The ECSA is an international society dedicated to the scientific study & management of estuaries and other coastal environments

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Marsh Marigold (*Caltha palustris* subsp. *araneosa*) on a freshwater tidal marsh in the Elbe estuary, Germany
Ken Schoutens

Bulletin of the Estuarine & Coastal Sciences Association

ECSA Bulletin

N°69

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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 authors are requested to submit a candidate picture that may be used for the front cover of the ECSA bulletin. Please mention a short description and the author of every picture. The editors will choose the front cover picture among the submitted candidate pictures.

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VIEW FROM THE CHAIR

Having missed the last ECSA Bulletin, this is only my second 'view from the chair'. And what an unprecedented view it is. I am writing from my kitchen table, overlooking the picturesque university holiday town of Oban and calmingly blue waters of the bay. The sun is shining, and a multitude of birds are sweetly celebrating the delights of spring.

Amidst such a sublime scene, it is virtually impossible to comprehend the devastating, all-encompassing grip that the COVID-19 virus has taken on our globalised society. I am sure that every reader will already have been impacted professionally in many ways: the compulsion to work from home, damaging restrictions on laboratory and field work, postponed conferences delayed grant and award deadlines, withdrawn job offers; the list goes on. These are such uncertain, stressful times.

I have no wisdom to describe what the academic and practitioner landscapes for environmental science will look like when we have finally established how to live 'normally' with this ongoing threat in our midst. But, for now, at least there are some opportunities: precious time is available for that most important of scientific treasures: 'reflection'. Time may be freed for analysis of almost forgotten data sets; preparing - more thoughtfully, perhaps – those manuscripts that have been stifled in the unrelenting morass of emails, meetings and bureaucracy; marshalling ideas for exciting, redefining proposals; importantly, a little time to relax and ponder.

Wherever you are, whatever the restrictions currently upon you, I, and my ESCSA Council colleagues send our best wishes for your safe passage through this global crisis. And, when circumstances once again allow, we very much look forward to seeing you at our future meetings, conferences and workshops. In the meantime, please take care!

With very best wishes,
Axel.

Prof Axel E J Miller
ECSA President.

Jason Lynch | Queen Mary University of London (QMUL)

Linkages Between Macroporosity, Infiltration and Vegetation Type within Two Saltmarsh Environments

Preparing for torvane measurements whilst monitoring infiltration in a very saturated marsh.

I am an Environmental Science by Research MSc student at Queen Mary University of London (QMUL) having completed my Environmental Science BSc also at QMUL as a mature student. Throughout my degrees I have established an interest in coastal environments owing to their uniqueness and array of ecosystem services. I have really enjoyed undertaking my own research and it is something I wish to pursue further. As such, I am humbled to share that I will be starting a Natural Environment Research Council (NERC) PhD as part of the London NERC Doctoral Training Partnership in September 2019.

Title and nature of my project

"Linkages Between Macroporosity, Infiltration and Vegetation Type within Two Saltmarsh Environments".

Using an array of fieldwork and laboratory analysis, I am working towards establishing how infiltration rates vary across different vegetation types and how environmental controls such as particle size, geochemistry and pore space impact these rates in natural saltmarshes. My work will be undertaken at Tillingham Farm, Essex and Warton Sands, Lancashire and whilst is explicitly a standalone MSc project, it will align with the NERC funded RESIST(UK) 'Response of Ecologically-mediated Shallow Intertidal Shores and their Transitions to extreme hydrodynamic forcing in UK settings' project (https://www.nerc-resist.uk/).

Scientific aims

1. Infiltration rates across four different types of vegetation/non-vegetation types: Spartina, Salicornia and Puccinellia spp, and unvegetated mudflat.
2. The geochemical characteristics of sediment and vegetation for each site.
3. Subsurface hydrological functioning across the sites, including lateral and vertical drainage rates.
4. Infiltration and drainage linkages with structural and textural porosity.

Preliminary findings and direction

Preliminary findings suggest that shear strength is higher where presence of more complex root networks exist (Puccinellia and Salicornia spp). However, this is not necessarily the same for infiltration rates, which appear highest where root stems are generally straighter and wider (Spartina spp). I can now explore this data against our micro CT porosity data (processed by colleagues at QMUL and University of Cumbria) and geochemical data I have since analysed in the QMUL laboratories.

Finally, I hope to draw the above datasets together to establish how relative vertical infiltration rates are influenced by these physio-chemical controls in my attempts to help understand saltmarsh behaviour. This may be useful in the future management of coastal environments, which are extremely valuable as a habitat and coastal buffer zone, and particularly at a time of climatic uncertainty.

What I was able to achieve with support from ECSA

Support from ECSA covered associated costs for fieldwork at Warton Sands to carry out in-situ infiltration, shear vane and torvane tests. As a self-funding MSc student, it would not have been possible to have carried out this fieldwork without this award – I am very grateful, thank you!

Wrapping a sediment core for geochemical analysis. Credit, Dr. Clementine Chirol.

Hayley Craig | University of Manchester | United KIngdom

Charles Boyden small grant awardee presents her PhD research at an international mangrove conference in Singapore

Hayley Craig, PhD student at the University of Manchester, recently received a Charles Boyden Award towards travel costs to attend the 5th International Mangrove, Macrobenthos and Management Meeting in Singapore. She received an outstanding mention for her oral presentation titled "Effects of nutrient loading on diversity, composition and function of soil bacterial communities in mangroves". Mangrove ecosystems are important coastal carbon sinks in the tropics and sub-tropics but little is currently known about the microbial communities involved and how environmental change, such as eutrophication or sea-level rise, could impact on the ecosystem services they provide. Hayley's research focusses on soil bacterial communities in Florida's mangroves and various factors controlling their composition. Using eDNA and high-throughput sequencing methods, her research aims to understand how changes in bacterial community composition relate to changes in soil functioning and the implications for carbon storage and nutrient cycling. The field and laboratory work associated with this study was undertaken in collaboration with researchers from various disciplines based at the Smithsonian Environmental Research Center, University of Florida, Manchester Metropolitan University and the University of Salford.

As Hayley is currently in submission pending while completing her thesis, she did not have access to university funding to attend this conference. This grant enabled her to present her PhD research to an international audience of mangrove researchers, proving valuable networking opportunities. To hear about upcoming publications from Hayley's PhD research you can follow her on twitter @hayzleypop

Hayley Craig collecting samples in Florida's mangrove/saltmarsh ecotone

Emmanuel Bustamante | Durham University

Late Holocene land-level changes along the River plate subduction zone in Jalisco, Mexico

Manual coring of a site next to a creek.

Examples of the stratigraphic sequences, showing environmental and sedimentary changes.

My PhD research is framed within the coastal paleoseismology approach. My overall aim is to investigate the geological evidence of Holocene earthquake sequences along the Pacific coast of Mexico, in order to understand the behaviour of the Rivera plate megathrust fault. The evidence is frequently imprinted in estuarine sediments, and can be seen as abrupt relative sea-level (RSL) changes caused by crustal deformation. I am particularly interested on identifying the stratigraphic signature of megathrust earthquakes, know the tendencies of crustal deformation, coastal uplift or coastal subsidence, quantify its magnitude and estimate the recurrence interval of these events.

The support obtained from ECSA was addressed to cover partially the first fieldwork season. The objective of this visit was to investigate the stratigraphy of the Marabasco river's estuary. This exploratory phase was critical to identify those sites that better represent abrupt environmental changes, which potentially could be associated to earthquake crustal deformation. At the end of this fieldwork season I collected three sediment cores (~ 2m depth), using hand corer tools, to analyse in the laboratory. The core samples are strategically separated hundreds of metres among them, across the same estuary, in order to test the hypothesis that abrupt environmental changes preserved in the fossil record correspond to a regional event, which in this case might be a megathrust earthquake. The evidence of palaeoearthquakes is aimed to enrich the earthquake hazard assessment of the eastern coast of Mexico, where previous evidence of tsunamis was found, but its direct correlation to megathrust earthquakes is still unclear.

Izzy Langley | PhD student at University of St Andrews

Behavioural ecology and population biology of marine top predators

The Estuarine & Coastal Sciences Association The Charles Boyden Award

As a PhD student at the Sea Mammal Research Unit, The University of St Andrews, my research focusses on the behavioural ecology and population biology of marine top predators. I have worked on a range of projects investigating the behaviour and ecology of seal populations around the coast of the UK and Antarctica and have worked with institutes throughout the UK and abroad. My PhD project is looking at the ecological interactions between grey and harbour seals and I will investigate the population level effects of grey seal competition and predation on the regionally declining harbour seals.

In collaboration with Natural Resources Wales, we showcased their long-term grey seal photographic identification (photo-ID) database to investigate female grey seal breeding and haul-out site use along the Welsh coastline. The aims of this work were to understand the connectivity between haul-out sites in relation to Special Areas for Conservation, and to better understand the space use of the coastal zone. Using semi-automated pelage pattern recognition software (*ExtractCompare*), I matched images of the same individuals and constructed spatially explicit sighting histories. These sighting histories showed connections between sites along the entire coastline, across protected area boundaries, within and outside of the breeding season, and spanning up to 23 years. This has important implications for the management and conservation of this highly mobile protected species, and we have a peer-reviewed paper in press which we hope to be published later this year.

With support from The Estuarine & Coastal Sciences Association Charles Boyden Award, I was able to present this collaborative work to an audience of several thousand scientists at the World Marine Mammal Conference held in Barcelona, December 2019. This enabled me to expand my network and meet with experts in the field from all over the world. From these meetings throughout the conference, I am now involved in two further collaborations with colleagues from Ireland and mainland Europe. Not only will this help me in my career to build a strong research base, but these collaborations will contribute to our understanding of coastal ecosystems.

Hannah Lee | recipient of the ECSA Charles Boyden Small Grant

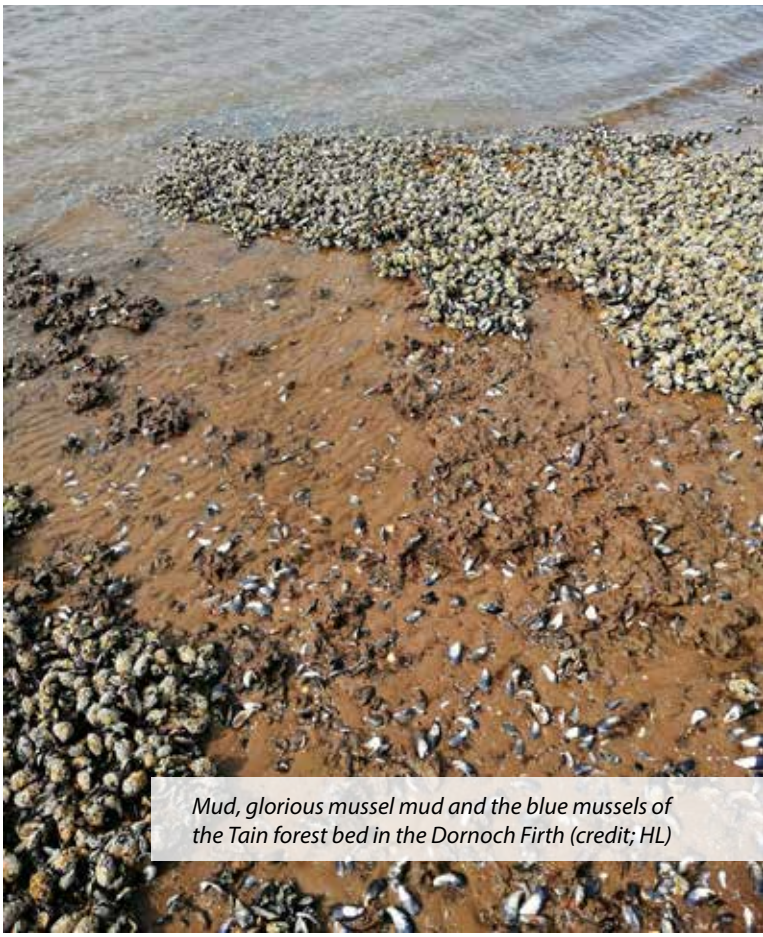
EMBS 54 2019: Carbon stores and blue mussel (M. edulis) beds: A priority in Marine Protected Areas?

Starting at 3am for Summer surveys lends the opportunity for great sunrise photography! (credit:HL)

Currently in the second year of my PhD, my research is orientated towards understanding the role of bivalve shellfish beds as pathways of carbon capture and burial, while also considering the carbon which they produce through calcification and respiration. I have also identified further pathways of both carbon loss and accumulation, and I am working to explore these with time.

The Grant from ECSA allowed me to present one facet of this work: how sediment stratification can be quantified across a blue mussel bed and the importance of collecting metadata on bed structure prior to conducting carbon stock assessments. Sediment grain size correlated with carbon content of sediment. Therefore, without fully understanding sediment stratification across a bed, a blue carbon stock assessment may be inaccurate, either over or under estimating carbon storage of the bed. The work feeds into the development of accurate survey tools for considering shellfish beds as potential blue carbon stores. In the coming months I will be processing cores which were taken in an informed way using the metadata presented at EMBS 54.

Receiving the Charles Boyden Small Grant from ECSA enabled me to deliver the first international verbal presentation of my PhD. The European Marine Biology Symposium, now in its 54th year, begun in Germany and very quickly became focused on participation of delegates from across Europe. The atmosphere of this conference was about creating a welcoming research culture to present work and develop connections with delegates from a diversity of both backgrounds and levels of experience. Although the name of the conference may suggest a European audience, this year's delegates were from over 30 countries, having travelled from as far as China, the USA, Japan, Australia and New Zealand. The conference has become more international each year.

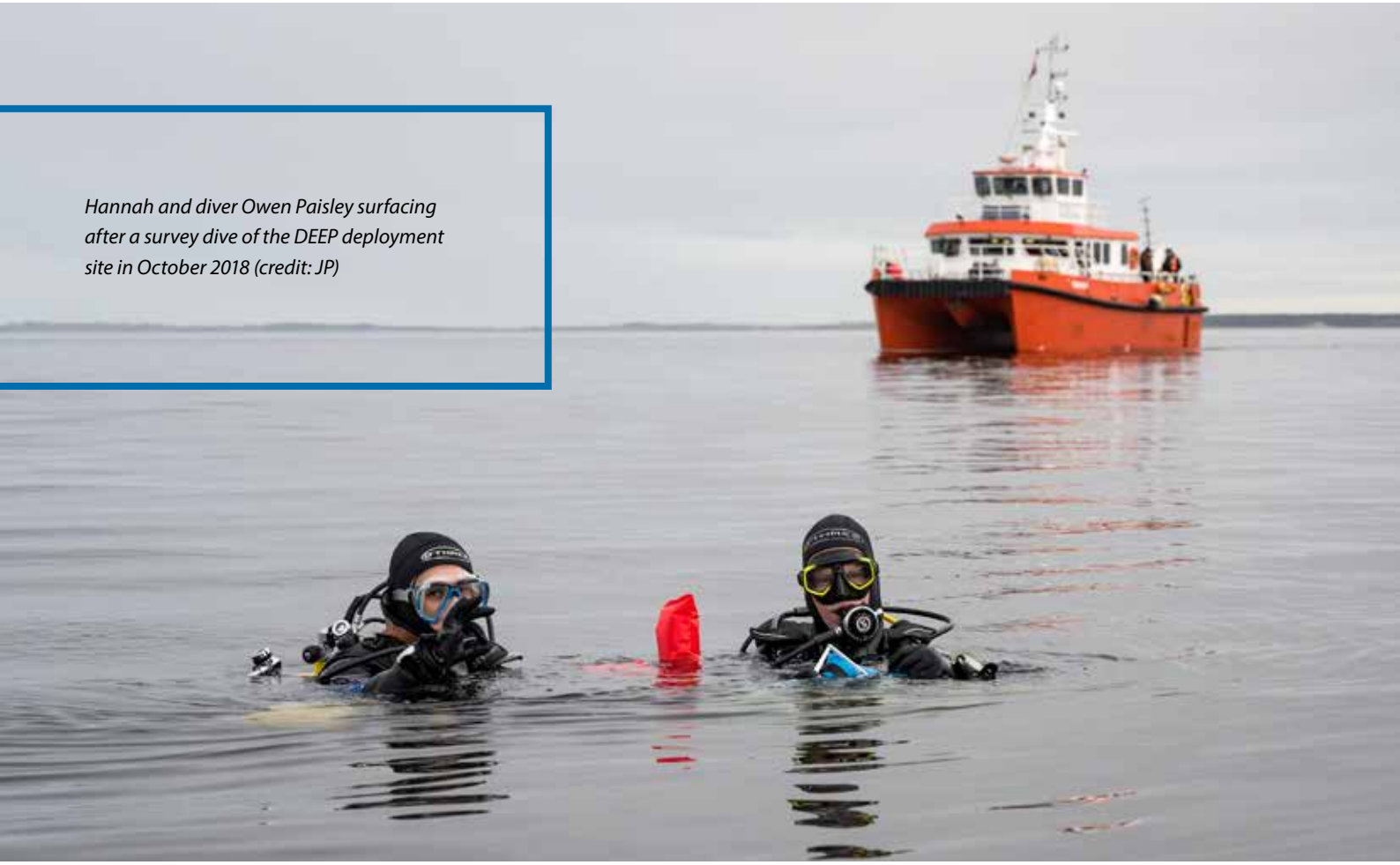


Mud, glorious mussel mud and the blue mussels of the Tain forest bed in the Dornoch Firth (credit; HL)

Following the presentation of this piece of work, discussions were had with delegates from Germany regarding the potential of rhodoliths as carbon stores in the Arctic as demonstrated in the SNH Scottish blue carbon inventory report, as well as the means of quantifying calcification as a carbon source or sink. Work presented by other researchers on infaunal community composition and variation within a mussel bed was directly relevant to my own work: Infaunal community composition changes with sediment type, associated changes in feeding strategies can directly influence the decomposition of stored carbon I.e. an increase in deposit feeders would increase sediment oxygenation facilitating the breakdown of carbon at a higher rate.

Being able to attend EMBS 54 and present this work was a great opportunity as the conference and delegates were all very welcoming, providing good opportunities for networking professionally, as well as taking part in the yellow submarine and kayaking excursions to network socially.

Sediment cores in the -40 freezer in BGS awaiting sectioning, cores were taken from the Dornoch blue mussel bed utilising the sediment map presented at EMBS 54 (credit:HL)



Hannah and diver Owen Paisley surfacing after a survey dive of the DEEP deployment site in October 2018 (credit: JP)

New Membership rates for annual and student members from OECD/DAC countries

ECSA Council wishes to encourage applicants from a greater diversity of countries. We have therefore used the OECD DAC (Organisation for Economic Co-operation and Development, Development Assistance Committee) list to identify which countries would benefit most from reduced membership fees. The DAC list can be viewed at https://ecsa.international/membership-rates, with the first three columns qualifying for the reduced rates, which can be seen below. This list will be reviewed periodically in line with the OECD review.

We hope this will assist people in these countries to benefit from the opportunities ECSA membership offers. Membership benefits include being able to apply for grants to attend meetings, awards for best poster or presentation at ECSA meetings, a reduced rate for online access to the journal Estuarine & Coastal Shelf Science (individuals only), and being part of a world-wide network of scientists. Please see here for more on the benefits of ECSA membership https://ecsa.international/membership.

We hope this will be of assistance to students, and early career workers in particular. If you have queries on this please contact me via the ECSA website.

Membership Rates for (£ sterling) - DAC countries*

Membership type	Rate	Note
Full annual member	12	Per annum
Student member	10	Three year membership, 1 payment only

Clare Scanlan
ECSA Membership Secretary

Dear ECSA Member,

This year promises to be an exciting year for ECSA. We have a UK Focus meeting at Plymouth in late March/early April - see here https://ecsa.international/event/2020/ecsa-focus-meeting-catchment-coast-emphasis-estuaries-and-coastal-waters-sw-england for further information. Then in September we have our biennial international meeting, which this year is being held jointly with EMECS (the International Center for Environmental Management of Enclosed Coastal Seas). This is being held in Hull in the U.K., and is on the theme of 'Estuaries and coastal seas in the Anthropocene'. This is a great opportunity for presenting work, and for meeting a wide variety of scientists from different countries - see here for further details https://ecsa.international/event/2020/joint-ecsa-58-emecs-13-conference-hull-september-2020. There is still time to submit abstracts.

Please note that there are lower registration rates for these meetings for ECSA members, an excellent reason for joining ECSA. Do take note of any early bird rates too. There are also opportunities for applying for grants to attend meetings. Benefits of ECSA membership are listed on our Membership pages https://ecsa.international/membership.

May I remind existing members that subscriptions for the coming 2020/21 membership year are due by 1st April. ECSA cannot function and carry out its charitable aims without its members, so please continue to support our work, and form part of our scientific community.

Clare Scanlan
ECSA Membership Secretary

ECSA58-EMECS13 2020 MEETING POSTPONED

As the spread of COVID-19 continues and the situation is still uncertain, Elsevier and the Conference Chairs have taken the decision to postpone the ECSA58 – EMECS13 conference to 6th-10th September 2021 in Hull, UK. We regret the inconvenience, but this is a sensible decision in light of the dangers to health.
More information will be available shortly.

Beauregard Marsh

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

VI International Rhodolith Workshop 2018

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!

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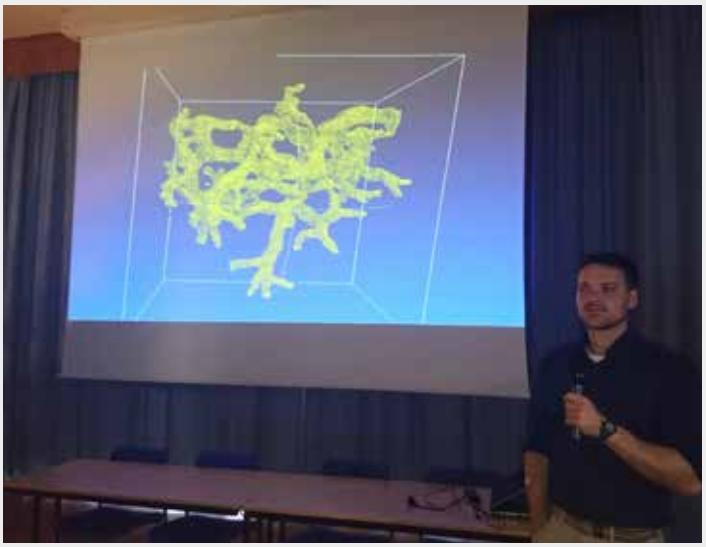

Robert Barnett | Trinity College | Dublin | Ireland

PALSEA 2019 - 21-23July2019

Using ecological and chronological data to improve proxy-based sea-level reconstructions

The Charles Boyden Small Grant from the ECSA enabled me to attend the first meeting of the new phase of PALSEA (Paleo constraints on sea-level rise) at Trinity College, Dublin in July 2019. PALSEA is a long standing international working group that brings together scientists working in ice sheet, climate and sea-level science with the aim of better defining ice sheet response to rapid climate change using observational constraints from past sea-level and ice sheet changes. This first meeting of the new four year phase was focussed on refining proxy-based reconstructions of past sea-level changes through improved ecological and chronological constraints.

Many members of the PALSEA community develop precise sea-level data using coastal sedimentary archives. The development of this data often relies on a quantified understanding of the elevational range that sea-level indicators inhabit within contemporary coastal zones. Over recent decades, this has led to an abundance of modern ecological data that is suitable for reconstructing past sea-level changes over a wide range of time scales. Support from the ECSA allowed me to present a talk entitled *"Ecological constraints on sea-level indicators"* at this meeting. The presentation demonstrated the breadth of ecological data being used to develop high-resolution (decadal scale) and precise (decimetre scale) sea-level reconstructions for the Common Era and the pressing need for a standardised approach for collecting, curating and archiving this data. The talk served as a proposition for a community-wide approach towards developing a framework and protocol for the databasing of modern ecological data used in sea-level science. Such a database will become a valuable tool for: i) developing verified sea-level indicators that are robust across time and space; ii) contributing new data and (ecological) perspectives to discussions in related disciplines (e.g., blue carbon budgets), and; iii) constraining widespread ecological changes driven in recent centuries by sea level and climate changes.

As part of the wider programme, PALSEA 2019 included workshops and breakout sessions that focussed on two widely studied time periods, the Holocene and the Last Interglacial, which are critical for better understanding current ice sheet and sea-level changes in a warming world. The breakout groups discussed open questions in the respective fields, identified important regions of study that currently lacked data and defined future scientific directions. Attending this meeting has allowed me to engage with scientists in related disciplines from around the globe, contribute towards the direction of the scientific community and benefit greatly from the insight of peers and mentors. Thank you, ECSA, for this support.

Jaya Kelvin | Blue Carbon Lab | Deakin University

AMSA CONFERENCE 2019

Fremantle, Perth, Australia

Figure 1 | Jaya presenting his work (first PhD chapter) at AMSA Conference 2019 in Fremantle, Perth, Australia.

Jaya Kelvin is a second-year PhD candidate at Blue Carbon Lab, Deakin University. His research background is coastal oceanography and he has been involved in coastal protection projects back in Indonesia, including his bachelor thesis on damping performance of coastal forest on tsunami wave run-up. Currently, he is working on coastal protection services provided by wetlands in Australia. His thesis is part of Mapping Ocean Wealth project, that aims to address the social and financial benefits of coastal wetlands by estimating economic values of the ecosystem services. His objective is to find the best approach to quantify the protection services by coastal wetlands, particularly in projecting future conditions (ecosystem distribution, wind and wave climates, and socio-economic development) under this changing climate and the unpredicted anthropogenic development in coastal area. Therefore, Jaya is exploring options to use available tools that are built with different complexities to solve Coastal Protection services valuation. With the support from ECSA Charles Boyden Fund, he was able to present his first PhD chapter at AMSA Conference 2019 (Fig. 1). He presented the first valuation of coastal protection service in national scale of Australia. His first approach was using user-friendly model called InVEST (https://naturalcapitalproject.stanford.edu/invest/) and its Coastal Vulnerability toolbox by assessing the Coastal Hazard Index. His participation in the conference has enabled him not only to disseminate his findings, but also to practice public speaking, hone his English skill, and learn to network.

Figure 2 | Jaya deploying water level logger in coastal wetlands

Further, he will employ a more complex model that includes physical processes, e.g. hydrodynamics, using SWAN and XBeach models. He has been deploying loggers across Victoria to measure wave attenuation by coastal wetlands (Fig. 2-3). He hopes that his project could improve the flood model development (vegetation-wave-flow interaction) and thus better estimate the role of coastal wetlands in protecting Australian coasts. Finally, through ECSA membership, he is hoping that he can develop future collaboration with other members who work in related studies.

Figure 3 | Pressure loggers were deployed within coastal wetlands to estimate wave attenuation

Oceans Science meeting 2020, San Diego, USA

a conference report by PhD Stefano Schenone | University of Auckland - New Zealand

I am a PhD student at the University of Auckland, New Zealand, under the supervision of Professor Simon Thrush. With the help of the ECSA Charles Boyden Award, I was able to attend the joint ASLO, AGU and TOS "Ocean Sciences Meeting 2020" in San Diego, California. The event took place in February, with a number of parallel scientific sessions covering a large variety of research projects about oceanography, biology and ecology.

My research on "Scaling-up estuarine ecosystem functions combining field data and drone imagery" focuses on the crucial and hard task of understanding ecosystem functioning and the distribution of ecosystem services at large scales and finding ways to map this information. Although the mapping of ES supply has become a common practice for terrestrial ecosystems, its application in marine ecosystems is hindered by inadequate knowledge of the distribution of communities and habitats and the ecosystem functions that they provide and by the difficulty to obtain high resolution data over large scales. In this regard, remote sensing offers the ability to collect data over large areas in a snapshot of time that can complement field-based sampling methods by extrapolating them into the wider spatial and temporal context.

Using a drone to collect pictures of the sediment surface, Whangateau Harbour, New Zealand.
Photo by Brady Doak

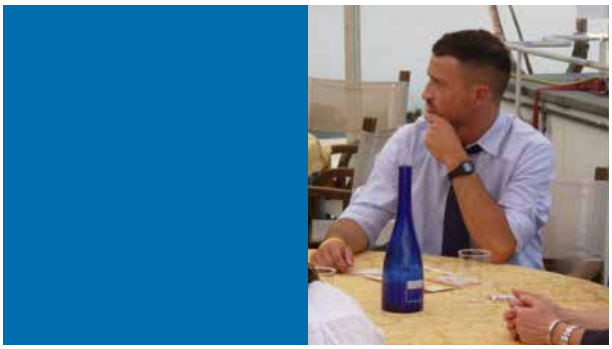

Photo: Enrico Schenone

In this study, we describe a drone-based imaging system and mapping procedure that was developed for constructing high resolution ecosystem functioning models of intertidal soft sediments. Using regression analysis we studied the relationship between biogenic surface features in estuarine soft sediments and ecosystem functions in a heterogeneous landscape. We then mapped the distribution and abundance of biogenic features from drone-captured images of the sandflat to scale-up these relationships to the whole estuary. The image processing procedure uses automatic feature detection and matching and requires minimal human input. The resulting maps combine imagery and field data and show the distribution and quantification of a set of ecosystem functions at the scale of an estuary.

This project is a unique collaboration with Computer Science PhD candidates Mihailo Azar (University of Auckland) and César Adrián Victoria Ramírez (Universidad Nacional Autónoma de México) and their supervisors Dr Patrice Delmas and Dr Alfonso Gastelum Strozzi. Helping with the technological aspects of the project, the main objective of their contribution is to develop an image processing procedure that uses automatic feature detection and matching and requires minimal human input.

To conclude, I want to thank ECSA once more for helping me cover the costs associated with attending OSM 2020. Being close to submitting my PhD thesis, OSM 2020 has been an incredibly important experience and a great opportunity for me to present the outcomes of my research and discuss with researchers in my field as well as other fields. In addition, I was able to network and establish connections with a number of researchers, potentially leading to collaboration in the future.