell and my supervisor Dr. Juliet Coates. Great speakers from different areas (such as non-flowering plants, algae, moss etc.) had been invited to this session to present their research. One of the most insightful talks was the first presentation in this session on 4th July by Dr. Dianne Edwards (Cardiff University) on "Morphogenesis in early land plants: the beginnings". She described the morphology of early embryophytes that existed before 390 million years ago. She also explained how a better understanding of the processes involved in the morphogenesis of organs that produced considerable variation in vegetative and fertile architecture in plants can be achieved by analysis of the different levels of organisation and taking advantage of rare fossils with excellent cellular preservation,

The location of collecting Ulva samples, Llantwit Major beach, South Wales.

However, the most relevant talk to my research in this session, which I had this privilege to be in chair of it, has been presented by Dr. Thomas Wichard (Friedrich Schiller University Jena, Germany) about bacteria-induced morphogenesis in green macroalgae (*Ulva* species). He discussed growing concerns about the dramatic increase in *Ulva* biomass on beaches worldwide, and how a deep understanding of the biology and physiology of green algae is fundamental for humans to engineer new and useful biological systems and to reduce seaweeds' deleterious ecological, environmental and economic harm.

The poster that I submitted in conference was entitled "The cross-kingdom interaction: Bacteria-induced morphogenesis in the marine green macroalgae" which covered the results of a collaborative research with Dr. Wichard in Germany. Through this investigation I tried to address a key question about the extent of specificity involved in the *Ulva*–bacterial interactions. It has been shown in this poster that there is no species-specificity between two Ulva species, because a range of bacteria can perform their eco-physiological functions similarly in both species. These data will help to increase understanding of algal growth and development, to shed light on the underlying mechanisms involved in the cross-kingdom cross-talk of algae and bacteria.

Coming to the end of my PhD journey this year, SEB annual meeting provided a perfect opportunity for me to present the outcomes of my research, have discussions with a number of researchers in this field and to get valuable feedback and comments from other attendees. In addition, I established a number of new contacts potentially leading to collaboration in the future. Therefore, to conclude, I want to thank ECSA one more time for enabling me to travel to SEB meeting and I would also like to thank everyone involved for making this meeting such a unique experience.

fxg433@student.bham.ac.uk

Mariana Lima | PhD Student | School of Environment & Technology | University of Brighton

World Seagrass Conference 2018

PROMOTING SEAGRASS AWARENESS WHILE TRANSLATING SCIENCE INTO ACTION

In June 2018, The World Seagrass Association held its 13th International Seagrass Biology Workshop (ISBW) series, a biannual event held in conjunction with the World Seagrass Conference (WSC), at the National University of Singapore, Singapore. The ISBW had the common theme of "Translating Science into Action", motivated by the need for effective communication of seagrass science amongst scientists, managers and practitioners, to better develop and implement science-based seagrass conservation and restoration policies.

The WSC grouped lead scientist in seagrass research, including between many others a plenary talk from Professor Peter Ralph - author of *Systems Biology of Marine Ecosystems*, discussing how genetic science can be a useful tool on seagrass physiology research. The sessions ranged from management to resilience, covering topics such as blue carbon, plant physiology, faunal interaction, and survey technologies, all with the aim of demonstrating how scientific research can be applied to conservation projects and put into action to promote public awareness. One of the highlights of the sessions was the talk from Professor Paul Lavery, discussion the updated assessment of seagrass carbon storage in Australia, demonstrating an overall increase in carbon stocks since previous publications. A selected number of manuscripts from the conference will be featuring in a Botanica Marina special issue.

As a PhD student at the University of Brighton, I was able to attend the WSC2018 and give a talk about the impacts of climate change on Solent's UK seagrass carbon sink potential, with the aid of a student grant from the conference organisation and a Charles Boyden award from ECSA. I shared preliminary results from my research, demonstrating how Solent's seagrass soil carbon stocks fluctuated over time and how climate change related extreme weather events could possibly be correlated to these changes.

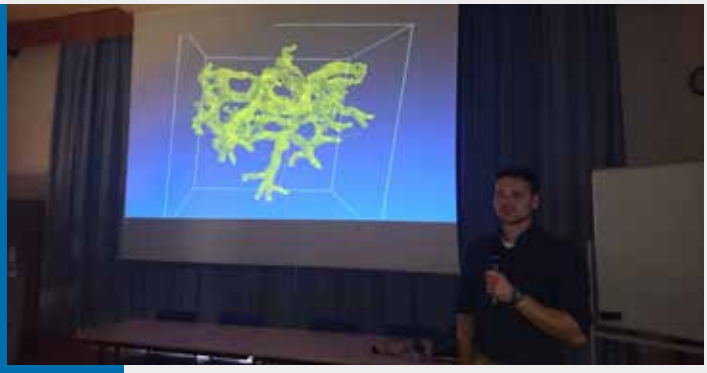
I was also very lucky to attend the series of workshops included in ISBW13, going on a number of fieldtrips to visit successful seagrass green engineering restoration sites along Changi Bay, and doing seagrass drone surveys in Labrador Natural Reserve. The Seagrass Restoration and Engineering Workshop provided a very useful insight on the existing evidence of seagrass eco-engineering, with the goal to produce a short review article on the potential for seagrass eco-engineering, covering current evidence, opportunities, and 'things we need to know'. While the mapping and analysis of drone imagery workshop had a hands on approach, introducing us to the basics of drone flying and remote sensing.

I am very grateful to ECSA and the Charles Boyden grant for contributing towards my attendance providing me a chance to liaise with other students and researchers from a range of countries with an extremely strong research profile in the area and exchange thoughts and ideas regarding our projects to consequently develop my PhD.

Beauregard Marsh | bcm2@hw.ac.uk

VI International Rhodolith Workshop 2018

Marine Benthic Ecology, Biogeochemistry and In-situ Technology Research Group, The Lyell Centre for Earth and Marine Science and Technology, Heriot-Watt University, Edinburgh EH14 4AS, UK



In June of 2018, I had the pleasure of attending the VI International Rhodolith Workshop 2018 thanks to the generous support of ECSA. This workshop was hosted by Sophie Martin and Jacque Grall at the Station Biologique de Roscoff in the picturesque seaside town of Roscoff, France. Every three years since the first meeting in 2000, researchers from around the globe have gathered to discuss the ubiquitous and fascinating group of red coralline algae which form rhodoliths (also known as maerl). Rhodoliths are rigid nodules of calcium carbonate deposited by coralline algae. Much like a coral reef, their complex, 3-dimensional shape allow coralline algae to form large beds which support biodiverse ecosystems throughout the world's seas.

I was pleased to see what an impressive scope of research is being done on this particular group of algae by such an international community of scientists. I suppose it is not surprising given the expanse of rhodolith beds, from the tropics to the poles and down to the deepest mesophotic regions. Topics ranged from taxonomy to ecophysiology to paleoecology and more. This made for really dynamic discussions since participation included people from nearly every field of the earth sciences. For example, I learned about the different techniques being developed in order to use fossil rhodolith beds as biomarkers for past climate reconstructions. Also, there is a lot being done to measure how future ocean acidification projections may affect coralline algae. Due to the high Mg concentration calcite which forms the skeleton of coralline algae, multiple researchers presented how growth rates of the algae can greatly decrease, whilst dissolution will increase. This is of great concern to scientists given their major role in the global carbon cycle. It certainly highlighted the global significance of coralline algae as both primary producers and marine calcifiers.

As a first year PhD student, I was excited to be giving my first oral presentation and be able to contribute to the conference. My research focuses on the photosynthetic mechanisms employed by red coralline algae. Something else interesting about this algae is that is currently the deepest found photosynthesizer in the world; it has recently been found deeper than 330m! I presented the first results of my PhD which utilized 3D scanning technology to analyse how the physical structure of coralline algae, formed by its rigid calcite skeleton, may enhance light availability to its photosynthetic pigments. My presentation was well received, and I was lucky enough to be awarded a presentation award for which I was extremely grateful!

I would like to thank ECSA for supporting my participation at this meeting. It provided me valuable insights into potential new directions for my research, and I made new connections with researchers of similar interests. Thanks to the ECSA and the International Rhodolith Workshop, I now have exciting, international collaborations which will provide a great addition to my PhD. Overall, it was an invaluable experience, and I cannot wait to attend the next meeting in Newfoundland!

ECSA PHOTOGRAPHY COMPETITION

Earlier this year saw the lunch of the inaugural ECSA Photography Competition. Thank you to everyone who submitted. There were a lot of fabulous entries, including a 'best sunset' debate, making it a very difficult to job for the judges. After much debate, a shortlist of six entries was produced from which the winner 'Scottish saltmarsh sunset' by Benjamin Taylor was selected. Ben's photo was taken after spending a few hours sampling and capturing a time-lapse sequence of the incoming tide over the mudflats. Luckily it flooded before losing too much light and he got a pretty nice sunset to finish up the day with. Congratulations to Ben and thank you once again to everyone who took part. We plan to run the competition again very soon, dates and instructions to be announced on Twitter, in the newsletter and online.

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First › Scottish Saltmarsh Sunset by Benjamin Taylor

This photo was taken after spending a few hours sampling and capturing a time-lapse sequence of the incoming tide over the mudflats. Luckily it flooded before losing too much light and got a pretty nice sunset to finish up the day with

Second › The Draw of Freshwater at Low Tide by Helene Burningham

The photo was captured as part of a UAS survey of a large dune system at one my research sites in west Donegal, northwest Ireland; although the flight was programmed by myself and colleague Dave Griffiths, the photo credit goes to our little Phantom 4 UAS!

Third › Sampling at Sunset by Naomi Wells

PhD student Mustefa Reshid braves the chilly mid-winter waters of the Peel Estuary (Western Australia) to set up our sampling system for measuring nutrient fluctuations overnight

Runners up ›

Giants and Grains by Paul Kilkie

This photo was taken during my PhD research site visit to Isle of Grain in the Medway Estuary.
I was struck by the relationship between the stark horizontal planes of the landscape and the distant man-made structures, whose giant form seemed to dwarf and mimic the figure below.

Villainous Crown by Michaela Larsson

Crown-of-thorns starfish on the reef flat at Kia Island, Fiji.

Sun, Sea and Snow by Marina Lima

It was taken on the 27/02/2018, during the beast from the east cold wave, at Brighton beach, UK.