

# newsletter

Union Géographique Internationale

International Geographical Union

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Margarita Stancheva, Editor

Norbert P. Psuty, Co-Editor

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**Objectives:** The Commission on Coastal Systems encourages the study of coastal systems throughout the world. The Commission sponsors and supports activities leading to the exchange of information regarding coastal systems among our members and throughout the IGU at large. The focus of attention is on interactive systems, both human and physical, and the areas of inquiry include issues such as sea-level rise, land-use changes, estuarine resources, coastal tourism and shoreline development, coastal recreation, and coastal zone management. The Commission will make concerted efforts to emphasize issues of Global Change. Copies of our Newsletter and announcements are on our website: <http://igu-coast.org/>  
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## PHOTO OF THE ISSUE



Spectacular, steep limestone cliffs, up to 70 m high, at Cape Kaliakra', North Bulgarian Black Sea coast (close to Romanian border). This is the largest cape along the Bulgarian coast, jutting out 2 km into the sea. The rich history, the well-preserved landscape, and the beautiful panoramic views make Cape Kaliakra one of the most attractive tourist spots on the Black Sea coast. Kaliakra is a nature and archaeological reserve. It stretches over 687 500 m<sup>2</sup> and comprises wild steppes and incredible cliffs. More than 400 plant species can be found in the reserve. It sits on the Via Pontica, a major bird migration route from Africa into Eastern and Northern Europe. A total of 310 types of birds live on the territory of Kaliakra, as 100 of them require special measures for preservation of their habitats. 106 of these bird species are protected at the European level.

**Submitted by CCS Secretary:** Margarita Stancheva, CCMS, Bulgaria

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## MESSAGE FROM THE CHAIR

I hope that 2021 will be a better year for you all than 2020. What a disruptive year we have been through. As a result of the pandemic, we have seen changes to the way that almost all of our activities are undertaken, and after the distress and heartache, there seems little prospect that we will return to what has been considered normal over recent decades.

In terms of coastal science, I hope that you can enjoy and reflect on some of the issues in this newsletter. In August 2020, the International Geographical Union would have held the International Geographical Congress in Istanbul. Early in the year, it became apparent that this was not going to be possible. The Executive Committee convened its annual meeting virtually, and the Congress has been postponed for a year, with plans to hold it, either in-person, or virtually (or a combination) in August 2021. Our Commission had intended to convene a session on coasts in the Anthropocene at that IGC, and we hope that the session will now go ahead a year later. We would be pleased to receive further contributions and details can be found later in this newsletter.

Meanwhile, Mike Meadows has taken on the role of President of IGU; in his message to the global geographical community (some of which is included in this newsletter), Mike has emphasised how we need to become more representative to truly tackle global environmental change and promote sustainability. During this year, within which international travel has become so restricted, we have seen a greater appreciation of the potential of the ever-increasing range of geospatial datasets. Mike stresses the capabilities of these and other technologies, such as Google Earth Engine. We had explored how such global datasets were enabling a worldwide perspective on coastlines in an earlier newsletter, and that theme is expanded in this newsletter with a contribution by Dhritiraj Sengupta, who completed a PhD with Mike, on the capabilities of GEE.

Whereas it was decided to postpone the IGC, and a number of other conferences, some conference organisers boldly continued with their plans and held a virtual conference. I would particularly like to commend the organisers of the conference on Coastal Hazards in Africa, a virtual meeting that CCS is proud to have sponsored. Online technology enables a hitherto inconceivable interaction between scientists around the world, and it was a particular pleasure for me to listen in real time to many of the talks by participants from across Africa.

It will be interesting to see how international conferences evolve in coming years. The disruptive year behind us has shown us some of the potential for virtual interactions. There have been other coastal initiatives which have adapted and successfully convened in recent months (Coastal Transitions held in New Haven, Connecticut; the ESPON workshop on the Black Sea), and several of our more enterprising colleagues have organised series of coastal webinars. We have seen that it need not be essential to undertake air travel of many hours to participate in person in symposia and other networking events. Of course, the experience is not the same, and we are all keen to meet up once again with our colleagues and collaborators, and share in the exchange of ideas and knowledge. But, it is hard to see a rapid return to the way that we did things only 12 months ago; these new technologies offer so much potential to re-invent collaboration in science and education. I believe we can anticipate some exciting new ways of working together and sharing knowledge.

The Commission on Coastal Systems would like to engage more closely with coastal scientists in sharing these exciting developments; our mission is to build stronger and more participatory networks. To this end we need to

update our capabilities and broaden our reach. We would welcome expressions of interest from coastal scientists who would like to assist in doing this; we'd be keen to hear your ideas, and to add additional members to the Steering Committee who can further develop those suggestions.

I am pleased to indicate that the Commission on Coastal Systems has a new website; please note the URL - <http://igu-coast.org/> - and update your bookmarks accordingly. Dhritiraj Sengupta has joined the Steering Committee, and I'd like to express my appreciation to him for setting up this new website, as well as overseeing our transition into social media with a new CCS Twitter account @igu\_on. I also thank Jeff Ollerhead for having maintained the previous CCS website over recent years. This newsletter has been produced by Margarita Stancheva who continues to play an essential role in supporting CCS as Secretary and newsletter editor, ably assisted by Norb Psuty.

In this newsletter, we provide information on recent conferences, forthcoming conferences, recently released coastal books, and a number of other coastal topics. A particular feature that is developed in this issue relates to the use of drones in coastal research. Just as it has become simple to access satellite imagery of almost anywhere on the globe, to zoom there, and to marvel at the complexity and beauty of the coastline, so too have other ways developed to visualise and monitor the coast. Remote piloted aircraft systems, also called unmanned (or unpiloted) airborne vehicles, and to many of us more simply known as drones, offer a new scale of visualisation of the landforms and ecosystems that we all seek to understand in greater detail. In this issue, several colleagues have generously shared their experiences and outlined some recent developments using this smaller scale of technology.

A particularly noteworthy development is the beginning of the United Nations Decade of Ocean Science for Sustainability. 2021 marks the start of this bold initiative to extend our knowledge of the oceans in order to better manage them in a sustainable way. We as a Commission are pleased to promote this program (see details in this newsletter); we consider that Geography has a very substantial role to play both with respect to the land, but also the 70% of the globe that is covered by ocean. Indeed, Coastal Systems encapsulate the interface between the two.

I hope that you enjoy the contents of this newsletter, I wish you all a safe (and less disruptive) year. The success of the Commission on Coastal Systems revolves around the participation of coastal scientists like yourselves. Please visit our website, and contribute your thoughts and findings.

COLIN WOODROFFE

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## MEETINGS / SESSIONS SPONSORED OR CO-SPONSORED BY THE COMMISSION ON COASTAL SYSTEMS

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**AUGUST 16 – 20, 2021, 34<sup>th</sup> INTERNATIONAL GEOGRAPHICAL CONGRESS (IGC)  
“GEOGRAPHY: BRIDGING THE CONTINENTS”, ISTANBUL, TURKEY**

**34<sup>th</sup> International  
GEOGRAPHICAL  
Congress**  
17-21 AUGUST, 2020 • Istanbul  
Istanbul University  
"Geography: bridging the continents"



At IGC, CCS will convene a session entitled “**Sustaining coastal and marine environments in the Anthropocene**”. The burgeoning populations of the continents are placing increasing pressures on the coastline and the marine areas that surround them. The seaside is generally an area of beauty and bounty. People value these environments for their

abundant resources, as well as for cultural and recreational sustenance. However, as the global population expands, the connections and conflicts between people and nature are nowhere more apparent than in Coastal Systems. The **Commission on Coastal Systems** encourages the study of coastal areas throughout the world and welcomes papers on sustaining coastal and marine environments in the Anthropocene. The focus of this session is on interactive systems, both human and physical. Coastal and adjacent marine zones are threatened by natural and anthropogenic activities in the catchments. The low-lying plains associated with deltas and estuaries support ever increasing populations engaged in agriculture, fishing, aquaculture and industrial activities. Rapid urbanization is being

experienced with many of the world's megacities on deltas associated with big rivers; deltaic cities are home to more than 150 million people and seem likely to exceed 200 million in the next two decades. These human activities are directly impacting coastal and marine ecosystem services through pollution and degradation. The pressures are exacerbated by climate change which is particularly evident in these areas through observed trends of sea-level rise. There is pressing need for adaptation along much of the world's coastlines.

This coastal session will provide a chance for a wide range of physical and social scientists, students, administrators, stakeholders and decision makers to share their insights and invaluable experiences on the state of the coast, and to move towards much wiser use and management of coastal and marine resources so humans can protect and sustain these critical, yet vulnerable habitats for generations to come.

**The session is being organized by Colin Woodroffe (Australia) and Margarita Stancheva (Bulgaria)**

The 34<sup>th</sup> IGC conference has been postponed due to the ongoing global COVID-19 spread and it will be held at the same venue between 16-20 August 2021. Due to the postponement the important dates of the conference have been rescheduled, find the details below:

**Deadline for abstract papers and posters submission** – 11 January 2021

**Notification of acceptance (new abstracts)** – 08 February 2021

**Authors' registration deadline** – 05 April 2021

**Early bird registration** – 05 April 2021

**Regular registration** – 06 April – 21 June 2021

**Late & On-site registration** – 22 June – 20 August 2021

Previously the organizers have received total of 170 sessions suggested for the conference and after the abstract submission deadline 140 session have received submissions. They have decided to keep these active sessions only and the submission platform for next year will only include these active topics. It is not planning to open session applications for next year, **however any session proposals regarding the COVID-19 pandemic will be welcomed by the local organizing committee.**

Stay tuned via the congress website for more information on abstract submission, deadlines, registration and other details: <https://www.igc2020.org/en/default.asp>.

For more details, please contact **Colin Woodroffe**: [colin@uow.edu.au](mailto:colin@uow.edu.au)

**COASTGIS 2021: "SUSTAINABLE COASTAL PLANNING IN A CHANGING WORLD"**  
**RASEBORG FINLAND**



*Photo: Ekenäs Old Town by Johan Ljungqvist for Visit Raseborg*



**CoastGIS 2021** will be held on **16-18 September 2021** in Raseborg, Finland as a hybrid event, enabling both in-person and virtual participation. We will communicate further about the new submission and registration periods, programme, and other information when more arrangements have been made. This information will be shared on the CoastGIS 2021 website and via newsletter.

If you would like to be added to the newsletter mailing list, please send an email to [coastgis2020@novia.fi](mailto:coastgis2020@novia.fi) with the subject line "Newsletter".

## Overview

CoastGIS 2021 will be held in Raseborg on the South Coast of Finland at Novia University of Applied Sciences. The symposium will be the 14<sup>th</sup> consecutive symposium for an international exchange of knowledge, ideas and experience on how spatial data and information technologies aid marine and coastal zone managers and stakeholders in better understanding and managing coastal space and resources. As in previous years, a wide range of topics will be covered including technological advances and analyses, as well as applications and policies for solving coastal challenges. Field trips to the spectacular Finnish archipelago and the historical town Fiskars will be organized!

The symposium theme "**Sustainable Coastal Planning in a Changing World**" refers to the challenges faced worldwide in light of sustainable development and emphasis will be on cooperation in spatial planning between countries. The symposium aims to address recent challenges in managing our coastlines effectively and sustainably.

## What is CoastGIS?

CoastGIS is a biennial series of symposia that brings together practitioners and researchers in the fields of marine and coastal Geographic Information Systems, remote sensing, and computer cartography. It is an established major international coastal and marine event attracting delegates from around the globe. A wide range of topics have been covered in previous years covering technological advances and progress, and the evolving challenges.

The **CoastGIS International Symposium** is usually held once every two years under the joint scientific sponsorship of the Commission on Coastal Systems of the International Geographical Union (IGU/CCS) and the Commission on Marine Cartography of the International Cartographic Association (ICA/CMC).

The first International Symposium on GIS and Computer Cartography for Coastal Zone Management, CoastGIS, took place at University College Cork in Ireland in 1995. The second CoastGIS meeting took place in Aberdeen, Scotland, two years later and, since then, CoastGIS symposia have been held in Brest, France in 1999; Halifax, Nova Scotia in 2001; Genoa, Italy in 2003; Aberdeen again in 2005; Sydney and Wollongong, Australia, in 2006; Santander, Spain in 2007; Santa Catarina, Brazil, in 2009; Oostende, Belgium, in 2011; Victoria, on Canada's West Coast in 2013, Cape Town, South Africa in 2015 and Ísafjörður, Iceland in 2018. Over the years the CoastGIS events continue to provide a showcase for new developments in information management and technology as well as a learning experience for all involved in coastal zone management, science, and research.

## Abstract submission and registration

Abstract submission and early bird registration will tentatively open in early 2021. We will communicate finalized schedules on the CoastGIS website and via newsletter. **Tentative schedule:**

- **Abstract submission** will be open from **15 January – 31 March 2021**
- **Early bird registration** will be open from **15 January – 31 March 2021**
- **Notification of abstract acceptance** will be provided on **15 April 2021**
- **Release of symposium programme** will be made on **15 April 2021**
- **General registration** will be open from **15 April – 31 August 2021**

Contributions related to the following themes, but not restricted to them, are invited for abstract submission:

- **Coastal surveys and mapping**
  - Satellite applications
  - Seabed mapping
  - Ecological surveys
- **Data Analyses / Analytical approaches**
  - Statistical modelling
  - Data bases and meta data
  - Marine spatial planning
  - Decision support for marine spatial planning and management
  - Conservation prioritization
  - Remote sensing and spatial analysis in coastal zone management
- **Policy**
  - International perspectives/applications
  - Governmental perspectives/applications
  - Consumer/citizen perspectives/applications
  - GIS applications for fisheries and coastal resources management
- **Sustainability**
- **Climate change**
  - Impacts and adaptation of coastal settlements
  - Coastal vulnerability assessment – strategies for mitigation and adaptation
- **Coastal Societies**
  - Data on demographic and social changes in coastal settlements

Follow the conference website for further updates and details: <https://www.novia.fi/coastgis2020>  
 For further information, please contact: [coastgis2020@novia.fi](mailto:coastgis2020@novia.fi)

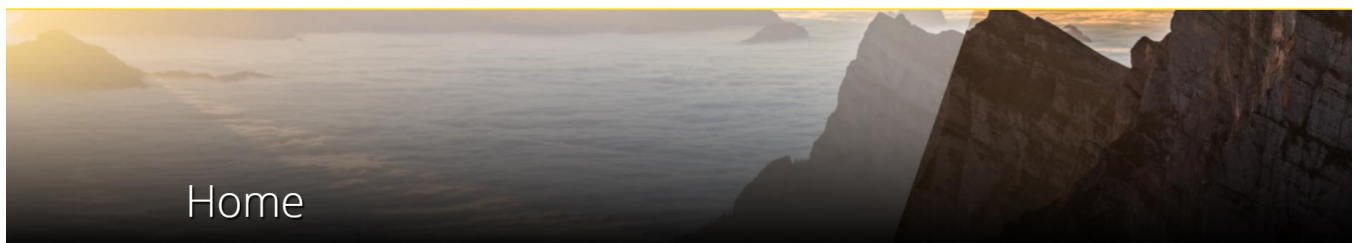
To be added to the CoastGIS 2021 newsletter mailing list, please send an email to [coastgis2020@novia.fi](mailto:coastgis2020@novia.fi) with the subject line "Newsletter".

**APRIL 19-30, 2021. EUROPEAN GEOSCIENCES UNION GENERAL ASSEMBLY vEGU21: GATHER ONLINE (#vEGU21)**



vEGU21: Gather Online | 19–30 April 2021

ABOUT ▾ ABSTRACTS & PROGRAMME ▾ GUIDELINES ▾ ↗ ▾



In 2021, EGU will be hosting vEGU21: Gather Online (#vEGU21), a fully virtual meeting that will be held in place of the General Assembly in Vienna. vEGU21 will provide as full a representation of the experience that EGU members enjoy at the annual meeting in Vienna as possible.

## GM 6.6 Session: Coastal Zone Geomorphological Interactions: Natural versus Human-Induced Driving Factors

The session will be organised for the thirteenth time at the EGU2021 General Assembly. The session gives priority to the subjects of coastal geomorphology: evolution of coastal landforms, coastal morphodynamics, coastline alterations and various associated processes in the coastal zone, e.g. waves and sediment drift, which shape coastal features and cause morphological changes. Contributions to this session will focus on the mechanisms responsible for coastal erosion and shoreline behaviour (advance or retreat) and will address the many natural and human factors involved. The topics may include work on predictions of shoreline change and discussions on the effects of human activities and their continuing contribution to coastal changes. The session will also cover submissions on coastal vulnerability to the combined effects of natural and human-related hazards, any type of coastal and environmental sensitivity classifications, and risk assessments. Studies related to Marine Spatial Planning (MSP), including Integrated Coastal Management (ICM) are also welcome. For any MSP and ICM, it is essential to consider the dynamics across the land-sea interface, i.e. the Land-Sea Interactions (LSI) that involve both natural processes and the impact of human activities.

This session is being organised by Hannes Tonnison (Estonia), Margarita Stancheva (Bulgaria), Andreas Baas (UK), Giorgio Anfuso (Spain) and Guillaume Brunier (France).

The Session is sponsored by the Commission on Coastal Systems (CCS) of the International Geographical Union (IGI) (<http://igu-coast.org>).

Session link: <https://meetingorganizer.copernicus.org/EGU21/session/40296>

**Abstract submissions will be accepted until 13 January 2021 at 13:00 CET.**

Please follow the guidelines on this page for submission of your abstracts:

[https://egu21.eu/abstracts\\_and\\_programme/how\\_to\\_submit\\_an\\_abstract.html](https://egu21.eu/abstracts_and_programme/how_to_submit_an_abstract.html)

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## REPORTS ON MEETINGS

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### OCTOBER 27-29, 2020. COASTAL HAZARDS IN AFRICA, 2020, DURBAN, SOUTH AFRICA



The 2<sup>nd</sup> Edition of the International Symposium on Coastal Hazards in Africa went virtual in 2020 in response to the global pandemic, hosted by SAIAB (South African Institute for Aquatic Biodiversity – Durban, South Africa) in partnership with the University of Stirling, and the Oceanographic Research Institute.

The virtual platform was not without its challenges, particularly technical ones, with delegates spread far and wide. However, the experience was good with positive feedback. A great advantage of the virtual edition was that it allowed more accessibility and visibility. Seven sessions

over the three days, including one Industry Spotlight and three Keynotes sessions, saw 69 delegates interacting from 13 countries and over 50 institutes. Registered delegates were able to join the scheduled Zoom webinar series, while non-registered parties were able to watch via the live stream on the conference Facebook page. The latter reaching a peak of 2521 people!

A wide range of topics were covered highlighting the diversity of coastal hazards faced in Africa and relevant globally. This diversity represents a significant challenge to research and management of the coastal zone, yet equally represents great potential for collaboration between those in the coastal field. The opportunity to develop relationships between research, industry and national/local government is significant, and necessary, if we are to produce results and outputs beyond research.

Outcomes from this conference are:

- Start formalizing a network and convert the 2020 conference website to Coastal Hazards in Africa network website;
- Promote hybrid conference platform for greater accessibility across Africa and globally;
- Build a database of contacts for working groups / committees / associations / researchers and schedule periodic meetings;
- The location of the next edition would most likely take place in Senegal;
- A Special Issue publication from the conference will be considered, the details of which will be finalized following confirmation of potential contributors.

Following two successful editions of the **International Symposium on Coastal Hazards in Africa** (Morocco 2018 and Durban (virtual) 2020) the organizers are setting up a more formal network of interested parties. The goal of the network is to:

- Provide a forum for interaction, collaboration and communication about African coastal hazards, and generate debate on current issues
- Contribute to knowledge generation relating to coastal hazards in Africa
- Co-ordinate activities by stimulating appropriate inter-disciplinary and inter-institutional collaboration
- Help develop capacity in all sectors
- Distribute newsletters discussing and presenting relevant topics
- Disseminate information of meetings, conferences, research and funding opportunities as they arise
- Steer and support future symposia on Coastal Hazards in Africa

This will include periodic newsletters, relevant updates on opportunities and event information. The conference website and Facebook page will evolve into virtual network hubs with regular updates and information.

Should you wish to join the network, please contact **Errol Wiles**: [E.Wiles@saiab.ac.za](mailto:E.Wiles@saiab.ac.za).

**Submitted by CCS Steering Committee Member:** Dr. Abdelmounim El M'rini, Morocco

## **DECEMBER 15, 2020. ESPON PEER LEARNING WORKSHOP: THE ROLE OF MARINE SPATIAL PLANNING IN REDUCING MARINE POLLUTION IN THE BLACK SEA (Virtual).**



CCS Secretary Dr. Margarita Stancheva was a key note speaker at **ESPON PEER LEARNING WORKSHOP, conducted virtually on 15 December 2020** and presented how the integration of Land-Sea Integrations (LSI) into the MSP can help to reduce marine pollution in the Black Sea (under the MARSPLAN-BS II project, funded by the European Commission's DG MARE via EMFF).

This peer learning workshop (PLW) explored the applicability of marine pollution management strategies of other European seas in the Black Sea context. While these practices could potentially be interesting, they probably cannot

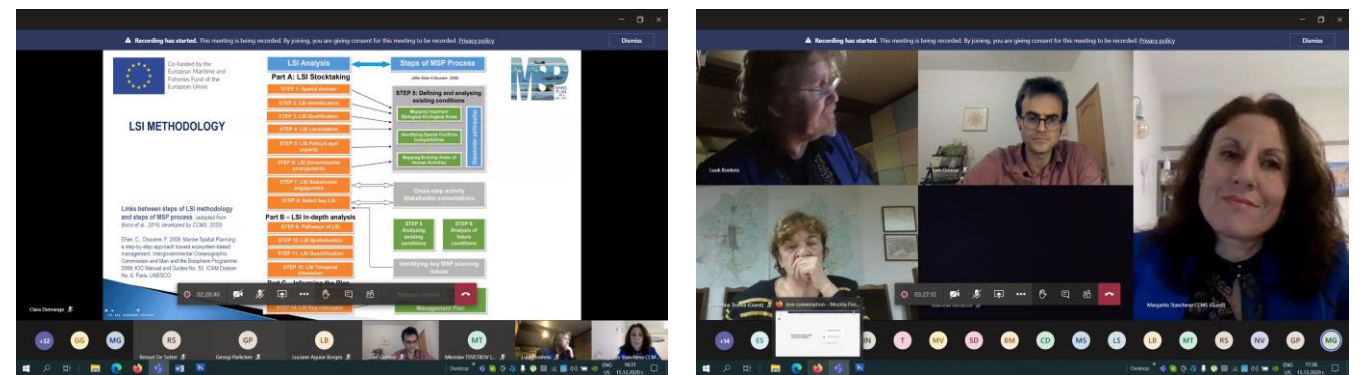


be applied directly. The situation in the Black Sea is not only determined by the environmental particularities but also by the relations between the numerous actors engaged in different activities.

Three questions lead the presentations and the following discussions during the peer learning workshop:

1. What are the environmental specificities and the stakeholder characteristics that define the situation in the Black Sea with regard to marine pollution?
2. What practices and strategies from other European seas are relevant to addressing the issue of marine pollution in the Black Sea?
3. How should these practices be adapted in order to be applicable in the context of the Black Sea?

Follow more information and presentations on the ESPON website: <https://www.espon.eu/espon-peer-learning-workshop-role-marine-spatial-planning-reducing-marine-pollution-black-sea>



Submitted by: CCS Secretary Margarita Stancheva, CCMS, Bulgaria

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## MEETINGS WITH COASTAL INTEREST

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**RE-SCHEDULED: MAY 3-6, 2021. INTERNATIONAL COASTAL SYMPOSIUM 2021, SEVILLE, SPAIN**

In the interest of global safety and at the recommendation of health advisors worldwide, it was decided to postpone the International Coastal Symposium (ICS) until 2021. The Symposium has been re-scheduled for May 2021 (May 3-6), at the same location (Seville, Spain).



The symposium will be hosted by the Coastal Environments Research Group, Universidad Pablo de Olavide de Sevilla, under the auspices of the Coastal Education and Research Foundation (CERF) and the Journal of Coastal Research (JCR).

The ICS brings together delegates from all over the world to collaborate and discuss the most current coastal research studies and projects. The proceedings of the conference, published as peer-reviewed papers in the Journal of Coastal Research, represent an invaluable resource for coastal scientists, engineers and managers.

For further information and updates visit the event website: <https://www.ics2020.org/>

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**SEPTEMBER 6-10, 2021. ECSA 58 - EMECS 13, ESTUARIES AND COASTAL SEAS IN THE ANTHROPOCENE, STRUCTURE, FUNCTIONS, SERVICES AND MANAGEMENT, HULL, UK**



The ECSA's next major symposium, ECSA 58 - EMECS 13: Estuaries and coastal seas in the Anthropocene – Structure, functions, services and management, will take place from the 6-10 September 2021 in Hull, UK.

The structure and functioning of our estuaries and seas are shifting within what is now termed the Anthropocene due to diverse drivers and pressures from local to global scales. The resulting threats to the natural and human features of 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.

ECSA 58 & EMECS 13 brings together a global multi-disciplinary community of researchers, educators and practitioners to address issues of outstanding importance in the science (both natural and social) and management of estuaries and coastal seas in this rapidly changing world.

**Contributions are invited within the following broad topics, covering the diversity of threats and opportunities facing estuarine, coastal and marine ecosystems and the people they support:**

- Physical, chemical and ecological structure and functioning
- Hydrodynamics and hydrology, including modelling
- Adequacy of modelling and prediction of change
- Endogenic Managed Pressures and Exogenic Unmanaged Pressures
- Interference with connectivity across and between systems
- Repercussions of the loss of resources (space, energy, water, etc.)
- Loss and gain of habitats and ecosystems
- Recovery, restoration and creation of habitats and populations
- Recovering and increasing resilience to future changes
- Urbanisation and industrialisation of estuaries and semi-enclosed seas
- Ecosystem Services and Societal Goods & Benefits
- Blue Growth and Green Growth – maximising benefits and minimising impacts
- Governance and adaptive management – from the local to the global
- Holistic approach to successful and sustainable management

- Coping with moving baselines
- Science-Policy communication

A number of special sessions are also envisaged, such as: **Anthropogenic pressure, Climate adaptation and mitigation, Coastal conservation, Coastal marine habitats, Ecosystem creation and restoration, Rivers, catchments and wetlands, Sustainability and resilience, and other.**

**Supporting Publications are foreseen in:**



**Abstract Submission Deadline: 9 April 2021.**

Stay tuned for further information following the conference website: <http://www.estuarinecoastalconference.com/>.

**SEPTEMBER 13-17, 2021. LITTORAL CONFERENCE 2021, COSTA DA CAPARICA, PORTUGAL**



16<sup>TH</sup> INTERNATIONAL CONFERENCE  
**LITTORAL 21**  
 13 - 17 SEPTEMBER | COSTA DA CAPARICA, PORTUGAL  
 ADAPT OUR COAST FOR A SUSTAINABLE FUTURE

The coastal and marine Community is pleased to announce its 16<sup>th</sup> conference Littoral to be held on the 13-17 September 2021, hosted by nova School of Science and Technology of NOVA University Lisbon (FCT NOVA). **Conference Special topic: Adapt our coast to a sustainable future.**

Coastal areas are very dynamic ecosystems that have been crucial for human activities for centuries. Its remarkable beauty, unique resources and exceptional ecosystem services make these areas extremely attractive for humans to live in. However, with the increase of population density in coastal areas, several environmental problems arise from that pressure, namely pollution, overfishing and habitats degradation, among others, causing losses in biodiversity and ecosystem services. These problems, nevertheless, are cross-bordered and, for that reason, it is important to

involve local, national and international decision-makers, as well as international organizations through treaties and policies that can help achieve both conservation and economic growth in marine environments.

Nowadays, millions of people live in already sensitive and vulnerable coastal areas, many of them below or very near sea-level. Besides the pressures caused by humans, coastal areas and its communities are also exposed to extreme events, that endanger population and coastal infrastructures, causing economic and environmental losses. Climate Change will aggravate these issues, causing these areas to become even more vulnerable to environmental risks. According to IPCC, it is expected that sea-level will rise in the next century and that storms will become more energetic and violent, with increased frequency. This will increase the risk of overtopping and flooding, as well as the damage and destruction of structures and dune erosion. Urgency to act combined with the large-scale societal changes call for new solutions in every sphere of our societies. **For that reason, Littoral21 conference is a multidisciplinary event that aims to address these issues in an integrative and comprehensive manner.** To this end, are invited contributions, which either explore the sustainability implications of coastal areas and/or provide solutions to the challenges presented above. This conference intends to bring together delegates from all over the world to collaborate and discuss the most current coastal research studies and projects. The discussions and knowledge that will emerge from the conference represent an invaluable resource for coastal scientists, engineers, and managers.

## **CONFERENCE THEMES:**

### **1. Literacy, education and governance**

Ocean literacy and Education for a sustainable future

Governance, active citizenship, and coastal communities

### **2. Planning and management**

Marine and coastal spatial planning and green/blue infrastructure

Source to sea – River basin and coast interactions

Nature-based solutions for coastal ecosystem restoration and management

### **3. Blue and circular economy**

Blue and circular economy in coastal areas

Fisheries, Aquaculture and other sea food resources

Tourism and Port Activities

Innovative energy production and mineral resources

### **4. Risks and climate change**

Climate change adaptation processes and strategies

Risk assessment and management and emergency planning

Offshore and nearshore infrastructure for coastal protection

EU policy and projects – managing global change and environmental risks

### **5. Coastal monitoring, mapping and modelling technologies**

Remote sensing and UAV (unmanned aerial vehicle)

Geospatial technologies (GIS)

### **6. Ecosystems, ecological services and biodiversity**

Coastal Ecosystem restoration and management

Biodiversity, coastal ecosystems, nature conservation and ecosystem services

### **7. Aquatic ecology and quality**

Ecotoxicology and risk assessment

Marine litter and microplastic

Bioremediation

Biosedimentary Dynamics of coastal environments

Wastewater treatment, emerging components, and coastal water quality



**Abstracts submissions:** 8 January 2021.

**Visit the LITTORAL 2021 website – [www.littoral21.com](http://www.littoral21.com) for more information and deadlines and stay tuned for more updates!**

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## HIGHLIGHTS & FEATURES

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### The International Geographical Union (IGU) and the International Geographical Congress (IGC)



The International Geographical Union (IGU) promotes the study of geographical problems; initiates and coordinates geographical research requiring international cooperation; promotes scientific discussion and publication; provides for the participation of geographers in the work of relevant international organizations; facilitates the collection and diffusion of geographical data and documentation in and among its member countries; promotes International Geographical Congresses. See the IGU webpage - <https://igu-online.org/>

The International Geographical Congress (IGC) is the major congress of the IGU. It is traditionally held every fourth year. However, Covid-19 necessitated postponement of IGC 2020, which is now scheduled to be held 16-20 August 2021 in Istanbul. See <https://www.igc2020.org/en/default.asp>

The Executive Committee of IGU held their first online General Assembly in the IGU history in 2020, and Professor Mike Meadows took on the role of President, having previously served as Secretary. In his welcome message in the most recent IGU e-newsletter, Mike said:

*In reflecting on the role of the IGU, it occurred to me that one of our major tasks must surely be to facilitate international cooperation in our discipline – in other words to promote genuine internationalism. If this is to happen, Anglo-American dominance needs to be challenged and academic geography must strive to be as globally representative as possible. .... This becomes even more important against the background of global environmental change and in the need for geographers in particular to embrace the United Nations Sustainable Development Goals (SDGs) which have the objective of 'leaving no one behind.'*

*Several challenges are evident. Firstly, scientific endeavour needs to be advanced across all nations to reduce imbalances in capacity and enable the participation of a more complete global community to address the key global challenges that are highlighted in the SDGs.*

*The free and unfettered availability of published scientific information and of scientific data is also essential if we are to address imbalances and inequities in the academic world. This too is easier said than done, although a wide range of geospatial data products are becoming more accessible through platforms such as Google Earth Engine..... Freedom of movement and exchange of ideas among scientists, along with improved opportunities for international exchanges and conference attendance, are essential elements of internationalism.*

*In summary, then, while the goal of internationalism is a noble one, there is a danger that it may serve to deepen, rather than alleviate, the disparities and inequities that persist in the global academy. The IGU can certainly contribute to ongoing efforts to iron out these imbalances; this is essential to ensure that the potential benefits of internationalism are more widely and more equitably shared.*

The **Commission on Coastal Systems (CCS)** is one of the Commissions within IGU. The IGU Executive has approved the continuation of the Commission for another four years, but encourages broadening of the membership of the Steering Committee. Accordingly, we would be pleased to hear from coastal scientists who have an interest in contributing to the further development of the coastal network. The CCS has a website that can be found at: <http://igu-coast.org/>.

Contact information for CCS Officers and Steering Committee members can be found on the website along with past and present newsletters.

The Commission is sponsoring a session at the 2021 IGC in Istanbul in August 2021. The focus of the session is: Sustaining coastal and marine environments in the Anthropocene. Abstracts for IGC 2021 are due 11 January 2021, and notice of acceptance will be provided 8 February 2021.

**If you are interested in becoming a member of the CCS, an on-line membership form is available.**

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## A DECADE OF OCEAN SCIENCE



The United Nations General Assembly in 2017 proclaimed the UN Decade of Ocean Science for Sustainable Development (2021-2030) ('the Ocean Decade' - <https://www.oceandecade.org/>)

This seeks to stimulate ocean science and knowledge generation to reverse the decline of the state of the ocean system and catalyse new opportunities for sustainable development of this massive marine ecosystem. The vision of the Ocean Decade is 'the science we need for the ocean we want'. The Ocean Decade provides a convening framework for scientists and stakeholders from diverse sectors to develop the scientific knowledge and the partnerships needed to accelerate and harness advances in ocean science to achieve a better understanding of the ocean system, and deliver science-based solutions to achieve the 2030 Agenda. The UN General Assembly mandated UNESCO's Intergovernmental Oceanographic Commission (IOC) to coordinate the preparations and implementation of the Decade, with the following aspirational outcomes:

1. A **clean ocean** where sources of pollution are identified and reduced or removed.
2. A **healthy and resilient ocean** where marine ecosystems are understood, protected, restored and managed.
3. A **productive ocean** supporting sustainable food supply and a sustainable ocean economy.
4. A **predicted ocean** where society understands and can respond to changing ocean conditions.
5. A **safe ocean** where life and livelihoods are protected from ocean-related hazards.
6. An **accessible ocean** with open and equitable access to data, information and technology and innovation.
7. An **inspiring and engaging ocean** where society understands and values the ocean in relation to human wellbeing and sustainable development.

**The International Geographical Union** recognises several emerging challenges, including hazards such as the increasing frequency of cyclones, coastal flooding and seawater intrusion into groundwater, with many regions now more vulnerable to such events. These issues are exacerbated by human activities, causing additional flooding, outflows of waste from urban areas, and industry, agriculture and fishing impacts. Substantial advances in our understanding of the oceans can be anticipated using sophisticated models; however, these need to be based on a considerably expanded range of observations using remote sensing and geospatial technology. In combination, these could enable better predictions of the consequences of disasters and contribute towards sustainability.

**The IGU has identified several objectives:**

1. Short and long term integrated observations of atmosphere, ocean, and coastal systems to forecast critical environmental changes.
2. Improvements in early warning capability of climate and oceanic phenomena through dynamical models.
3. Mapping multi-hazard weather events and coastal vulnerability, exposure, risk and disasters.
4. Understanding interactions between the ocean and coastal systems through land use changes at various spatial and temporal scales.

5. Development of community preparedness plans for people and resources in order to contribute towards Integrated Coastal Zone Management.
6. Promotion of resilience building of people and places for ocean and coastal sustainability through spatial, sectoral and institutional integration.

The IGU is considering establishing a Commission focussed on the ocean, and has discussed this with the Future Earth Coasts Committee. It has identified several tasks, including:

1. Identifying needs and issues relevant to policy-making
2. Proposing scientific methodologies and frameworks for sensors
3. Establishing customized interdisciplinary commissions and training programmes, particularly in the fields of remote sensing and spatial information technology
4. Assist in organisation of inter-disciplinary scientific sessions at relevant conferences
5. Liaise between different scientific unions and societies in the field

The Commission on Coastal Systems recognises that a better understanding of the ocean is an essential ingredient in more sustainable management of coastal systems around the world. We invite ideas and expressions of interest by which CCS can become more actively involved in the Ocean Decade, focusing on the links between the ocean and the coast.

**CCS Chair: Colin Woodroffe**

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The official **Newsletter of the Coastal Education and Research Foundation, *JUST CERFing***, is available for viewing at: <http://cerf-jcr.org>, under the JCR CONTENT heading. The Newsletter has information about the current issue of the Journal of Coastal Research, series of short articles, as well as information on the Special Issues of the journal and recently published books. It is an extremely well-produced review of the materials conveyed by the Foundation.

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## **COASTAL MONITORING & CHANGE STUDIES**

**David R. Green<sup>1</sup>, Andrew Smith<sup>1</sup>, Dmitri Mauquoy<sup>2</sup>, Brian Burnham<sup>3</sup>, Billy J. Gregory<sup>1,4</sup>, Jason J. Hagon<sup>5</sup>, Alex Karachok<sup>1,4</sup>**

<sup>1</sup> *UCEMM/AICSM, Department of Geography and Environment, University of Aberdeen, Scotland, UK*

<sup>2</sup> *Department of Geography and Environment, University of Aberdeen, Scotland, UK*

<sup>3</sup> *Department of Geology, University of Aberdeen, Scotland, UK*

<sup>4</sup> *DroneLite, Forres, Moray, Scotland, UK*

<sup>5</sup> *GeoDrone Ltd., Cornwall*

### **Salt Marsh Monitoring, Mapping and Modelling**

In the previous CCS Newsletters (July 2017 and July 2020) we reported on some of the drone-related coastal monitoring and mapping that we had been undertaking in UCEMM and AICSM.

In this short article, we wanted to bring you up to date on some of the developments we have been working on via a number of coastal projects using UAV technology.

One of the projects that we have been working on is part of a PhD research project (Andrew Smith) looking into the monitoring and mapping of saltmarsh around the Scottish coastline. The purpose of the project is to firstly determine



if it is possible to acquire stereo-imagery using an off-the-shelf UAV platform and sensor (e.g. DJI Mavic Pro 2, DJI Mavic Mini, DJI Spark), and with the aid of soft-copy photogrammetry to generate high resolution Digital Terrain Models (DTM) and Digital Surface Models (DSM) of the saltmarsh. The orthophotos, mosaics and DTMs will then be used to study the saltmarsh vegetation to see if it is possible to remotely map and monitor the vegetation communities. Alongside the imagery acquired from the various multi-rotor platform, some of the work has included using a Wingtra VTOL (Vertical Take-off and Landing) drone which was initially tested for coastal work where large areas of coverage are required, together with stability of the drone platform and camera in windy environment.



**Photo 1** – Saltmarsh at Tynninghame, Lothian, Scotland, UK (DJI Mavic 2 Pro – Billy J. Gregory – DroneLite)

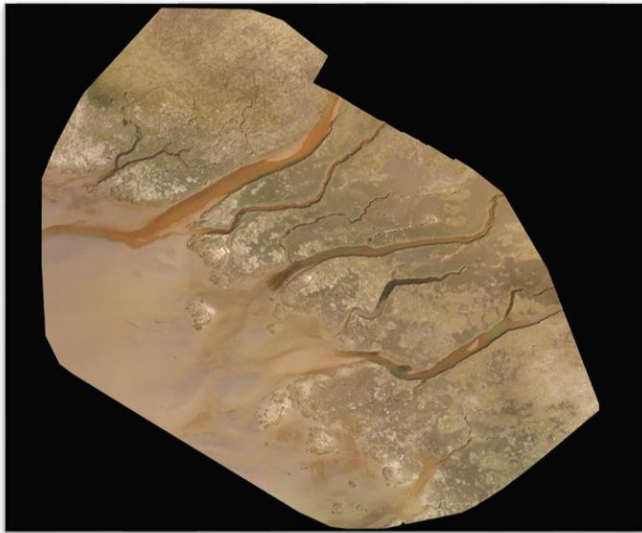


**Photo 2** – Ground Photograph of Tain Saltmarsh, Scotland., UK (Photograph - David R. Green)



**Photo 3** – Saltmarsh Fieldwork at Tain Saltmarsh, Scotland, UK (Cameron Gourlay, Jason J. Hagon, and Dmitri Mauquoy) (Photograph - David R. Green)





**Photo 4** – Orthomosaic of Tain Saltmarsh, Scotland, UK (DJI Inspire 1: Jason J. Hagon, UCEMM and GeoDrone Ltd.)



**Photo 5** - Vertical UAV Photograph of Tynninghame Salt Marsh, Lothian Scotland, UK (DJI Mavic 2 Pro – Billy J. Gregory, DroneLite)



**Photo 6** – Team with Wingtra VTOL (Billy J. Gregory, David R. Green, Dmitri Mauquoy, Andrew Smith and Dave Harrison (Geo-4D Ltd., UK)



**Photo 7** – Vertical UAV Photograph of Tynninghame Salt Marsh, Scotland, UK (Wingtra VTOL – Dave Harrison (Geo-4D Ltd.)

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**David R. Green<sup>1</sup>, Ray Lawrenson<sup>5</sup>, Billy J. Gregory<sup>1,4</sup>, Andrew Smith<sup>1</sup>, Dmitri Mauquoy<sup>2</sup>, Brian Burnham<sup>3</sup>, and Alex Karachok<sup>1,4</sup>**

<sup>1</sup> UCEMM/AICSM,/MSc in GIS, Department of Geography and Environment, University of Aberdeen, Scotland, UK

<sup>2</sup> Department of Geography and Environment, University of Aberdeen, Scotland, UK

<sup>3</sup> Department of Geology, University of Aberdeen, Scotland, UK

<sup>4</sup> DroneLite, Forres, Moray, Scotland, UK

### **Monitoring Coastal Dynamics and Sustainable Coastal Protection**

The second project has recently started in early 2020 also involves the application of low-cost drone monitoring and mapping, using similar platforms and sensors to those described above, to (a) monitor, map, and characterise coastal erosion at a number of coastal dune-fronted golf courses around the UK, and (b) to monitor a novel approach to sustainable coastal protection using low-cost brash bales. This is the basis of a new PhD Studentship at the University of Aberdeen.

To date we have been undertaking some preliminary work of coastal golf course assets along the Aberdeen coast at the edge of the Royal Aberdeen Golf Course, and also the St. Enodoc Golf Course in North Cornwall beginning with some trial drone flights and aerial photography. The stereo-photography has initially been used to generate DTMs, DSMs and also a series of short fly-bys for illustrative visualisation.

The PhD work (see: <https://www.quadrat.ac.uk/projects/sustainable-resilience-to-coastal-erosion-a-demonstration-project-of-an-innovative-system-for-erosion-mitigation-for-coastal-golf-courses-case/>) will subsequently be developed by looking into the use of drones for spatio-temporal monitoring and modelling at least three coastal sites around the UK, undertaking a detailed investigation of the coastal processes active at each coastal location, and finally by monitoring the installation and placement of sustainable coastal protection installed at each site.

The research work will begin in September 2021 and will continue over three seasons at sites where dune golf courses are currently exposed to rapid coastal erosion as a result of climate change. Aerial overflights will monitor both the coastal protection and the site. Each coastal protection platform installed will also carry a number of sensors to record information about the platform over time e.g. distortion and stresses. Coastal modelling will be undertaken to understand the coastal sediment budget as well as the wave climate. The project will be completed by 2024.



**Photo 1** – Royal Aberdeen Golf Club (Screenshot: Royal Aberdeen Golf Club, Aberdeen, Scotland, UK)





Central area of zone



Northern section of zone



Isometric view looking south



View to south

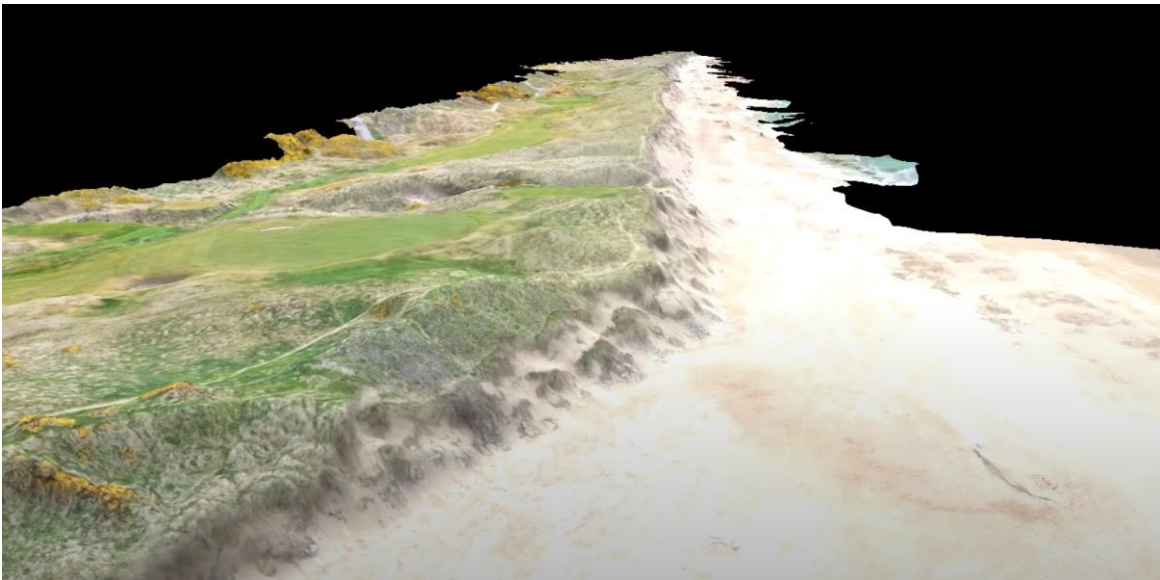
**Photo 2** – Coastal Erosion at the Edge of Dune/Golf Course (Ray Lawrenson – Siskin Asset Management Ltd.)



**Photo 3** – Brash Bale for Sustainable Coastal Protection (Ray Lawrenson – Siskin Asset Management Ltd.)



**Photo 4** – Aerial UAV Image of the Dune/Golf Course Edge (DJI Mavic 2 Pro – Billy J. Gregory (DroneLite))



**Photo 5** – 3D Model Derived from UAV Stereophotographs of Saltmarsh Using Global Mapper Lidar Module (Andrew Smith – University of Aberdeen) (Aerial Imagery: DJ Mavic 2 Pro - Billy J. Gregory (DroneLite))

## Websites

AICSM: [www.abdn.ac.uk/aicsm](http://www.abdn.ac.uk/aicsm)

UCEMM: [www.abdn.ac.uk/research/ucemm](http://www.abdn.ac.uk/research/ucemm)

MSc in GIS: [www.abdn.ac.uk/gis](http://www.abdn.ac.uk/gis)

DroneLite Ltd: [www.dronelite.co.uk](http://www.dronelite.co.uk)

Geodrone Survey Ltd: [www.geodronesurvey.com](http://www.geodronesurvey.com)

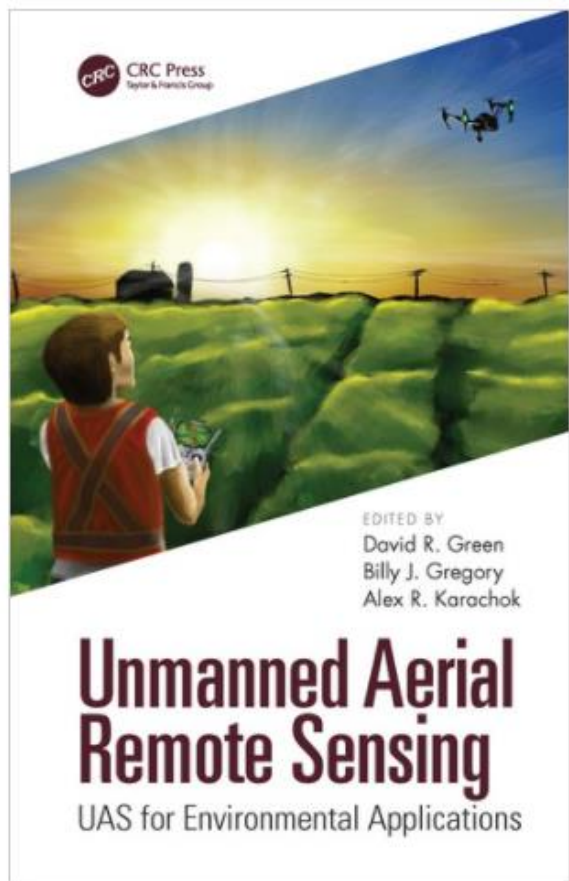
Geo-4D Ltd: [www.geo-4d.com](http://www.geo-4d.com)

Siskin Asset Management Ltd: [www.siskinassetmanagement.com](http://www.siskinassetmanagement.com)



## UNMANNED AERIAL REMOTE SENSING - UAS FOR ENVIRONMENTAL APPLICATIONS

A book on Unmanned Aerial Remote Sensing - UAS for Environmental Applications has been also published.



Edited by: *David R. Green, Billy J. Gregory, and Alex R. Karachok:*

<https://www.routledge.com/Unmanned-Aerial-Remote-Sensing-UAS-for-Environmental-Applications/Green-Gregory-Karachok/p/book/9781482246070>

**December 2020**

In response to the continuing evolution of this technology, this book discusses Unmanned Aircraft Systems (UASs) and explores some of their environmental applications. It explains how they can be used for mapping, monitoring, and modelling a wide variety of different environmental aspects for practitioners using remote sensing and other geospatial technologies for environmental applications. Several chapters focus on coastal environments, including saltmarshes and dunes. It discusses modelling, management of coastal areas, and examines how the technology can be extended from the land into underwater habitats.

**Submitted by CCS Vice-Chair:** Dr. David R. Green, UCEMM/AICSM,/MSc in GIS, Department of Geography and Environment, University of Aberdeen, Scotland, UK.

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## REMOTE SENSING WITH GEE

Google Earth Engine (GEE) is a cloud-based platform for large-scale analysis of geospatial data. GEE is free for non-commercial use provided users sign up for a GEE account (<https://earthengine.google.com/>). Since 2010, it has progressively advanced to become a recognized tool for large-scale geospatial analysis.

Following tutorials are very useful to start your cloud computing based geospatial analysis with GEE.

- 1) <https://developers.google.com/earth-engine/tutorials/edu>
- 2) <https://developers.google.com/earth-engine/tutorials/ttt>
- 3) <https://geohackweek.github.io/GoogleEarthEngine/>

Also, GEE organizes Geo for Good summit annually, however, this year it was organized virtually. Lighting talks and presentations are uploaded here for everyone to view (<https://www.youtube.com/watch?v=W0wjMQhQRcE&list=PLLW-qoCMKQsze8jjRsfbXurFm3wUyOerb>), and are a good resource to understand the workflow of GEE in depth.

**GEE Python API** ([https://developers.google.com/earth-engine/guides/python\\_install](https://developers.google.com/earth-engine/guides/python_install))

In addition to the web-based IDE, GEE also provides a Python API that can be used on your local machine. A simple example to begin with GEE Python API can be found here- <https://www.earthdatascience.org/tutorials/intro-google-earth-engine-python-api/>

Following two Python based packages are very useful for large scale geospatial analysis.

### 1) GEEMap

**geemap** is a Python package for interactive mapping with GEE. This package is developed by Professor Qiusheng Wu from the Department of Geography at the University of Tennessee, Knoxville. (<https://blog.gishub.org/about>) Description and tutorials on how to use this package is available here <https://geemap.org/>. Feel free to explore 300+ GEE notebook examples <https://github.com/giswqs/earthengine-py-notebooks>. GEEMap Tutorials on YouTube provides hands on experience with more than 40 videos and counting - <https://www.youtube.com/c/QiushengWu>

### 2) CoastSat (<http://coastsat.wrl.unsw.edu.au/>)

CoastSat is an open-source software toolkit written in Python that enables users to obtain time-series of shoreline position at any coastline worldwide from 30+ years (and growing) of publicly available satellite imagery. The underlying approach of the CoastSat toolkit is described in detail in the following publications:

1. Shoreline detection algorithm: <https://doi.org/10.1016/j.envsoft.2019.104528> (Open Access)
2. Accuracy assessment and applications: <https://doi.org/10.1016/j.coastaleng.2019.04.004>
3. Beach slope estimation: <https://doi.org/10.1029/2020GL088365> (preprint here)

### GEE in QGIS (<https://gee-community.github.io/qgis-earthengine-plugin/>)

The QGIS Earth Engine plugin incorporates GEE and QGIS using GEE Python API. Currently, the plugin implements only a subsection of Map API typically used within the Google Earth Engine Code Editor. To get started – please familiarize yourself with the basics of GEE: <https://developers.google.com/earth-engine/getstarted>. You can also view the code repository in Github- <https://github.com/gee-community/qgis-earthengine-plugin>

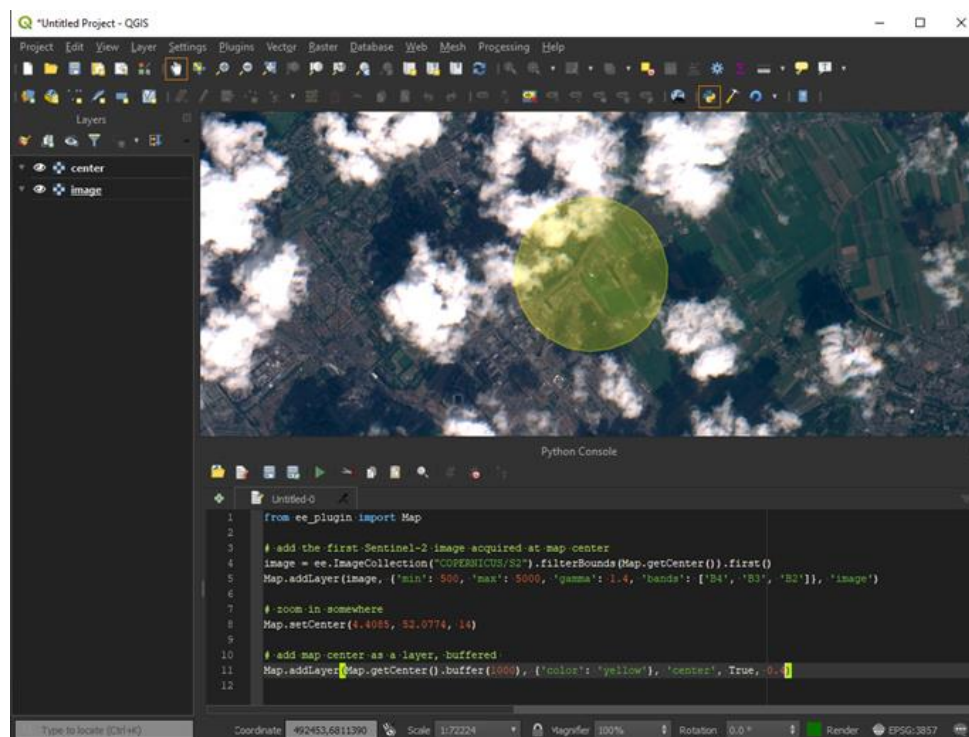


Figure- GEE plugin in QGIS

### GEE Apps (<https://developers.google.com/earth-engine/guides/apps>)

Earth Engine Apps are dynamic, shareable user interfaces for GEE analyses. With Apps, professionals can use simple UI elements to explore Earth Engine's data catalog and analytical power, for experts and non-experts alike to use.

Apps published from Earth Engine are accessible from the URL generated at time of publishing. GEE account is not required to view or interact with a published App.

#### List of Apps useful for coastal geosciences:

1. **REMAP**- Remap is an online mapping platform for people with little technical background in remote sensing <https://remap-app.org/>
2. **Global Surface Water explorer**- <https://global-surface-water.appspot.com/map>
3. **Global Intertidal Dataset**- The intertidal environment is one of the last remaining unmapped coastal ecosystems on Earth. We developed a new machine-learning analysis of over 700,000 satellite images to map the global distribution and change of intertidal areas over a 30-year period. <https://www.intertidal.app/>
4. **Sentinel-2 Multispectral Explorer**- <https://ael2014.users.earthengine.app/view/sentinel-2-multispectral>
5. **.gif animator**- This EE App will make an animated GIF from a Landsat time series that has been smoothed by LandTrendr spectral-temporal segmentation- <https://emaprlab.users.earthengine.app/view/lt-gee-time-series-animator>

**Submitted by CCS SC Member:** Dhritiraj Sengupta, East China Normal University, China.

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## GEONADIR – USING DRONES TO PROTECT MOTHER EARTH'S MOST AT-RISK ECOSYSTEMS

**I don't think I need to convince you of the importance of coastal environments.** And I'm sure all of you have admired many a coastline in your lives, both from standing on the shoreline, and viewing from above. It's the aerial perspective that interests me the most, and specifically from drones (also called unoccupied aircraft systems – UAS, or remotely piloted aircraft systems - RPAS).

Using drones, we can map and monitor many aspects of coastal environments including shoreline changes, erosion and deposition, wave energy, debris, coastal vegetation, and other coastal habitats. But with more than one million kilometers of coastline around the world, it would take a very long time to map them by drone! Or would it?

It's fairly well accepted that capturing data with a drone is limited by battery life and that the drone must stay within view of the operator. So what if we had lots of drones and lots of operators instead? Believe it or not, the United States alone has more than 1.75 million drones registered! Imagine if every one of those drones mapped one kilometer of the world's coastlines – we'd even have some overlap! Ok so there's a challenge with distributing them around the world (especially during COVID), but hopefully you can see that it's not a drone supply problem. It's not a pilot supply problem either – there's plenty of those, with the US (for example) reporting more than 200,000 certified remote pilots.

How would we manage all the data that the drones collect? I'm so glad you asked, because I'd like to introduce you to GeoNadir – our online global drone data repository created based on open and FAIR principles (findable, accessible, interoperable, and reusable). We're collecting and archiving drone data from operators around the world to map and monitor our most at-risk ecosystems, and we'd love you to join our mission ([www.geonadir.com](http://www.geonadir.com)).

**Submitted by:** Karen E. Joyce, Senior Lecturer in remote sensing - James Cook University / Education Director – She Maps.

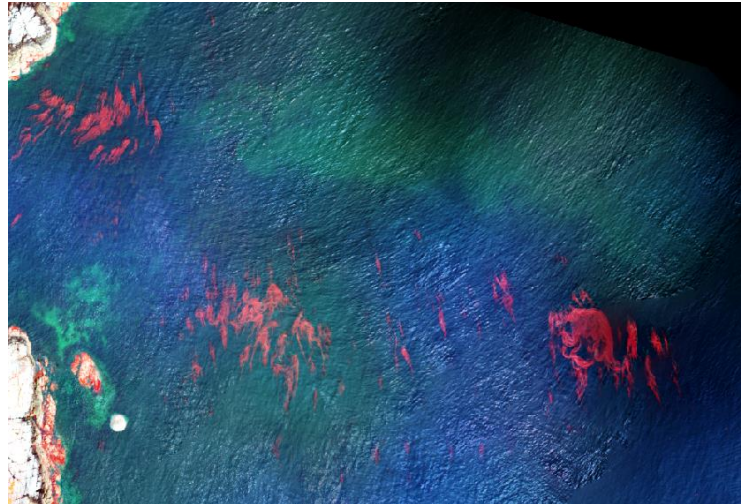
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## SPECTRAL LAB

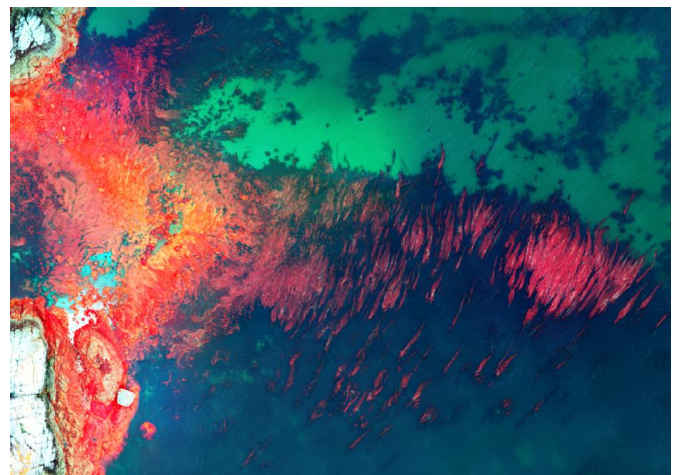
The SPECTRAL lab is engaged in multiple projects focusing on the use of remote sensing technologies to map kelp forests on the coast of British Columbia. This work relies on the use of satellite imagery to understand the effects of



environmental drivers on spatiotemporal variability of kelp forests. The large tidal range along the BC coast leads to the submersion of kelp canopy, creating uncertainties when attempting to extract kelp area from imagery. University of Victoria Graduate student Brian Timmer, in collaboration with the Hakai Institute, is working with high spatial and temporal resolution UAV imagery acquired over a tidal cycle to quantify the uncertainties associated with tide and current on aerial extent of kelp.



University of Victoria Graduate student Nicola Houtmann, in collaboration with the Department of Fisheries and Oceans and project Watershed, is using UAV imagery to locate and identify small schooling fish including Pacific herring, Pacific sand lance, surf smelt, and shiner perch. UAV imagery provide potentially useful and non-invasive methods for monitoring important nearshore habitats as shallow depths limit common vessel-based sampling methods. This is part of a larger project aiming to identify forage fish species in nearshore pelagic habitats in the Strait of Georgia and Barkley Sound, west coast of Canada.



**Submitted by:** Maycira Costa, University of Victoria (UVic), Remote Sensing and Spectral Lab, Victoria, BC Canada



## VICTORIAN COASTAL MONITORING PROGRAM

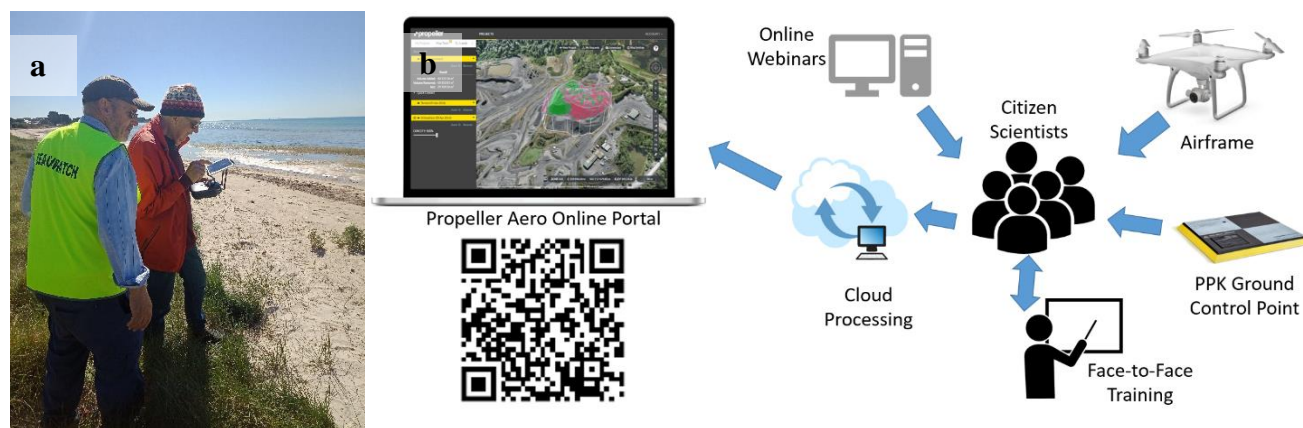
The Victorian Coastal Monitoring Program (VCMP) is a citizen-science drone program that, started in 2018, aimed at empowering the community to actively monitor and predict beach change in response to changing environments (e.g. storms and sea level rise) and management interventions (e.g. renourishment and sea walls). It is a collaboration between the Victorian State Government. The University of Melbourne (A/Prof David Kennedy) Deakin University (A/Prof Daniel Ierodiaconou) and Propeller Aerobotics.

The program recently won the 2020 Australian Museum Department of Industry, Innovation and Science Eureka Prize for Innovation in Citizen Science. (<https://www.youtube.com/watch?v=l2ujeK3YWg8&feature=youtu.be>) and 2020 Victorian Marine & Coastal Council Award for excellence in Citizen-Science.

The VCMP uses consumer-drone technology and cloud data processing to enable citizen-scientists to collect, process and interrogate sand movement on Victoria's beaches. The result is three-dimensional surface models and aerial photography of centimetre-scale precision and accuracy which enable everything from footprints to dune erosion scraps to be measured and monitored. All data is open source enabling all community members to observe state-wide beach change.

The project is designed around lightweight consumer drones (Phantom 4 Pro) which weigh <2 kg. These units are light, easily flown, low-cost and importantly can be safely flown by the community under the Australian Civil Aviation Safety Authority (CASA) 'Excluded Category' for commercial operation.

The project design starts with recruitment through established networks (e.g. Bellarine Bayside Foreshore Committee of Coastal Management, Port Fairy Coastal Group, Great Ocean Road Coastal Committee), social media (e.g. Ocean Grove Community Forum), or traditional media (e.g. ABC Radio and TV). Recruitment has also occurred spontaneously through people joining when observing the drone surveying. Once citizen-scientists have been identified training is undertaken by the scientific team. This is initially a series of 6 online educational videos, followed by a 2-day intensive course at each beach, and concludes with CASA online registration. All participants who wish to fly (>80% of citizen-scientists) receive the necessary training to operate safely under the <2kg CASA Excluded Category. For safety and insurance compliance all groups undertake a successful supervised survey, after which they are delivered their own equipment package consisting of a drone, batteries, smart ground control points (developed by Propeller, an Australian innovation company), safety equipment and manuals.

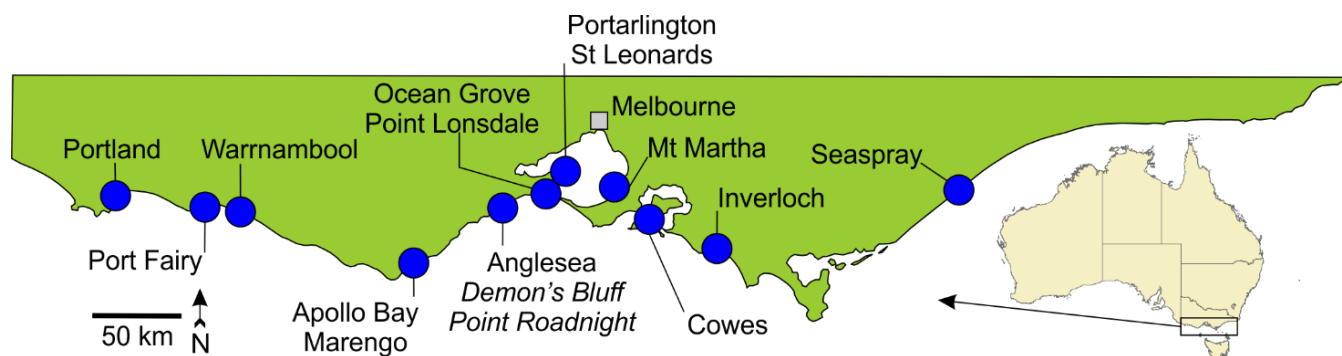


**Figure 1:** (a) citizen-scientists flying the drone on St Leonards Beach near Melbourne. (b) Project design for the establishment and training of each citizen-science group.

Once drone data is collected it is uploaded and analysed in the cloud and delivered to the community via the Australian-developed Propeller Aero Online Portal. The citizen-scientists are therefore also trained in data analytics and management. This is supported through the development of a series of online training tutorials and hardcopy manuals.

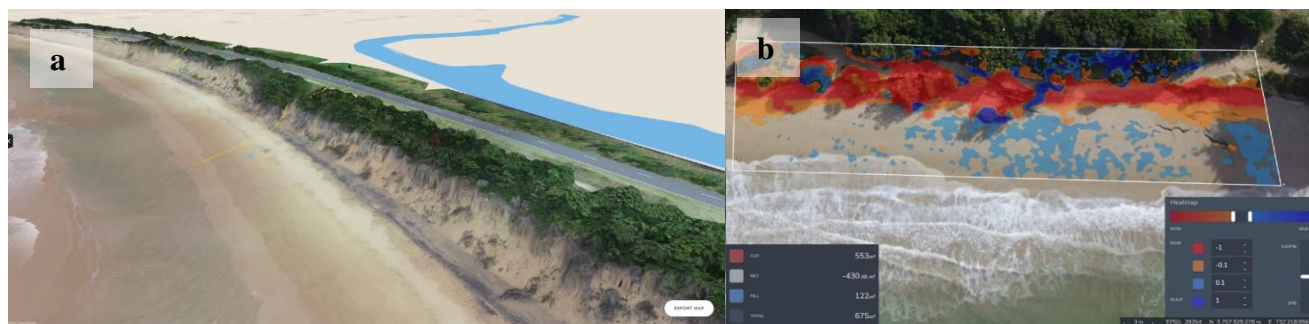
To date 14 citizen-science groups are located across Victoria, surveying 16 sites (Fig. 2). As of the end of 2020, over 200 datasets have been collected. The program has engaged over 150 citizen-science community members and the

scientific team have coordinated 142 site visits (201 person days for training, meetings and flight support) since inception of the program in February 2018.



**Figure 2:** Location of citizen-science drone survey sites across Victoria

The methodology that we've developed is highly transferrable to any coast where drone flying is possible. Please feel free to contact us if you would like to learn more ([davidmk@unimelb.edu.au](mailto:davidmk@unimelb.edu.au)).



**Figure 3:** (a) 3D view of Marengo Beach, where erosion is threatening the Great Ocean Road. (b) Analysis of beach change undertaken in the web portal at Apollo Bay (Fig. 2). Erosion of the dunes (in red and orange) from a recent storm is observed.

**Submitted by:** David M. Kennedy, University of Melbourne, Australia

## ESTUARIES AND COASTAL WETLANDS OF THE SOUTHERN HEMISPHERE



The Commission on Coastal Systems sponsored a themed session at ECSA57 (Estuarine & Coastal Science Association) in 2018, entitled: '**Similarities, stressors and sustainability of southern hemisphere estuaries on wave-dominated coasts**'. A virtual special issue of *Estuarine Coastal and Shelf Science* is now available, edited by Janine Adams, Débora de Freitas, Kerrylee Rogers and Colin Woodroffe.

Coasts and estuaries of the southern hemisphere share key characteristics, and in some respects contrast to better studied systems of the northern hemisphere. Sustainability of southern hemisphere estuaries, including those that occur in wave-dominated east coast settings, as well as more tropical tide-dominated settings, and the wetlands associated with them, is considered.

The collection of 21 papers draws out similarities between estuaries and associated wetlands in Australia, Brazil, South Africa and New Zealand; these coastlines have experienced relatively stable sea level, at or above present, for several millennia, resulting in broad coastal plains and estuarine systems at different stages of infill.

After examining ways in which coastlines of the southern hemisphere might differ from those of the northern hemisphere, the principal findings are summarised under the headings: estuary evolution, physical processes, environmental constraints on estuarine ecosystems, perturbation in wetland systems, and biomass and carbon storage.

**Submitted by:** CCS Chair Colin Woodroffe

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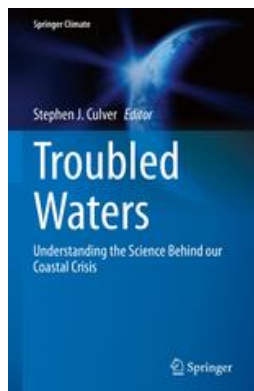
## BOOKS & REPORTS ON COASTAL AND MARINE TOPICS

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### TROUBLED WATERS

#### Understanding the Science Behind our Coastal Crisis

**Editors:** Culver, Stephen (Ed.)



The book communicates coastal geology such that the reader gets a better understanding of how scientists work and how scientific knowledge is acquired and how it progresses. It presents the human side of geologic research, including missteps, in this case, research on coastal change of the recent past, the present, and the near future. The audience for this volume is the general public, coastal managers, politicians, and decision makers in general, in the coastal realm. But the implications of this work with regard to future climate change and human responses are relevant globally.

Springer, 2021: <https://www.springer.com/gp/book/9783030523824>

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### RIVERS OF EUROPE

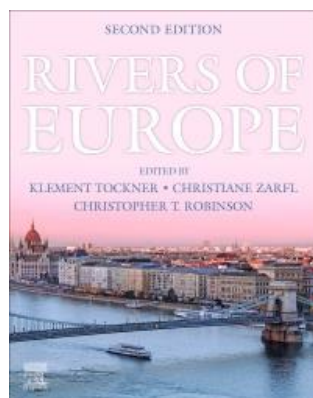
2<sup>nd</sup> Edition

**Authors:** Klement Tockner, Christiane Zarfl, Christopher Robinson

Paperback ISBN: 9780081026120

Imprint: Elsevier

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Rivers of Europe, Second Edition, presents the latest update on the only primary source of complete and comparative baseline data on the biological and hydrological characteristics of more than 180 of the highest profile rivers in Europe. With even more full-color photographs and maps, the book includes conservation information on current patterns of river use and the extent to which human society has exploited and impacted them. Each chapter includes up to 10 featured rivers, with detailed information on their physiography, hydrology, ecology/biodiversity and human impacts. Rivers selected for specific coverage include the largest, the most natural, and those most affected by humans. This book provides the most comprehensive information ecologists and conservation managers need to better assess their management and meet the EU legislative good governance targets. Elsevier: <https://www.elsevier.com/books/rivers-of-europe/tockner/978-0-08-102612-0>.

# COASTAL MANAGEMENT REVISITED

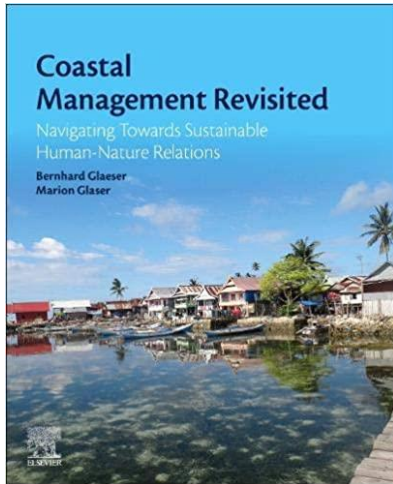
1<sup>st</sup> Edition

## Navigating Towards Sustainable Human-Nature Relations

**Authors:** Bernhard Glaeser, Marion Glaser

**Paperback ISBN:** 9780128181942

**Imprint:** Elsevier



Coastal Management Revisited: Navigating Towards Sustainable Human-Nature Relations presents an account of twenty plus years of research on coasts, oceans and small islands, linking social and ecological systems, in close collaboration with natural scientists, managers, policy makers and the local populations involved. Integrated and sustainable coastal management is multi-faceted, greatly issue-dependent and has, during its history, followed different trends and paths. The authors address challenges to society - to coastal management in particular - that have been generated by human activity in both temperate and tropical environments. Ultimately, the book describes the maturation of a field.



**The organization of the IGU Commission on Coastal Systems and the current member list of the Steering Committee of the CCS is as follows:**

**Chair since 2015/ Président**

**Prof. Colin Woodroffe**

School of Earth, Atmospheric and Life Sciences,  
University of Wollongong,  
Wollongong, NSW 2522,  
AUSTRALIA  
[colin@uow.edu.au](mailto:colin@uow.edu.au)

**Secretary/Secrétaire, Editor of Newsletter**

**Dr. Margarita Stancheva**

Center for Coastal and Marine Studies  
(CCMS)  
9000 Varna  
33 Podvis str., A, floor 5, 75  
BULGARIA  
[stancheva@ccms.bg](mailto:stancheva@ccms.bg)

**Vice-Chair since 2020**

**Dr. David R. Green**

G10 | AICSM/UCEMM  
Department of Geography and Environment  
School of Geosciences  
University of Aberdeen  
St. Mary's | Elphinstone Road  
AB24 3UF, Scotland  
UNITED KINGDOM  
[d.r.green@abdn.ac.uk](mailto:d.r.green@abdn.ac.uk)

***Steering Committee Members***

**Prof. Edward J. Anthony (past Chair)**

Université de Provence,  
CEREGE, UMR CNRS 6635,  
Europôle Méditerranéen de l'Arbois,  
13545 Aix en Provence Cedex 4,  
FRANCE  
[anthony@cerege.fr](mailto:anthony@cerege.fr)

**Prof. Françoise Breton**

Director ARCTIC Research Center  
Edifici C - Torre C5, 4a planta  
E-08193 Bellaterra (Barcelona)  
SPAIN  
[Francoise.Breton@uab.cat](mailto:Francoise.Breton@uab.cat)

**Prof. Paolo Ciavola**

Dipartimento di Scienze della Terra,  
Università di Ferrara,  
Via Saragat 1,  
44100 Ferrara,  
ITALY  
[cvp@unife.it](mailto:cvp@unife.it)

**Dr. Abdelmounim El M'rini**  
Department of Earth Sciences  
Abdelmalek Essaâdi University  
P.O. Box 2121  
Tetouan, Tetouan  
MOROCCO  
[aelmrini@gmail.com](mailto:aelmrini@gmail.com)

**Dr. Jeffrey Ollerhead**  
Mt. Allison University  
65 York Street  
Sackville, New Brunswick  
CANADA E4L 1E4  
[jollerhead@mta.ca](mailto:jollerhead@mta.ca)

**Prof. Norbert P. Psuty (co-editor Newsletter)**  
74 Magruder Road  
Institute of Marine and Coastal Sciences  
Rutgers University  
Highlands NJ 07732  
U.S.A.  
[psuty@marine.rutgers.edu](mailto:psuty@marine.rutgers.edu)

**Prof. Paul Rooney**  
Department of Geography and Environmental Science  
Liverpool Hope University  
Liverpool L169JD  
UNITED KINGDOM  
[rooneyp@hope.ac.uk](mailto:rooneyp@hope.ac.uk)

**Profa. Dra. Marinez Scherer**  
Universidade Federal de Santa Catarina  
Centro de Filosofia e Ciências Humanas  
Departamento de Geociências  
Campus Universitário - Trindade  
Florianópolis, SC - 88040-970  
BRASIL  
[marinezscherer@gmail.com](mailto:marinezscherer@gmail.com)

**Dr. Toru Tamura**  
Geological Survey of Japan, AIST  
Central 7, 1-1-1 Higashi,  
Tsukuba, Ibaraki 305-8567,  
JAPAN  
[toru.tamura@aist.go.jp](mailto:toru.tamura@aist.go.jp)

**Dr. Dhritiraj Sengupta**  
Post Doctoral Fellow,  
State Key Laboratory of Estuarine and Coastal Research,  
East China Normal University  
500, DongChuan Road, Shanghai,  
CHINA  
[dhritiraj@sklec.ecnu.edu.cn](mailto:dhritiraj@sklec.ecnu.edu.cn)

The **IGU Commission on Coastal Systems (CCS) website** is at: <http://igu-coast.org/>.

Contact information for CCS Officers and Steering Committee members can be found on the website along with past and present newsletters. If you are interested in becoming a member of the CCS, an on-line membership form is available at the end of the Newsletter.

Mike Meadows, Professor at the Department of Environmental & Geographical Science, University of Cape Town, South Africa, President of the International Geographical Union (IGU), is our liaison with the executive committee of the IGU: [michael.meadows@uct.ac.za](mailto:michael.meadows@uct.ac.za).

## THE STEERING COMMITTEE MEMBERS: WHO WE ARE

### Colin Woodroffe (CCS Chair since 2015)



Colin is Professor in the School of Earth, Atmospheric and Life Sciences at the University of Wollongong. He has a PhD and ScD from the University of Cambridge. Colin has studied the stratigraphy and development of coasts in Australia and New Zealand, as well as on islands in the West Indies, and Indian and Pacific Oceans. He has written a comprehensive book on *Coasts, form, process and evolution*, co-authored a book on *The Coast of Australia*, and is also co-author of a book *Quaternary Sea-Level Changes: a global perspective*. Colin was a lead author on the coastal chapter in the 2007 Intergovernmental Panel on Climate Change (IPCC) Fourth Assessment report. He teaches coastal geomorphology and the application of geospatial techniques to coastal environments.

### Margarita Stancheva (CCS Secretary, Editor of Newsletter)



Margarita is Co-founder and Director of the Center for Coastal and Marine Studies (CCMS) in Bulgaria. She has special interests in coastal geomorphology, coastal processes, sand beaches/dunes, coastal erosion/cliff retreat, shoreline changes, MSP and sustainable coastal development. She has a PhD in Oceanology with thesis: "Beach dynamics and modifications under impact of port and coast-protection structures". Since 2009 she has been convener of Geomorphology Session at the EGU General Assembly: "Coastal zone geomorphologic interactions: natural versus human-induced driving factors". Research Fellow to the Programme for the Study of Developed Shorelines (PSDS), WCU – USA. Author of a chapter for Bulgaria in a book on *Coastal Erosion and Protection in Europe - A Comprehensive Overview*, co-author in coastal atlas on *Sensitivity Mapping and Analysis of the Bulgarian Black Sea Coastal Zone* and primary author of a book on *Burgas Case Study: Land-Sea Interactions*.

### **David R. Green (CCS Vice-Chair since 2020)**



David is Director of the Aberdeen Institute for Coastal Science and Management (AICSM); Director of the M.Sc. Degree Programme in Geographical Information Systems (GIS); and Director of the UAV Centre for Environmental Monitoring and Mapping (UCEMM) at the Department of Geography and Environment, University of Aberdeen, Scotland, United Kingdom. His interests lie with Remote Sensing, UAVs, GIS and Mobile GIS, Digital Mapping and Hydrography, Coastal Management, and Marine Spatial Planning (MSP).

### **Edward Anthony (Past Chair)**



Edward Anthony is currently professor of coastal geomorphology at Aix-Marseille University and Editor-in-Chief of Marine Geology. Author of nearly 130 published papers, E.A. has carried out research over the last 30 years on the Amazon-influenced coasts of South America, the coasts of West Africa, the Mediterranean, the English Channel and North Sea coasts, and recently the Mekong and Irrawaddy River deltas. His scientific interests focuses on the inter-related connections between the human and natural dimensions of coasts, and how human activities and developments impact on coastal geomorphology, sediment dynamics, ecology and management, especially in the face of global change, sea-level rise and sediment supply perturbations on river systems. A particular area of focus is river deltas, largely based on experimental field (measurements and observations) and laboratory work, and employs innovative techniques in remote sensing and modelling based on statistical and cartographic data. This activity is supported by various on-going grants and projects and involves collaboration with French universities, the IRD, Japanese, American, Indian, Vietnamese and Moroccan colleagues specialised in coastal studies. EA has supervised nearly 30 PhD thesis, and teaches at both undergraduate and post-graduate levels.

### **Françoise Breton**



Emeritus Professor at the Universitat Autònoma de Barcelona, she is involved in research on coastal and sea socio-environmental systems and resource management. Anthropologist, geographer and environmental science expert, work focused on integrated management, co-management of ecosystems and habitats, and governance. Formed in Paris X University, later at the Boston University (1978-1980), and at the UAB, she created and directed the Centre for Sea study in Sitges, Barcelona Diputació (1981-90), working on fisheries, fishermen knowledge, and fishery anthropology in collaboration with A. Geistdoerffer and the Museum of Natural History of Paris. Head of the UAB Interfase Research Group since 1990. After different collaborations with international institutions in Europe, she coordinated the EU FP7 project PEGASO, on ICZM and governance in the Mediterranean and the Black Sea (2010-2014), She developed with IRD responsible research with local communities on ecosystem services and food security in the West-African coast. Since 2015, she focussed research on marine mammals in the Arctic and their interactions with people, collaborating with the Norwegian College of Fishery Sciences, University of the Arctic - Tromsø, and the Svalbard University, Norway. The Research Center on the ARCTIC was Inaugurated the 1<sup>st</sup> December 2017 at the Universitat Autònoma de Barcelona, together with the 2017 Stefansson Memorial Lecture, by the Stefansson Arctic Institute (Iceland), where she is Associate Professor, and the Institute of Arctic Studies, Dartmouth College, USA. In February 2016, she



awarded the Narcís Monturiol medal of the Catalan govern in recognition to her high research and innovation trajectory.

### **Paolo Ciavola**



Paolo is an Associate Professor of Coastal Dynamics and Geomorphology in the Department of Physics and Earth Sciences of the University of Ferrara, where he teaches Physical Geography and Geomorphology, Coastal Risk, GIS and Remote Sensing. His current main research interests include coastal processes, the impact of climate change on coastal morphology, the role of extreme storm events in generating coastal risk, river delta and estuarine dynamics, sedimentation in coastal lagoons. He is on the Editorial Board of the Journal of Coastal Research, Continental Shelf Research and the Journal of Integrated Coastal Zone Management of Portuguese Speaking Countries. He was an expert reviewer of the IPCC WGII AR5 report- Europe Chapter and is currently a Science Officer of the European Geoscience Union for the Natural Hazard sub-group. Recently he has published for Wiley two books dealing with coastal storms (*Management of the Effects of Coastal Storms: Policy, Scientific and Historical Perspectives*; *Coastal Storms: Processes and Impacts*).

### **Abdelmounim El M'rini**



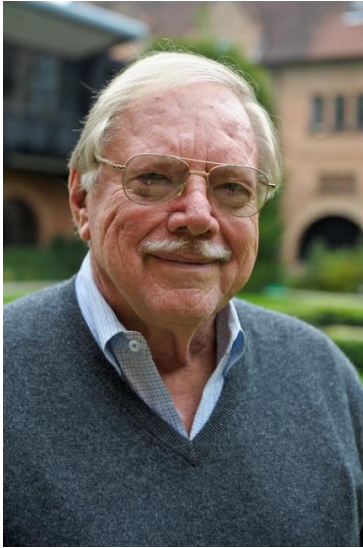
Abdelmounim is Professor at the Department of Earth Sciences at Abdelmalek Essaâdi University of Tetouan (Morocco). He has a PhD from Abdelmalek Essaâdi University and from Nantes University (France). His research activities focus on the characterization of coastal systems and the impacts of human activities on their processes at the short, medium and long terms. He has participated at many projects that focus on coastal areas with technical approaches (coastal morphodynamics, coastline kinematics, impact of coastal facilities, coastal flooding hazards, sedimentological, geochemical and isotopic studies), as well as coastal planning and management (in this context, in Integrated Coastal Zone Management projects). This works are done mainly in collaboration with Moroccan, French, Spanish and Italian colleagues. He teaches coastal geomorphology, interactions on coastal systems, Integrated Coastal Zone Managements and the application of remote sensing to coastal environments.

### **Jeffrey Ollerhead**



Jeff Ollerhead is a member of the Geography and Environment Department at Mount Allison University in Sackville, NB, Canada. He is a coastal geomorphologist who studies beaches and salt marshes. In recent years, he has been particularly involved in designing and monitoring salt marsh restorations in the upper Bay of Fundy. He was Dean of Science and Graduate Studies for 10 years and is now Provost and VP, Academic and Research, at Mount Allison.

## Norbert Psuty



Norb is Professor Emeritus at Rutgers University and is currently Director of the Sandy Hook Cooperative Research Programs. He is a coastal geomorphologist whose research encompasses the dynamics of the coastal zone, incorporating process-response studies of beaches, coastal dune processes and morphology, sediment budget studies, barrier island dynamics, estuarine sedimentation, and sea-level rise. His research has been conducted primarily in various portions of coastal New Jersey and New York and it has both a basic science component as well as an applied side. He has been and continues to be consultant to the U.S. National Park Service and the U.S. Fish and Wildlife Service on shoreline dynamics and change in coastal parks and refuges.

## Paul Rooney



Paul is the Deputy Head for the Department of Geography and Environmental Science at Liverpool Hope University, United Kingdom. Following studying at university, Paul became a Coastal Ranger on the Sefton Coast, the largest area of open dunes in England. In 1995 he was appointed as the Project Officer for an EU funded LIFE-Nature project to implement species and habitat restoration and to develop a conservation strategy for the Special Area of Conservation (SAC) for that dune coast. Paul joined the Liverpool Hope University in 1999 and established the UK Sand Dune and Shingle Network in 2006. The aim of the network is to help to conserve sand dunes and shingle as dynamic landscapes by linking science and management. Paul's research interests are mainly in coastal dune ecology, change and management. He is a Chartered Environmentalist, a full member of the Chartered Institute of Ecology and Environmental

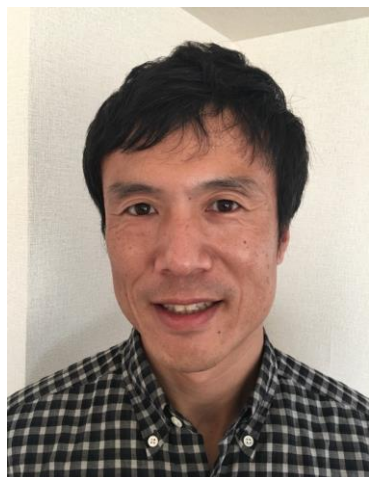
Management, a Chartered Geographer through the Royal Geographical Society (with IBG), and a Fellow of the Higher Education Academy (now part of Advance HE).

## Marinez Scherer



Marinez has a degree in Biological Sciences (Federal University of Santa Catarina / Brazil) and a PhD in Marine Science at University of Cadiz / Spain. She has been teaching Integrated Coastal Management at Federal University of Santa Catarina, and is the Research Leader of the Integrated Coastal Management Group and Laboratory. Marinez is also visiting professor at the University of Cadiz. She is the executive secretary of the Brazilian Sea Forum and the Technical Director of the Brazilian Agency for Coastal Management. She is also one of the Brazilian Coordinators of the Ibero American Network on Coastal Management (IBERMAR). Her main research interests are on integrated coastal and marine management, ecosystem based management, coastal and marine protected areas, and networks.

## Toru Tamura



Toru is senior researcher at the Geological Survey of Japan, National Institute of Advanced Industrial Science. He has a PhD in Geology at Kyoto University, and is also a visiting associate professor at Graduate School of Frontier Sciences, University of Tokyo. His primary research interest is multi-temporal scale evolution of the coastal landform in sandy beach and muddy deltaic systems. He has studied many coastal systems mainly in Asia and Australia using a combination of sediment cores, radiocarbon dating, optically-stimulated luminescence dating, remote sensing and ground-penetrating radar, for better understanding of the present and predicting future coast. He also manages an OSL dating laboratory at the Geological Survey to enhance the dating of Pleistocene and Holocene coastal landforms and stratigraphy.

## Dhritiraj Sengupta



Dhriti is a Post-Doctoral research fellow at the State Key Laboratory of Estuarine and Coastal Research SKLEC, East China Normal University, Shanghai, China. His research involves mapping spatial trends and patterns of large scale coastal land reclamation using advanced geospatial technology to understand the current status of coastal adaptation in major Asian cities. Besides, he actively involves himself in Volunteered Geographic Information (VGI) related task by working with community members for flood mitigation in coastal areas. At CCS, he manages our website and web presence for effective coastal science communication. [https://www.researchgate.net/profile/Dhritiraj\\_Sengupta](https://www.researchgate.net/profile/Dhritiraj_Sengupta)



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**Thank you for your cooperation. Margarita and Norb**

### **Communication with the co-editors**

E-mail: [stancheva@ccms.bg](mailto:stancheva@ccms.bg)

E-mail: [psuty@marine.rutgers.edu](mailto:psuty@marine.rutgers.edu)

Phone: +359 52 331324