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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, web-site, etc.

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All papers and correspondence to:

Jean-Paul Ducrotoy, editor
jean-paul.ducrotoy@hull.ac.uk

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Le Tréport Photo J-P Ducrotoy

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Cover photograph: Jean-Paul Ducrotoy

This newsletter was edited by
Jean-Paul A. Ducrotoy
Institute of Estuarine and Coastal Studies
The University of Hull
Hull HU6 7RX, United KIngdom
T: +33 (0)322 238 074
E: jean-paul.ducrotoy@hull.ac.uk
with thanks to all contributors.

Editorial ECSA 62

Thousands of people in the Netherlands, Belgium and the UK died during the night of January 31st 1953. A massive storm surge swept into unaware sleeping communities, claiming the lives of more than 2,500 people, damaging almost 50,000 properties and killing tens of thousands of livestock. In England, 307 people were killed in the counties of Lincolnshire, Norfolk, Suffolk and Essex. 19 were killed in Scotland. 28 were killed in West Flanders, Belgium. Unusually low atmospheric pressure had occurred and wind blowing along, or towards the coast, piled the water up and waves broke through the seawalls.

Following what was called the North Sea Flood, the government of the Netherlands initiated a series of building projects in the southwest of the Netherlands to protect the flooded area, around the Rhine-Meuse-Scheldt delta, from the sea. The works consisted of dams, sluices, locks, dykes, levees, and storm surge barriers. The aim of the dams was to shorten the Dutch coastline, thus reducing the number of dykes that had to be raised. The Delta Plan was born. The works were declared finished after almost fifty years in 1997. In reality the works were finished on 24 August 2010 with the official opening of the last strengthened and raised retaining wall near the city of Harlingen, the Netherlands.

Within the UK, a range of flood defence systems were also used. These included hard structures, such as concrete seawalls; beach replenishment and "soft engineering", including "managed realignment" of the coastline. In addition, the UK constructed storm surge barriers on the River Thames below London and on the Humber estuary. The Thames Barrier programme was started to secure central London against a future storm surge; the Barrier was officially opened on May, 8th 1984. In the Humber Estuary (UK) the Hull Tidal Surge Barrier is situated where the River Hull joins the main estuary. It is lowered at times when unusually high tides are expected. It is used from 8 to 12 times per year and protects the homes of approximately 10,000 people from flooding. Many areas of Hull were flooded again during the June 2007 floods in the United Kingdom, with 8600 homes and 1300 businesses affected, but fortunately no casualties.

A similar weather event unfolded on December, 6th 2013. The massive mid-Atlantic depression, called Xavier, triggered a storm surge, that is to say a rise in sea-level on top of the tide. Both hurricane-force winds and tidal surges have killed at least seven people in northern Europe, flooded parts of Hamburg and left thousands of homes without electricity. However, casualties were much less in 2007 and 2013 than in the 1950s and one should rejoice about the efficiency with which the problem has been tackled. It was disappointing to see how the media seemed not interested in this positive aspect of these major events as the flood defence systems had worked very well. This real success, in terms of coastal management and meteorological and oceanographical forecasting, was ignored. Yet, scientists should not let the public believe that there is now absolute safety and that integrated coastal management will solve any future problems. The very foundation of science is to keep the door open to doubt. Failure to appreciate the value of uncertainty is at the basis of much poor management in our society. The notion of uncertainty is perhaps the least well understood concept in science. The fact that global warming estimates are uncertain, for example, have been used by many to argue against any action at the present time. So acquiring sound scientific knowledge, and storing and exchanging knowledge are essential. There is, for instance, a need to share ecological engineering experience at international level. This is where ECSA excels and should increase its activities.

The scientific concept which would improve our cognitive toolkit is holism: the recognition that the whole has properties not present in the parts and is not reducible to the study of the parts. The whole has a complexity that raises higher than the number of its parts. The fact is that random events behave predictably in aggregate even if they are not predictable individually. This is why we need an integrated approach to coastal management, meaning that in combining various aspects of a problem makes it easier to tackle. As a result there are several options to reduce the risk from submersion of people and properties. Such a global vision should include a spatial dimension but also a temporal perspective. Any attempted alterations in the functioning of ecosystems should be viewed in the long-term. Let us not forget that a reliant ecosystem is one which is able to auto-maintain. The restoration of damaged habitats and coastal retreat (i.e. through reopening polders to the sea) are part of the equation.

We have seen that coastal communities living by the southern North Sea already benefit from efficient defences. However, flood risk is increasing because of sea-level-rise induced by global warming. In England, the government has launched an ambitious plan for the Thames estuary, called Thames Estuary 2100. The TE 2100 Plan sets out the strategic direction for managing flood risk in the estuary to the end of the century and beyond. It sets out how to continue protecting 1.25 million people and £200 billion worth of property from tidal flood risk. In this case, as in any other coastal management project, evaluating the work to be done before it is completed is vital, bearing in mind that increasing connectivity between estuarine compartments will be crucial and that any human intervention should respect the carrying capacity of the affected natural systems. Involving local communities in the reflection will be vital and should start from the word go. Projects which are socially acceptable have also to go together with sociological measures such as education and the improved dissemination of scientific information. Diminishing pressures on ecosystems from human activities is a crucial part of the package meant to bring a better quality of life to local communities. Together with flood management, restoring ecological continuity will be essential for supporting future defence strategies.

Jean-Paul A Ducrotoy
Bulletin editor
Jean-paul.ducrotoy@hull.ac.uk

Paranagua Bay, Brazil Photo J-P Ducrotoy

View from the Chair

The past few weeks have been a busy time for ECSA. Firstly, the Association held its annual international Conference, ECSA-53, in Shanghai, October 13-16, which was a great success. About 400 delegates attended and they were treated to excellent oral and poster presentations by scientists from 47 countries, including the keynote and invited speakers. A particular highlight for me was to hear the invited speech by Andrew Olds, winner of the best student presentation at ECSA-50 in Venice 2012, who spoke on "Recognising the value of seascape connectivity in marine conservation" (Image 2: Andrew Olds delivering his speech). There were many thought-provoking presentations by Chinese colleagues on the coastal science and engineering involved in the management of their huge estuaries. Also, the Scientific Committee organised two workshops one on "How to get published" and the other on "Reviewing papers" both of which were delivered by the Editors of Estuarine Coastal and Shelf Science and Ocean and Coastal Management and an Elsevier publisher. These sessions were well supported, generated considerable interest and robust debate. I thought that the sessions were of great benefit to scientists from many countries in their quest to get their research published in Elsevier journals. This was a successful venture which I hope will be followed up in future conferences.

Image 2

Special thanks go to all colleagues engaged in making the Conference such a huge success. In particular, Professor Yunxuan Zhou who heads the State Key Laboratory in Estuaries and Coasts (SKLEC) (Image 3: Professor Zhou is the first person on the left of the table) and Professor Zhongyuan Chen, both of whom were ably supported by their colleagues Dr Xiuzhen Li and Li Tan. ECSA is also appreciative of the support given by the PhD students who were on duty throughout the six parallel sessions ready with the microphones to ensure that questions were heard by the whole audience. Organising large conferences with hundreds of delegates is not an easy task and is very demanding on personal time, so it was essential to have support from our partners in Elsevier. The Association is very fortunate to have had the professionalism and commitment of Elsevier staff Luaine Bandounas (Journal Publisher Oceanography & Hydrology), Laura Copeland, Neha Aggarwal and Kirsty Nichols. We are grateful for your excellent contributions.

Image 3

ECSA-53 was also a high water mark for the Association's Conference and Workshop Coordinator, Professor Victor de Jonge. He has been instrumental in organising our international conferences and in the past two years has brought considerable added value by creating the Association's partnership with Elsevier, who have supported our recent international conferences. The Association is very appreciative of Victor's efforts to enhance the international reputation of the Association and as he steps down we wish him well in his future endeavours. The Conference and Workshop Coordinator baton has been passed to Dr Sally Little from University of Hull. It may be difficult to fill the gap left by Victor but we are confident that Sally will receive support from colleagues to make a smooth transition into this important responsibility.

The second major event for the Association was our first contribution to SedNet at their 8th International Conference in Lisbon, November 6-9. The President-Elect, Dr Kate Spencer, had put in a considerable amount of work to develop a working relationship with the SedNet Steering Group. For those who are not familiar with SedNet "it is a European network which aims to incorporate sediment issues and knowledge into European strategies to support the achievement of good environmental status and to develop new tools for sediment management. Its focus is all on sediment quality and quantity issues at the river basin scale, ranging from freshwater to estuarine and marine sediments". [Further information can be found at www.sednet.org]. Given this scope it is logical that ECSA improves its relationship with SedNet. During 2013, Kate Spencer attended meetings with the SedNet Steering Group which resulted in ECSA being invited to contribute a Special Session entitled "Changing Hydrodynamics of Estuaries and Tidal River Systems". The session was chaired by Kate Spencer who was supported by invited speakers Dr Henk Schuttelaars from Delft University of Technology, Dr Andrew Turner from Plymouth University and Professor Andrew Plater from University of Liverpool. The session was supported by a workshop in which delegates identified key research priorities in the field. Kate Spencer summarised the group priorities during her speech (Image 4: Dr Spencer delivers her speech to delegates)

to the Conference at the final session which was chaired by the current leader of the SedNet Steering Group Marc Eisma. Our discussions with the Steering Group indicated that there are opportunities for future collaboration with SedNet and it has been proposed that a member of SedNet Steering Group sit on ECSA Council and vice versa. Hence this is a very positive outcome and Council is grateful to Dr Spencer for all her efforts on behalf of the Association.

Finally, I hope that all members have had a relaxing festive season and very best wishes for the New Year. The Association will be moving into 2014 in a confident manner and the Council hope to bring new and exciting opportunities to foster outstanding research in estuarine and coastal science.

Best wishes,
Geoff Millward

Image 4

Stay connected

ECSA e-news

ECSA electronic newsletter (e-news) is a service dedicated to ECSA members. It is an easy and rapid way to spread information to the ECSA community, advertising for any events, courses, fellowships/job positions, etc. in the field of estuarine and coastal sciences.

ECSA e-news is fostered by the contribution of all members and can be also a good way to spread ideas to the ECSA community. Members are warmly invited to submit news by sending an email to the e-news editor, Anita Franco, **a.franco@hull.ac.uk.** The subject of the e-mail will be used as title of the announcement in the e-news, hence members are invited to keep it short and explicative. No attachments are allowed.

ECSA e-news is e-mailed to members three times yearly. If you are an ECSA member and you never received the e-news, you should make sure that we have your correct e-mail address by contacting our Membership Treasurer, Clare Scanlan, **clare.scanlan@sepa.org.uk.**

Guaraqueçaba 2013 - Photo J-P Ducrotoy

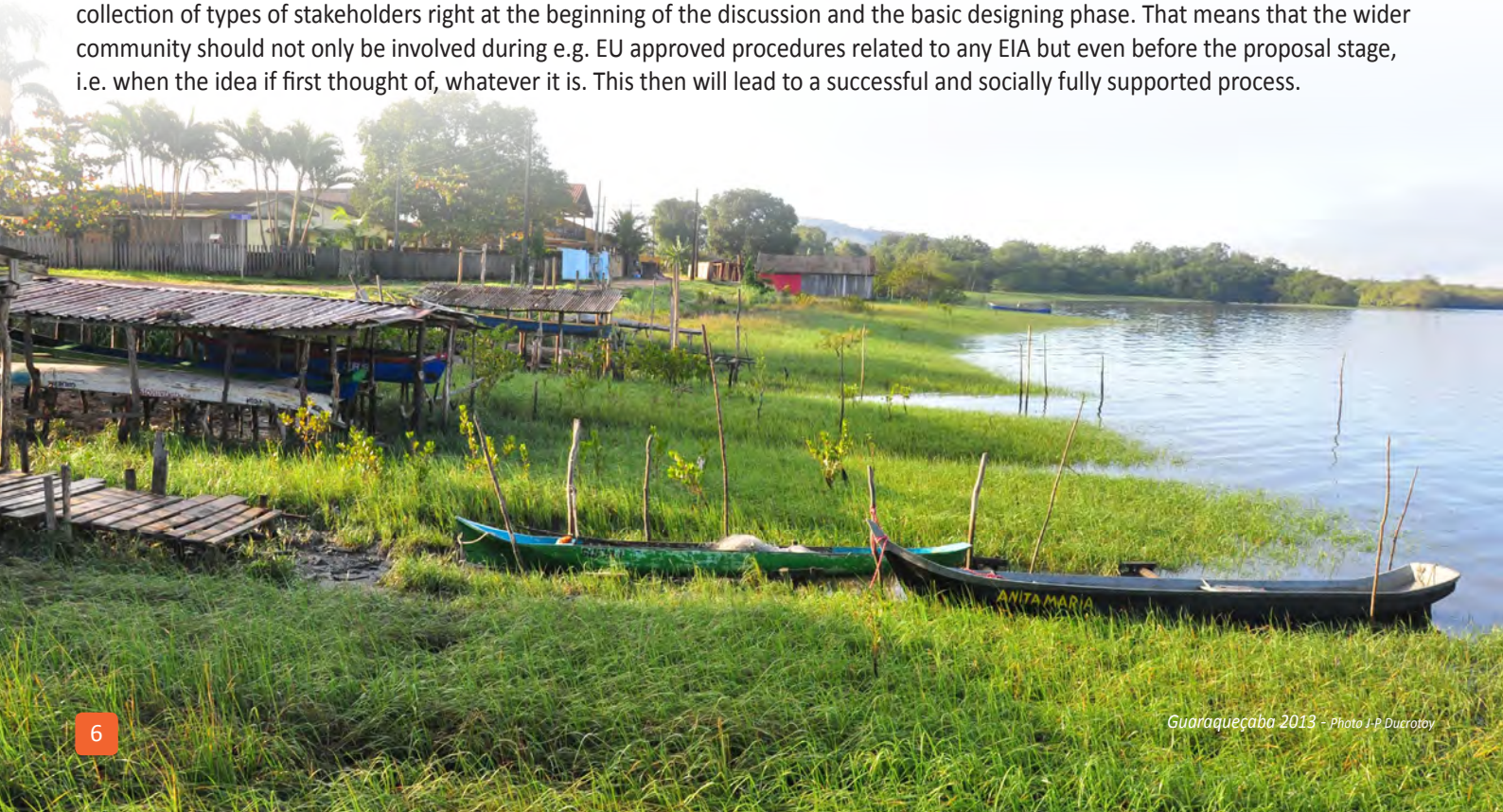
Letter to the Editor

Dear Editor,

I have noticed that there is quite some interest in getting estuaries prepared for any new future situation. These needs vary from protection against flooding, qualitative and quantitative water management measures to improving or widening economic activities. Recent issues I came across were related to some Dutch plans related to coastal developments along the new UNESCO World Heritage Site 'Wadden Sea' and the Thames estuary (United Kingdom). The Dutch plans are e.g. about 'greening' a 32 km long dike, to extend harbours and to widen and deepen fairways. In the UK the town of London needs to be protected by a new barrage while the second issue is related to an interesting but quite challenging alternative option (Europe's Hub Airport in the Thames) for Heathrow and the other airports of London. Especially the latter draw my attention because of its scale and because it resembles a former Dutch plan named 'Flyland'.

It is with increasing amazement to see that plans about changing coastal environments are presented by the most exciting brochures but without a full and wide economical, social and ecological justification of the plan or even a reference to it. Incomplete plans are thus presented with a sectoral focus being the economy and further the quality and importance of the designers, planners and consultancies that produced it. There is in these cases no way that one can check if the 10-tenets required for integrated, successful and sustainable marine management have been fulfilled (Elliott, 2013). It also means that if this brochure is the first public step and the necessary debate about the plan needs to follow later in time then the developers have obtained a beneficial, even competitive, position to all other parties involved, because the picture of the exiting design from the brochure has already been imprinted in the brain. If there is an assessment to the plan then too often at best aspects related to the engineering part (the infrastructure included) are well-developed, procedures (not necessarily the quality of the content) are followed correctly (as with Environmental Impact Assessments/ EIA) while the 'literature' is usually at best internal reports from the consultant and colleague partners.
To me there is a need to discuss this sort of plans within the widest possible community because, except for an attractively looking object such as Europe's Hub Airport in the mouth of the Thames or a 'greened' dike by mainly the questionable construction of artificial salt marshes (Wadden Sea), the best possible concepts and tools need to be applied if the feasibility and necessity of the plan are agreed upon. That is thus including the impact assessment and the consideration of mitigation and compensation measures. New, and often to consultancies unkown, concepts and tools are usually developed by the scientific community which is not widely consulted during these processes. As already suggested and explained a long time ago (de Jonge, 2007) both the scientific and policy making communities of our society should be better merged during the development of whatever plan than we did so far.

To come to a solution for whatever plan related to any estuary or coast, it would be good to first consider explicitly all the constraints in connection to 'environmental sustainability' (Brundtland, 1987, 1997), the 'ecosystem approach' while considering the existence of the 'integral system' (de Jonge, 2007; de Jonge et al., 2003, 2012) and its functioning in all aspects covering fields varying from the social sciences to the natural sciences (de Jonge, 2007; de Jonge et al., 2003, 2012) and using the best and fit-for-purpose science related to the relevant environment (Elliott and Whitfield, 2011). Thus society itself needs to be explicitly included as a large collection of types of stakeholders right at the beginning of the discussion and the basic designing phase. That means that the wider community should not only be involved during e.g. EU approved procedures related to any EIA but even before the proposal stage, i.e. when the idea if first thought of, whatever it is. This then will lead to a successful and socially fully supported process.



Guaraqueçaba 2013 - Photo J-P Ducrotoy

Functions of estuarine systems

The functioning of estuaries can be described in many ways and from quite different perspectives (de Jonge, 2007; Elliott and Whitfield, 2011; de Jonge et al., 2012; Whitfield et al., 2012; Basset et al., 2013; Tett et al., 2013). For simplicity I prefer here to follow the food production trajectory.

1. Tidal flat estuaries receive river water rich in nutrients and organic material that is mixed in the mouth with nutrient-poor sea water. This creates potentially conditions for a high production of 'green stuff'. In the estuaries around the North Sea this 'green stuff' represents food that mainly consists of micro-algae (macro-algae and macrophytes are often not important in tidal flat estuaries as main food source). They live in both the water column and on the bare looking intertidal flats (Colijn, 1983; de Jonge, 1992). Wind induced waves and tides make that a significant part of the benthic algae becomes resuspended to the water column so that the benthic micro-algae and the phytoplankton together form the food source for the zooplankton in the water column (de Jonge and van Beusekom, 1992, 1995). Since the temperatures in these shallow coastal systems rise quickly during spring time and also reach higher levels than the water temperatures of the open sea, these systems are indeed very productive.
2. In estuaries the interaction of fluctuating freshwater discharges and tides further creates conditions for a characteristic brackish water community (Remane, 1934). The bigger the brackish water area (e.g. Thames estuary, Duch Wadden Sea and Ems estuary) the more stable the regional brackish water communities can be and the higher the species richness is in these estuaries (data of Dr. H. Michaelis in de Jonge and de Jong, 2002). This relation between size and species richness is especially true for the smaller organisms that form the basis of the complicated food web (Telesh et al., 2011, 2013).
3. A rich food basis in estuaries creates a suitable functional basis as a nursery area for commercially valuable species (fish, crabs and thus also the icons of our coastal systems such as seals and dolphins). There is thus already a direct connection between any unaltered estuary and the social economic system that needs to be weighed against all other thinkable functions.
4. Estuaries form the natural transition zone between the open sea and the rivers as well as the land. Therefore they have always been in use as transport routes. As a consequence most estuaries around the world have big ports and cities connected to them, like London is situated on the Thames and Rotterdam is situated on a tributary of the Rhine River.
5. There are many more functions connected to shallow estuarine and coastal areas. They cover fisheries, generating power by wind turbines and power plants, excavation of shells or clay and sand, the drilling for gas and oil, land-claim of shallow areas for the creation of areas for housing and industries, boating and coastal recreation.
6. The species living in coastal areas form a genetic pool that can or might be used in the future for either modifying the genetic basis of organisms or the production of whatever chemical compound beneficial to society.

The functions of estuaries, as exemplified with the above short list, need to be discussed and weighted against any new designated role of the area or part of it by society.

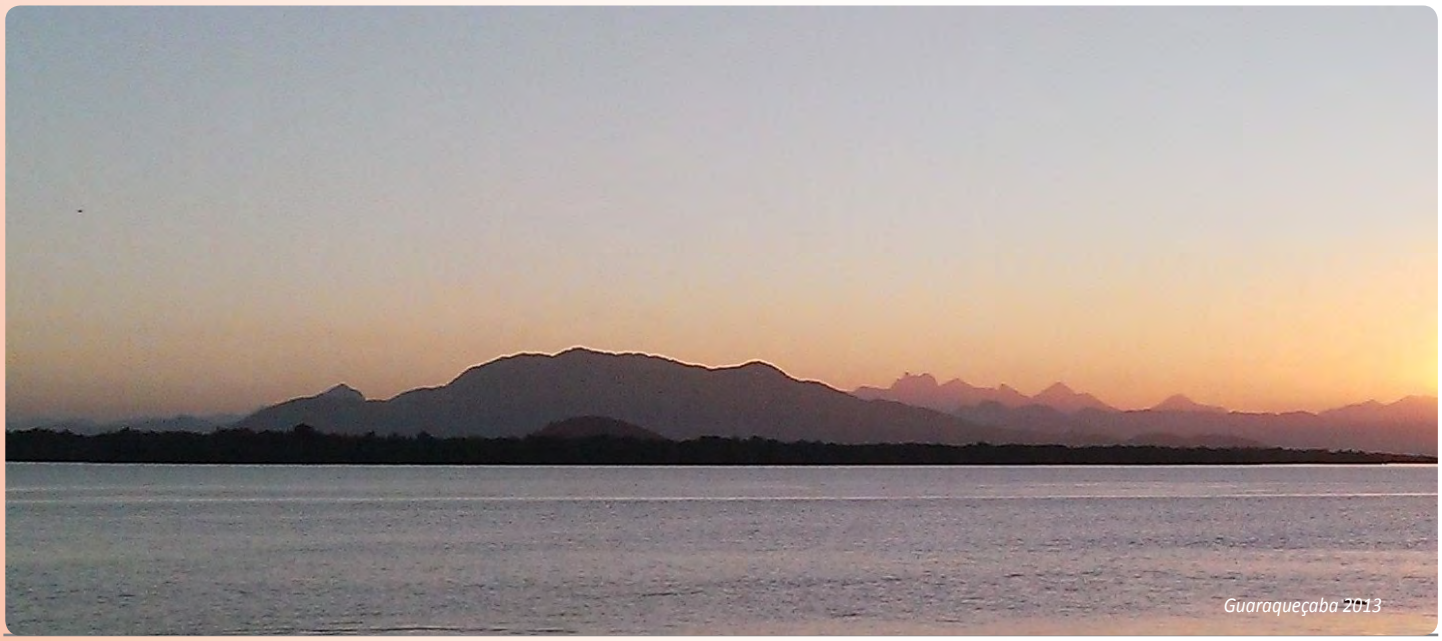
Estuaries under threat

Estuaries are world wide increasingly modified from more or less natural river mouths into more canalized systems or even big canals (e.g. the New Waterway which has replaced the former estuary of the Rhine River in The Netherlands; de Jonge, 2009).
Apart from the question whether society 'wants' to change coastal systems, another relevant question is whether 'society' (anno 2013) has the 'right' to change these systems or not. But, 'What is society?'. Is society the total of the inhabitants of a region or a country? If so, then the population should, as a rich collection of stakeholders, discuss whether it is desirable to change these systems as is happening continuously everywhere and following a sort of 'no regret' process and related decisions. If 'society' is the people representing us via the political elections then the question is whether we should leave the decisions about changes solely to them, the political arena, or not. This point is quite relevant since a) politicians do not have the required knowledge in comparison to the collection of stakeholders and b) our representatives are too often forced to play a slightly different role after the elections than hoped for before the elections.
This short letter is not the place to create an answer to the political reality, but it may be a place to suggest a 'no regret' sort of process. This point is quite relevant because not only tropical rain forests and coral reef systems are under threat but also estuaries. We more and more discover that these areas, via the tide related physics (see Schuttelaars et al., 2013; de Jonge et al., 2014), are nearly as vulnerable as all the other systems and we therefore need a thorough debate about the necessity to change them the way designers like it, because all the changes are unidirectional. The worrying dimension here is that it is an irreversible process, there is no way back simply because it is economically too costly!
There is a wealth of literature available about estuaries and coastal areas. It varies from very fundamental research on structures and functioning (Wolanski and McLusky (eds), 2011) to aspects related to the use of these systems and ideas and experiences related to their management (Steele et al., 2001). There is at present thus, apart from fulfilling all the required legal national and EU procedures, sufficient general knowledge for developers and planners that could be used to create a real socially, economically and ecologically

sound scientific basis under any project plan. There is also much very detailed scientific background information available. It is easy to summarise sufficient knowledge to put plans into a wide context and even the widest possible perspective. It means that, despite the fact that professional consultants play necessarily a different role compared to scientists, they still have a wide opportunity to check their ideas and to learn from historical successes and failures elsewhere by simply checking the scientific literature and to refer to these sources in their (summary) reports. That wider context is something that is too often missing, not only from brochures I see but also from the assessments I have seen. It is not good to read in a brochure how big (in terms of number of employees) the organisations are that were involved in developing and designing the plan and that the organisation is 'world leader in EIA' while at the same time there is further not any reference to any information source related to statements about 'no or very low environmental impacts'. The same holds for a report I found from the Mayor of London (Johnson, 2013). In the bibliography I found out of 40 references only 3 references to environment but only in relation to 'legally binding procedures' and not because of any intrinsic worry about the environment. It is really worrying that not one reference was to any scientific book or scientific journal because that could have indicated that, apart from legally binding issues, environmental issues are indeed taken serious. When, for instance, an airport is built in shallow waters close to intertidal flat areas and salt marshes as seems to be the case in the outer Thames estuary then we know for sure that we do not know what will happen with that system after the initial human intervention (at time T = 0). An example of continuous deterioration (despite several EIA) can be found in the well documented paper by de Jonge et al. (2014). These authors write: " One of the main reasons for the unintended deteriorations is the tension between the requirement to take measures from an economic and a management point of view, while the knowledge about the response of estuarine systems to such measures is still in its infancy. ". There is thus enough proof that the models used so far are not capable to cope with this sort of future developments. Or to quote Donald Rumsfelt: "there are known knowns; there are things we know that we know. There are known unknowns; that is to say, there are things that we now know we don't know. But there are also unknown unknowns – there are things we do not know we don't know. ".

It is thus by far not enough to be an expert in designing objects, landscapes and situations, in using tools or handling procedures related to an EIA. Additional expert knowledge is required to create a sound basis where the question is answered what the consequences or possible consequences are of the execution of the plan. We need to search for 'what we know and what we do not know'.

This letter is not meant to insult or to blame but it is meant as a 'warning' to be careful, detailed and precise and certainly not too opportunistic. This view is based on developments as documented by myself over the last 4 decades and especially based on the work on one of the few Dutch estuaries, the Ems estuary. Despite all the EIA prepared for every new intervention there, the system has deteriorated over time step by step because the developments that occurred after the interventions were not foreseen. Why not? Just because the modelling tools used were not sufficient to forecast any development after T=0 (the intervention itself). A comparable situation holds for the execution of the 'delta works' in the south west of the Netherlands. We got safety against flooding but in every closed tributary at least one new problem was created due to the works. In any assessment, not only the positive aspects and outcomes should be reported but all relevant aspects need to be answered and if they cannot be answered then also that result should be extensively be reported about to make clear what we know, what the certainties are, the uncertainties are and what we do not know!



Guaraqueçaba 2013

Photo J-P Ducrotoy

Is there a need for an additional role of the scientific community?

It is not only the consultants/ consultancies that need to be critical and not too opportunistic. In general, also the members of the scientific community need to start to play an additional role. It is very important that we start actively a better cooperation between the experts of both arenas (the professional consultants and the professional scientists) than we did so far. There is a need for discussing plans from quite different perspectives, more than we are doing. Consultants and independent non-consultant scientists should consider starting to co-operate without giving up their own different identities and professional roles because they will bring in quite different views. The professional consultants bring in their 'problem' and their standard tools available on the shelves, while the professional scientists bring in more new ideas and developments from their fields. That will lead to a divergence of the basic ideas brought in by the consultants. Such an approach could be carried out on a project basis, thus not within any institutionalized situation.
It is absolutely necessary to be 'divergent' in thinking at the start of any plan. That is to widen the view and to think 'out of the box'. The well known 'So what' and 'What if' questions need to be discussed to maximize the context and to explore all thinkable perspectives and not only the technical ones (e.g. engineering, economic benefits) related to the plan.
Apart from the above there is at the same time also a strong need for being 'convergent' that is being prepared to focus and to come to the best possible and best fitting ('tailor made') solutions that go beyond the main focus of the core of the plan but will serve the wider society and the future of the system in terms of sustainability as defined by Brundtland Commission in 1987. These solutions should also emerge from 'looking over the fence' and 'out of the box' and should at the same time serve all aspects related to ecosystem based management within the context of 'sustainability'. More than the professional consultants, the professional scientists should be fuelling this process because they are working at the 'frontiers of science' and they are the ones who will find new solutions to existing problems more easily than consultants will do. That process needs to serve the social and economic system as well as the ecosystem and for a period much longer than any political reality (usually the period in between the elections).

Possible solutions

Too often our decision makers behave like the 'fittest' that is the most powerful players based on which they thus also act as the potential 'survivors' in the 'survival of the fittest' a la Darwin. However, even in our modern and so called civilized 'anthropocene' the 'survival of the fittest' most likely holds for the one with the most powerful position. That person is, however, not necessarily also representing the best, most clever and most sustainable solution. We are in the policy making arena related to estuaries and coasts not facing 'just a debate' but we are dealing with essential changes to the world around us, a world that needs to be left to the next generation (remember the Brundtland Commission).

Professional consultants are not in the best position to develop and to renew easily their tools as a response to new developments in science because they need to make money based on advices. Their main business is preparing advices and not to develop methods or tools. They are consequently thus by definition also slightly 'conservative' in what they do. Therefore the professional scientific community has a responsibility here as well. They need to prevent that solutions as advocated at the end turn out to be a mirage. We need to be very precise from the beginning to the end and especially when we are dealing with big and complex plans in a system that in itself already functions as a complicated natural 'machinery'. There are several good examples available related to estuaries and coastal areas from which we can learn how not to do it (above). There are also two Dutch examples where the best available (but at the same time insufficient; see above) tools have been used. For the Flyland project (such as the UK alternative for Heathrow an alternative for Amsterdam airport) this has resulted in a standstill of the process to gain time for further research. For the extension of the Rotterdam harbours (Maasvlakte II which has been executed already) this has resulted in a process where serious questions and comments on the possible impact of the harbour extension on the transport of suspended material to the Wadden Sea have been partly ignored. May be the members of that project took the view that my 'ignored' is synonymous with their 'we took the information into account and then decided that on balance and in the public and national interest we should go ahead irrespective of what the science says'. Any objective monitoring afterwards to check if the projections or predictions were correct or not, is now unfortunately senseless because just after the completion of Maasvlakte II just north of the harbour extension a huge amount of sediment has been brought to the coast (by nourishment) to feed a large part of the Dutch coast with sand. That sand is thought to be distributed by the waves and the currents in an attempt to prevent any unforeseen large scale coastal erosion due to this harbour extension.

I think that there is a clear need for creating a sort of 'front office' by professional scientists to prevent the further defragmentation of our environment. That 'front office' should be a professional one that goes beyond the present roles of the NGO's and authorities. May be ECSA could be the vehicle to get it organised. These 'front offices' should not carry out a real full project task and should not be set up as a sort of institutionalized organisation related to companies, organisations, authorities or government because then it is only the continuation of the present situation. It should be more a pool of experts from where one or more people could be selected

to assist in advising a large preferably public project dealing with a specific problem like a big airport or an internationally important harbour. Under the circumstances as defined these advisors should be paid by the government because they deliver a general service to the community because they advise on matters beyond the primary goal of the project. Such a group of scientists should be able to indeed 'think out of the box' and 'look over the fence' in a way that is beneficial to the consultants, developers, planners but above all the authorities and politicians involved. They should together be able to make clear what the challenges, potentials and implications are of whatever sort of plan suggested by whatever sort of organisation. At the end they should in concert be able to come to the best possible and thus 'tailor made' solution.

Forthcoming International Symposia

Forthcoming International Symposia

CENTRO DE OCEANOGRAFIA

Centro de Oceanografia (PEst-OE/MAR/UI0199/2011)
Project Bioconnect (PTDC/MAR/117084/2010)
Project FishBiodiversity (PTDC/MAR/117119/2010)

ECSA 54: Coastal systems under change: tuning assessments and management tools.

12 - 18 May 2014. Sesimbra, Portugal

Environmental change is occurring at unprecedented rates and scales. However, knowledge on how climate and anthropogenic impacts interact and affect hydrodynamic, geomorphological, geochemical, biological and ecological processes in coastal areas is still limited. A better understanding of changes in ecosystem function and processes will contribute to more efficient management and conservation strategies. The integration of current knowledge and the development of predictive tools involve a multidisciplinary effort to deal with challenges posed by changing coastal environments.

To explore the topic of environmental change in coastal systems aiming at advancing assessment and management tools, ECSA 54 will address the following topics:

Themes:

1. Hydrodynamic and geomorphological shifts in coastal systems
2. Geochemical processes in changing environments
3. Shifts in biodiversity and ecosystem functioning
4. From genes to ecosystems: effects of global change
5. Connectivity and its implications towards conservation and management
6. Improving management and decision processes: advances in understanding and predictive tools

Convenor: **Henrique Cabral, Centro de Oceanografia, Portugal ecsa54@fc.ul.pt**
Abstract submission deadline: **28/02/2014**
Early registration closes: **31/03/2014**
Registration deadline: **30/04/2014**
Website: **http://ecsa54.fc.ul.pt/index.html**

ECSA 55: Estuaries and coastal seas in a rapidly changing world. Phuket, Thailand. 2014.

Due to the increasing risk of political unrest in Thailand the above meeting has been cancelled. ECSA would like to apologise for any inconvenience caused to members and potential delegates.

Local United Kingdom Meetings

ECSA Local Meeting: Estuaries and Coasts of North and mid- Wales.

8-10 April 2014. University of Wales, Bangor, Gwynedd.

The ECSA 2014 spring local meeting will focus on the coasts and estuaries of North and mid- Wales. This region extends from the River Dee in the North (which forms the boundary with England) to Aberystwyth and Cardigan Bay in the south and includes the North Wales coast, Anglesey and the Menai Straits, the Llyn Peninsular and the coast and estuaries of mid-Wales.
The region contains some of the most distinctive marine areas in Great Britain ranging from spectacular estuaries with extensive intertidal areas to the rocky shores of Anglesey and the Llyn Peninsular.

Topics:

1. The biology and ecology of coastal habitats
2. Hydrology, sedimentology and geomorphology in the coastal zone
3. Fisheries and aquaculture
4. Nutrients and pollution
5. Management of the coastal zone
6. Marine energy
7. Socioeconomic utilisation of the coastal zone

Abstracts are now invited and should be emailed to Andrew Wither at the National Oceanography Centre: awith@noc.ac.uk

Extended abstract deadline: **01/03/2014**

For more information, including registration costs please visit:
http://www2.hull.ac.uk/administration/ecsahome/forthcomingevents-1.aspx

Photo J-P Ducrotoy

Iperagui 2013

The ECSA53 Annual Science Symposium in Shanghai

14-18 October 2013

Estuaries & coastal areas in times of intense change

Victor N. de Jonge
Chairman of ECSA53

The 2013 annual ECSA symposium in Shanghai (14-18 October 2013) was held in one of the Hilton hotels and attracted over 400 participants.

Elsevier Conference Team

As was the case in Venice in 2012, also this meeting was logistically very well organised by the three ladies from the Elsevier Conference Team and socially very enjoyable because Elsevier and our hosts of the State Key Laboratory (SKLEC) of the East China Normal University (ECNU) in Shanghai had organised everything related to catering, symposium dinner and excursion, very well. Apart from the Elsevier Conference team we had seven science staff members from SKLEC involved while we also had 12 student helpers. Altogether 22 people have been working closely together with the Elsevier Conference Team, mysef and Prof. Dr. Yunxuan Zhou as Conference Chairs Prof. Dr. Zhongyuan Chen as co-Chair. All the administration related to the required personal invitations to obtain a visum for China was carefully handled by Prof. Dr. Xiuzhen Li ad Li Tan.
We received a much appreciated sponsoring from SKLEC, EMECS and LOICZ without which we could not have organised this event as we did.

Student helpers from SKLEC


ECSA53 Chairs Prof. Yunxuan Zhou (SKLEC) and Prof. Victor N. de Jonge (ECSA)

My sincere thanks go to all the people who have contributed to a very successful annual symposium.

The scientific part of the symposium covered 130 posters while the oral part was so big that we have been forced to split that in 6 separate streams with in total 300 oral presentations. On top of that we had 4 special sessions organised by SKLEC, EMECS and the LOICZ Yantai Node and 3 workshops about 'Writing papers', 'Reviewing papers' and 'How to use science in policy making and governance'.

Technically, we had decided to create after every 3rd or 4th oral presentation a 10 minutes 'synchronisation break'. This has turned out to be one of the most effective improvements of organising a symposium because it has prevented any problem when participants liked to switch from the one stream to another.

During the opening ceremony the ECSA Lifetime Achievement Award 2013 was presented to Prof. Dr. Jiyu Chen (ECNU), the founder of the State Key Laboratory of the East China Normal University (ECNU) in Shanghai for all his work and initiatives to get the coastal sciences organised in China.


Prof. Geoff Millward (ECSA president) thanking Li Tan and Prof. Xiuzhen Li for all their administrative support

In total 17 speakers were invited for a key note:

Prof. Richard Bellerby, *Norwegian Institute for Water Research, Bergen, Norway*
Presentation title: Land-ocean exchange and marine biogeochemical cycling under climate change

Prof. Zheng Bing Wang, F*aculty of Civil Engineering and Geosciences, Delft University of Technology, The Netherlands*
Presentation title: Morphodynamic processes and environmental sustainability in estuarine and coastal systems

Prof. Christopher B. Craft, *School of Public and Environmental Affairs, Indiana University, Bloomington, IN, USA*
Presentation title: Coastal Wetlands in a Changing Climate: Requiem or Renaissance?

Prof. Dr. Rudolf de Groot, *WUR, Wageningen, The Netherlands*
Presentation title: Use of ecosystem services to analyse ecological, socio-cultural and economic effects of coastal development

Prof. Victor N. de Jonge, *Institute of Estuarine and Coastal Studies/ IECS, The University of Hull, UK & Diana Giebels, Erasmus University Rotterdam, Department of Public Administration, Rotterdam, The Netherlands*
Presentation title: Handling complexity in the governance, marine environment and society triangle

Prof. Pingxing Ding, *State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China*
Presentation title: Environmental evolution of Chinese large river estuaries in the past half century and its response to global change

Prof. Mike Elliott, *Institute of Estuarine and Coastal Studies/ IECS, The University of Hull, UK*
Presentation title: Tools for improved and effective estuarine management to combat natural and anthropogenic hazards

Prof. Brian Fath, *Department of Biological Sciences, Towson University, USA & IIASA, Austria*
Presentation title: Quantifying Economic and Ecological Sustainability

Dr. Keita Furukawa, *National Institute for Land and Infrastructure Management, Japan*
Presentation title: What are the goals and what is the background information for restoring the ecosystem of Tokyo Bay?

Prof. Ramesh Ramachandran, *Director of the National Centre for Sustainable Coastal Management, Ministry of Environment and Forests, Government of India*

The 2012 winner of the best ECSA student oral presentation
Dr. Andrew Olds, *Research Fellow, Australian Rivers Institute (ARI) - Coast & Estuaries, School of Environment, Griffith University, Australia*
Presentation title: Recognising the value of seascape connectivity in marine conservation

Prof. Hans Paerl, *Institute of Marine Sciences, The University of North Carolina - Chapel Hill, USA*
Presentation title: Managing eutrophication along the freshwater-marine continuum in coastal watersheds

Dr. Fangli Qiao, *The First Institute of Oceanography, State Oceanic Administration of China, Qingdao, China*
Presentation title: Upwelling and thermocline dynamical processes in the China Seas

Dr. Henk M. Schuttelaars, *Delft Institute of Applied Mathematics, Delft University of T echnology , The Netherlands*
Presentation title: A synergetic use of different model types in research and management

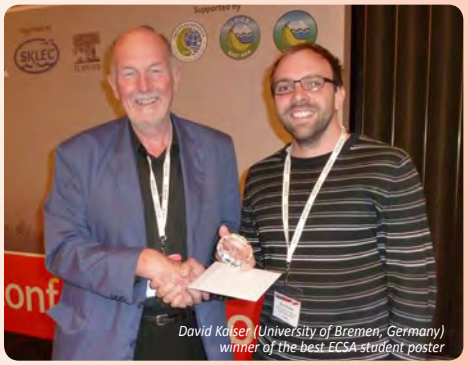
Dr. Sun S, I*nstitute of Oceanology, Chinese Academy of Sciences, Qingdao, China*
Presentation title: Monitoring the index species that describe the coastal and shelf eco-system quality under climate change and human activities

Prof. Eric Wolanski, *Australian Institute of Marine Science/ AIMS, Townsville, Australia*
Presentation title: Modelling the recruitment of estuarine, coastal and reef fisheries

Prof. Zuosheng Yang, *Institute of Estuary and Coastal Zone, Ocean University of China, Qingdao, China*
Presentation title: Environmental evolution of Chinese large river estuaries in the past half century and its response to global change

Prof. Weiguo Zhang, *State Key Laboratory of Estuarine and Coastal Research, East China Normal University, Shanghai, China*
Presentation title: The Yangtze Estuary in the Anthropocene past, present and future

Noemie Wouters (University of Lisbon, Portugal) winner of the best ECSA student oral presentation



David Kaiser (University of Bremen, Germany) winner of the best ECSA student poster

At the end of the symposium we have presented the ECSA prize for the best student oral presentation to Noemie Wouters (Centro de Oceanografia, Faculdade de Ciências da Universidade de Lisboa, Portugal) and the best student poster to David Kaiser (Leibniz Center for Tropical Marine Ecology, University of Bremen, Germany).

ECSA - SPRINGER Special Session "Estuaries of the World"

GLOBAL CONGRESS on ICM:

LESSONS LEARNED to Address NEW CHALLENGES

EMECS 10 - MEDCOAST 2013 JOINT CONFERENCE

30 october – 3 November 2013

Marmaris, Turkey

Based on the newly launched book series "Estuaries of the World" by Springer, a special session was held as part of the EMECS 10 – MEDCOST 2013 Global Congress which took place in Turkey in October-November 2013. This special session included invited papers and other presentations. It was intended for researchers, practitioners, undergraduate and graduate students in all disciplines who are dealing with complex problems and looking for cutting-edge research as well as methodological tools to set up truly transversal science and technology projects, such as the restoration of damaged estuarine habitats in the context of climate change.

This session was sponsored by Springer Publishers and the Estuarine and Coastal Sciences Association. 45 participants attended the session.

Communications

The presentation by Ducrotoy and Chéronet clarified the philosophy which supports the new collection of books. In order to discriminate between global and local influences, it was recognised that in-depth knowledge of natural processes is necessary to acquire, as well as relevant institutional, cultural, economic, social and political frameworks. An ecological vision on the long-term would require:

- Adopting a holistic (global) approach to ecosystems,
- Analysing the past for predicting the future, and
- Promoting local activities in harmony with local conditions.

Wolanski and Ducrotoy introduced the first book recently published in the EOTW collection "Estuaries of Australia in 2050 and beyond" . They showed that governance and sustainable development of estuaries are only practical where there is a large urban population demanding a high quality of life. Elsewhere (particularly in the Tropics), the policy of development at "all costs" is still common. However, there were still pristine estuaries in Australia which are a present to the world and which should be protected carefully. Threats from urbanization, irrigation, mining or industrialisation should be taken away from such valuable ecosystems.

Questions dealt mainly with fresh water resources and the need in the future for dams for irrigation and urban use. These would undoubtedly be detrimental to the health of affected estuaries.

Chen and Xu introduced several scenarios built to predict DIN concentrations in the lower Yangtze River in 2050. It appeared that when 3 selected scenarios (from the more optimistic to the more pessimistic) were applied to dry years, a large excess of DIN would be found in the lower river by 2020-2050 if drastic solutions were nor found by the government to abate pollution.

There were questions about contributions from further up the river, uphill from Shanghai. In particular the audience wondered what would happen if most of the suspended matter input was suppressed as it appeared as being an important factor in the distribution of the nutrients.

The presentation by Frumin introduced ways of establishing relationships between input of total phosphorus and total nitrogen to the Baltic Sea from 14 large international rivers. It considered the area of each basin, the number of inhabitants, the areas of forests and cultivated areas in the watersheds as well as rivers characteristics. The total number of inhabitants in the catchment and the area of the cultivated zones came out strongly as influential factors.

The discussion dealt mainly with possible measures to be taken by states to abate pollution to the Baltic Sea, and more generally, to enclosed coastal seas anywhere in the world.

General discussion

The general discussion was lively and several important comments were brought in. Debates and interviews were broadcasted on national Japanese television channels.

The discussion addressed several topics in relation to coastal sciences and socio-economics. Especially, the need for assessing pressures on the environment was identified, as well as the necessity to understand the response of estuaries when the ecological functions are affected. Further contributions gave a large place to a prospective approach and the need for planning on the long-term. The main conclusion was that the future of estuarine ecosystems would greatly depend on societal changes to take place on the mid-term, in particular those depending on socio-economics. A multidisciplinary approach was recommended. The need to make existing scientific information much more manageable by non-specialists, without compromising the quality of the information, was emphasized.

Contacts:

Conference site: http://conference.medcoast.net/

Series editor: Jean-Paul Ducrotoy, Institute of Estuarine and Coastal Studies, the University of Hull, U.K.
<jean-paul.ducrotoy@hull.ac.uk>

Springer Verlag: Alexandrine Cheronet
<Alexandrine.Cheronet@springer.com>

The First Winner of the ECSA Peter Jones Memorial Award is Announced

The Council of the Estuarine and Coastal Sciences Association is pleased to announce that the first winner of the Peter Jones Memorial Award is Dr Heidi Burdett from the University of St Andrews, Scotland. This annual award is given for the best paper by a current PhD student or an individual who has recently been awarded a PhD. Heidi obtained her PhD in February this year, from the University of Glasgow, and her application was based on a paper entitled "Spatiotemporal variability of dimethylsulphoniopropionate on a fringing coral reef: the role of reefal carbonate chemistry and environmental variability". The paper was published in May 2013 in PLOS One, Volume 8, Issue 5, e64651, which is an open access journal with a 5-year impact factor of 4.24.

Her PhD research concerned the production of dimethylsulphoniopropionate (DMSP) by coralline algal habitats and involved measuring its concentration and distribution. The image shows Heidi placing light and temperature loggers on the Suleman reef in Dahab, Egypt. The image was taken by her PhD supervisor Dr Nick Kamenos, during the field campaign that resulted in her paper. The significance of this research is that DMSP is known to be vitally important in the marine sulphur cycle, which ultimately has an impact on atmospheric processes that control the Earth's climate. However, very little is known about the contribution to DMSP in seawater by calcifying algae and, consequently, Heidi's research will add significantly to the wealth of knowledge concerning the factors that regulate the global climate

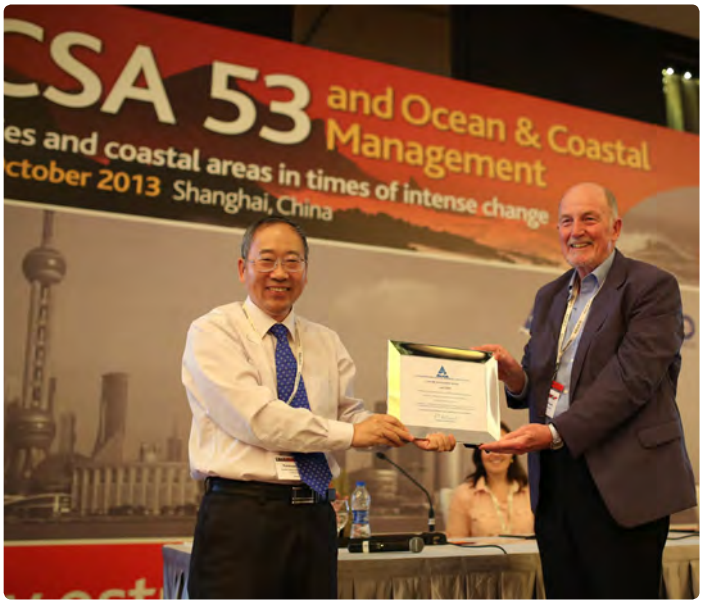
Dr Heidi Burdett

Heidi has spent most of her career in the field of marine science. She obtained a first class BSc(Hons) in Ocean Science in 2007 followed, in 2008, by a MSc(Distinction) in Applied Marine Science - both degrees from the University of Plymouth. She then moved to the University of Glasgow where she obtained her PhD in Marine Biogeochemistry in February 2013. She is now a Research Fellow at the University of St Andrews where she is sponsored by the Marine Alliance for Science and Technology for Scotland (MASTS). Here she intends to pursue her research on the quantification of the sulphur budget in tropical and temperate coastal ecosystems and to develop concepts in the use of coralline algal deposits as palaeo-climatic and palaeo-ecological proxies for climate change.

The ECSA Council send their congratulations to Heidi and wish her the best of success in her future research career.

Professor Geoff Millward
President of ECSA
University of Plymouth

Citation for the ECSA Lifetime Achievement Award 2013



Jiyu CHEN
Professor &Academician of the Chinese Academy of Engineering
State Key Laboratory of Estuarine and Coastal Research
East China Normal University
Shanghai 200062
China

CITATION OF ACHIEVEMENTS

Prof Jiyu CHEN, born in 1921, completed his undergraduate study from 1941-1945 and post-graduate study (equivalent to MSc) in geomorphology from 1945-1947 in the Department of History and Geography at the former National Zhejiang University, China. Subsequently, he worked as a research assistant in the University until 1951. Since 1952 Professor CHEN has been working in East China Normal University.

Professor CHEN led numerous national and Shanghai municipal research projects with over 60 scientific and technical reports

submitted to the authorities. He authored 9 books and published more than 140 scientific papers. Due to his outstanding contribution to the country and the estuarine and coastal region, Prof CHEN earned a first grade National Science and Technology Progress Reward. He was elected as a member of International Academy of Sciences for Europe and Asia (IASEA) in 1996 and became an Academician of the Chinese Academy of Engineering in 1999. He is now also the honorable chair of Chinese Society for Oceanography and Limnology.

Prof Jiyu Chen is recognized as a great pioneer of Chinese estuarine andcoastal science. He proposed and established the first Estuarine and Coastal Research Institute in China by the end of the 1940's. He not only developed estuarine and coastal theory but also converted this into engineering practice, integrating hydro-dynamics, sedimentation and geomorphology. As such, he made great achievements and contributed formidably to the work related to the mitigation of impacts in estuary, coastal engineering, port development, flood disaster prevention and water resources utilization.
Prof. Chen's scientific achievements were used to solve problems encountered in coastal development of China, especially many large coastal engineering works. As a representative example, he took charge of the development of "Pudong International Airport Relocated Eastwards and Ecological Engineering on Jiuduanshan Shoals" project, and successfully kept the balance between a large engineering construction and the local ecological environment. This project led to markedly social economic benefit.

Also, he was responsible for a project on "The Impact of the Three Gorges Project on the ecologicalenvironment of theYangtze Riverestuary", which is a national key scientific research project. He drew quantitative conclusions on environmental effects and qualitative conclusions on the ecological effects. Meanwhile, he continues to make important contributions to problems related to the Three Dam's, such as water resource management, tidal reclamation and shore protection engineering.

He analyzed the development of the Yangtze River and Estuary and recommended a focus on three key regions for improvement of its watercourse (1) the bifurcation area of south branch and north branch, (2) the bifurcation area of the south port and the north port and (3) the bifurcation area of the south and north channels. In order to stabilize the river and estuary regimes, he proposed the water course improvement principles that integrate the reparation, dredging and reclamation. He not only providedthe theoretical foundation for Yangtze River's improvement engineering, but also offered feasible instructions to aid the transformation of the estuary into an artificial system.

He has published many influential books, such as "Dynamic Processes and Geomorphologic Evolution of Yangtze Estuary", "Chinese Coastal Development Process and Evolution", "Development principle mode of Yangtze in the last 2000 years", "Processes of Dynamic Sedimentation in the Yangtze Estuary" and "Development of Yangtze Estuary and its Submerged Delta".

MAIN RESEARCH PROGRAMS

1. "The eighth five-year program": Deep Water Navigation Channel Management in the Yangtze Estuary
2. National Key Fund Program: Sediment Dynamic Processes and their Application in the Main Estuaries of China
3. Large scale engineering: Pudong International Airport Relocated Eastwards and Ecological Engineering on Jiuduanshan Shoals
4. "The ninth five-year program": Prediction Technologies on Disasters of Erosion-Siltation in the Typical Estuaries

SELECTED PUBLICATIONS

1. Dynamic Processes and Geomorphologic Evolution of Yangtze Estuary
2. Chinese Coastal Development Process and Evolution
3. Development principle mode of Yangtze Estuary in the last 2000 years
4. Processes of Dynamic Sedimentation in the Yangtze Estuary
5. Development of Yangtze Estuary and its Submerged Delta

All these achievements contribute majorly to Professor Chen's recognition as a world renowned founder of estuarine and coastal science and engineering in China. The Council of ECSA is pleased to confirm his nomination for the Lifetime Achievement Award 2013. The citation was read by Professor Victor de Jonge and presented by the President of ECSA, Professor Geoffrey Millward. Professor Chen was indisposed and unable to attend the presentation and the award was accepted on his behalf by Professor Yunxuan Zhou, Head of the State Key Laboratory of Estuarine and Coastal Research, East China Normal University.

Scourie - Photo: J-P Ducrotoy

ECSA 53 Bulletin Report

To attend 'ECSA 53 and Ocean & Coastal Management: estuaries and coastal areas in times of intense change', I was awarded a Charles Boyden Grant from the Estuarine & coastal sciences association. At the conference I presented 'Does a visual estimate of phytoplankton biomass warn effectively early a regime shift in the North Sea.' PhD student from the Oceanographic Center of the University of Lisbon funded by the Fundação para a Ciência e a Tecnologia (reference: BD/48402/2008), I am also co-supervised by the Director of a Brussels based consultancy company whom I warmly thank for this additional support.

The research presented was developed in cooperation with Prof. Edwards (Sahfos, Plymouth, UK) and Dr. Dakos (Integrative Ecology Group Bascompte Lab, Seville, Spain). Early warning signals are the expertise of Dr. Dakos and the main subject of my thesis. They are statistical parameters identifying Critical Slowing Down of regimes approaching a shift . We used data of Safhos from the 'Continuous Plankton Survey' initiated by Sir. Alister Hardy to assess spatiotemporally changes in phytoplankton. A plankton recording device is towed by merchant ships, while, back in the laboratory, the samples are visually analysed to estimate phytoplankton biomass . Around 1987 pronounced changes in this estimate were observed while dominant zooplankton species shifted to different species and catches of the western horse mackerel increased. Researchers from Sahfos hypothesised the changes in the North Sea as a regime shift. Our presentation showed increasing trends of early warning signals prior to this shift. Their significance and robustness were assessed, thanks to the richness of the data, and the use of an innovative approach. I was fortunate that senior scientists e.g. Prof. De Jonge, Prof. Elliott and Prof. Wolanski attending my presentation, raised relevant issues that I will surely consider for the paper!

As other students I was given the opportunity to chair sessions in cooperation with an experienced scientist, my chairmanship kept 'Estuarine Ecosystem Health, Governance and Management' on track.

The conference also offered three interactive workshops, that I all attended:

(1) How to enhance the scientific basis of environmental governance?

- Discussion on successful and less successful cases of marine management shed light on how essential knowledge-based governance is.

(2) How to get published?

- Best from the editors-in-chief !

(3) Reviewing papers

- Dr. Bandounas, Elsevier: tips for quality reviews.

Out of a list of notes, I want to share some quotes I found very valuable:

Prof. Elliott (WS1):

- 'Two management questions: 'what if?' 'so what?'.
- 'need to know', not 'nice to know' for governance

Prof. de Jonge (WS1):

- 'Effective management requires scientists to know what people think, mind set of stakeholders and other interest groups'.

Prof. Wolanksi (WS2)

- ' To get published: frame your research in an international setting: will researchers in New York, or Shanghai want to read it?'.

Beyond science, ECSA conferences are always of great inspiration and a unique opportunity to interact with scientists active in the field for more than 20 years, that passionately encourage students to pursue scientific careers and produce sound science.

Finally, receiving the award of the best oral presentation for students was the cherry on my cake!

See you all in Thailand for next ECSA, trust me it is definitely worth it!

Noémie Wouters

1 *Dakos, V., S. R. Carpenter, W. A. Brock, A. M. Ellison, V. Guttal, A. R. Ives, S. Kéfi8, V. Livina, D. V. A. Seekell1, O. Egbert, H. van Nes and M. Scheffer (2012). "Methods for Detecting Early Warnings of Critical Transitions in Time Series Illustrated Using Simulated Ecological Data." Pos ONE 7(7).*

2 *Batten, S. D., A. W. Walne, M. Edwards and S. B. Groom (2003). "Phytoplankton biomass from continuous plankton recorder data: An assessment of the phytoplankton colour index." Journal of Plankton Research 25(7): 697-702.*

Student Report Shanghai

53rd ECSA Symposium

12th to 18th October 2013, Shanghai, China

Giorgio Mancinelli, University of Salento, Italy

From 12th to 18th October 2013 I had the opportunity to attend the 53rd Symposium of the European Coastal Science Association. The symposium was held in Shanghai, China, in collaboration with the State Key Laboratory of Estuarine and Coastal Research, East China Normal University.

Given my past experiences, the symposium represented an important occasion to get in touch and interact with a community of scientists - primarily from China, but also from Taiwan, Japan, Korea, India, Thailand, etc - whose participation in "western" congresses and symposia is growing, yet to date still generally limited.

Obviously, it has not been only a matter of breathing an exotic atmosphere during coffee breaks: the symposium actually gave the opportunity to people using different approaches to focus on the same spectrum of theoretical and practical issues related to the ecology, conservation, management and sustainable development of coastal areas. Indeed, coastal areas in China, Japan and other eastern countries are facing an array of challenges - from human induced pressures due to e.g., pollution, overfishing, to natural perturbations e.g., typhoons, tsunamis - that are in principle comparable to those alarming European or North American countries; yet, they are characterized by different spatial, temporal and magnitude scales. It is sufficient to remember that, quoting the Chair Welcome Letter of the symposium, China alone has more than 18,000 Km of coastline, and three of the largest estuarine areas on earth created by the Changjiang, Huanghe, and Zhujiang River; in 2002, the coastal economic zone (comprising only 13% of the country' s land) was estimated to support approximately 40% of the population, producing nearly 60% of the gross domestic product.

The key of the success of the symposium has been to have organized the different plenary sessions, keynote speeches, and oral presentations, fostering a virtuous comparison of experiences, and why not, errors, and stimulating a constructive exchange of ideas for the implementation of future activities, projects, and policies.

From my point of view, the symposium was twofold stimulating and fruitful. My contributions - a poster and an oral presentation - were focused on invasive species; the topic was relatively underrepresented among the different applied aspects considered in the symposium, and this is likely to have determined a quite unexpected rise of interest.

I had the chance to discuss the results showed in my poster with a number of colleagues - from Europe, China and Japan - and this ultimately reflected in constructive suggestions that are still arriving by e-mail, together with a proposal for writing a paper on western-originated invasive crabs in the Yellow Sea and neighbouring areas. The oral presentation - hinging on a proposal to implement metrics for the estimation of the ecological impact of invasive species using stable isotopes – was even more stimulating, with valuable notes and contributions made by Alain Ménesguen from Ifremer, Mike Elliott from the University of Hull, and Salvatrice Vizzini from the University of Palermo.

In conclusion, the 53rd ECSA symposium provided a valuable learning experience and represented for me an important experience, from both a scientific and human point of view, and a key moment for clarifying pivotal aspects of the studies and investigations I am currently performing that need to be generalized and casted within a global context and for identifying topics and research lines to be developed in the future.

Dr Giorgio Mancinelli PhD in the laboratories of the ecology unit of the University of Salento (Lecce, Italy) holding a specimen of the Atlantic blue crab Callinectes sapidus, an invasive species in European waters on which he is currently focusing his research activities.

Sigma Plan Proves Efficiency

The recent "Saint Nicholas" storm surge in the Scheldt estuary: the Sigma plan proves its efficiency!

Patrick Meire[1], Wim Dauwe[2], Tom Maris[1], Patrik Peeters[3], Leen Coen[3], Maarten Deschamps[3], Jos Rutten[4] and Stijn Temmerman[1]

1 University of Antwerp, Ecosystem management Research Group, Universiteitsplein 1C, B2610 Antwerpen, Belgium.

2 Flemish Waterway Administration, Waterwegen en Zeekanaal W&Z, Lange Kievitstraat 111-113, Bus 44, B2018 Antwerpen , Belgium

3 Flanders Hydraulics Research, Berchemlei 115, B-2140 Antwerpen, Belgium

4 Nature and forest Department, Flemish Ministry, Koning Albert II-laan 20, B1000 Brussel, Belgium

Introduction

Over the last 1000 years large parts of the coastal and estuarine wetlands in NW Europe have been reclaimed. What began with little dikes embanking saltmarshes and turning them into fertile agricultural soils, developed to large scale projects embanking thousands of hectares at once. Sediment accretion in the marshes was even enhanced by planting Cordgrass, Spartina sp., and/or building small dams in order to reclaim the next piece of new land as fast as possible. Because the sea level kept rising and sedimentation in the reclaimed land stopped, many of these reclaimed areas lay below the present day sea level, making them very vulnerable for flooding. Indeed, the story of conquering land from the sea was not always successful. Storms and storm surges are an inherent part of the coastal dynamics and in the course of history many of the coastal areas have been flooded during storm surges, most of them being reclaimed again shortly or sometimes many years after the storm. Now large parts of the UK, France, Belgium, the Netherlands, Germany and Denmark are at risk for storm surges, at least without proper action, a risk that will increase with further sea level rise and with the expectation of increasing storm intensity due to climate warming.

The so called Delta area of the SW Netherlands and Flanders includes the former estuaries of Rhine, Meuse and Scheldt and forms a typical example of these developments. Since the early Middle Ages several hundred thousands of hectares of marshes were reclaimed changing fundamentally both the morphology and the hydrodynamics of the area. The Scheldt estuary (for a description see Meire et al. 2005 and reference therein) was shaped by a combination of embankments and major storm surges during the Middle Ages (Coen, 2008). The last decades also deepening of the fairway for the accessibility of the port of Antwerp had major consequences. The combination of sea level rise, construction of embankments, narrowing of the river floodplains, and deepening of the river channel for navigation led to a pronounced increase in tidal range. In Antwerp the tidal range increased by about 80 cm over the last 100 years due to lowering of the low waters (50 cm) and heightening of the high waters (30 cm). More upstream, near Dendermonde, high water increased even by about 1 cm y-1 (Taverniers et al. 2013). The point with the highest average high water level is now 120 km from the mouth, which is about 40 km more inland than 100 years ago (Fig 1). This of course has severe consequences for safety against inundations. Similar morphological and hydrodynamic developments are seen in several other European estuaries (Vandenbruwaene et al. 2013).

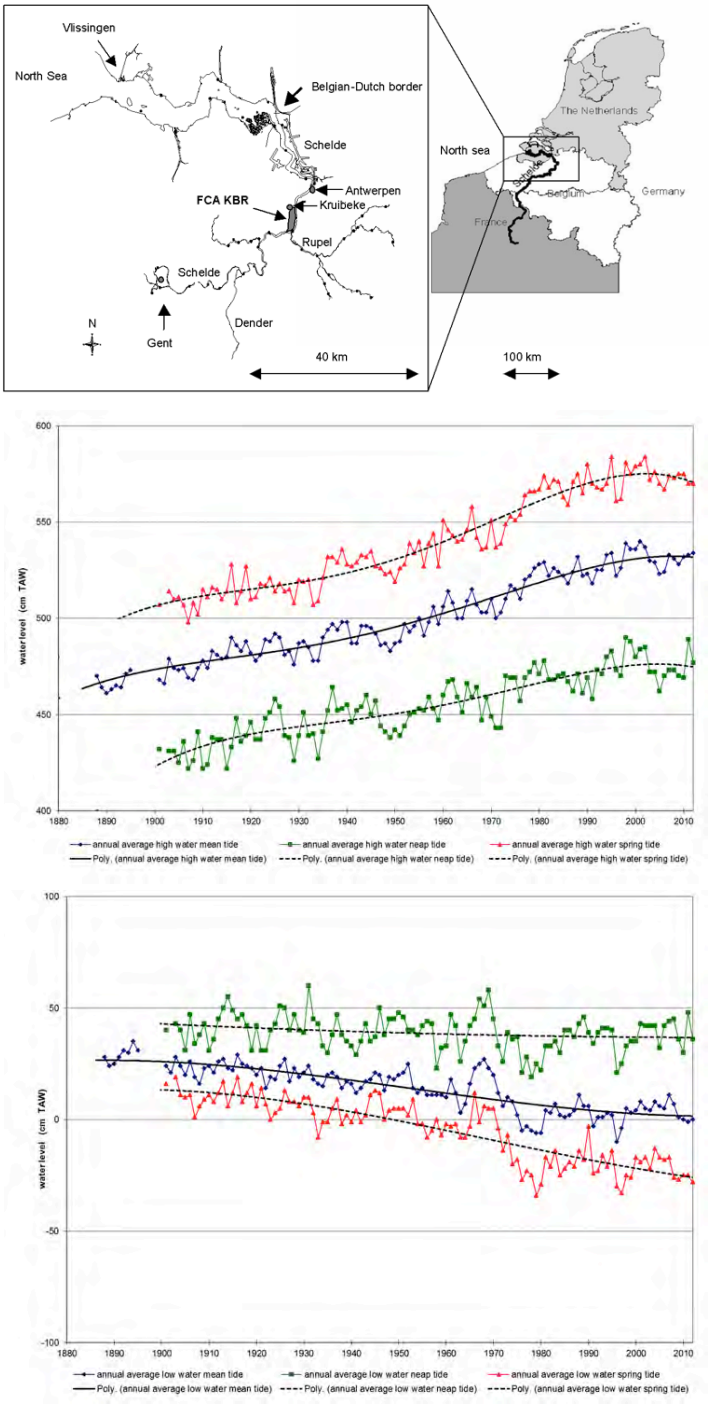


Figure 1. Map of the Scheldt estuary and the development of the high and low water levels near Antwerp (from Vanlierde et al., 2013). Values given are the yearly averages of spring (red), neap (green) and average (blue) tides. The upper panel is high and the lower panel low water.

The Sigma and Delta plan

During the dramatic storm of February 1st 1953, a combination of spring tide and a severe NW storm lead to extreme high waters along the coasts of the North Sea. In the Dutch Delta area dikes were breached at many places resulting in large inundations and the loss of more than 1800 people. Also along the Scheldt estuary large areas were flooded (Fig. 2) and within the Scheldt basin in Flanders, 6 people died.

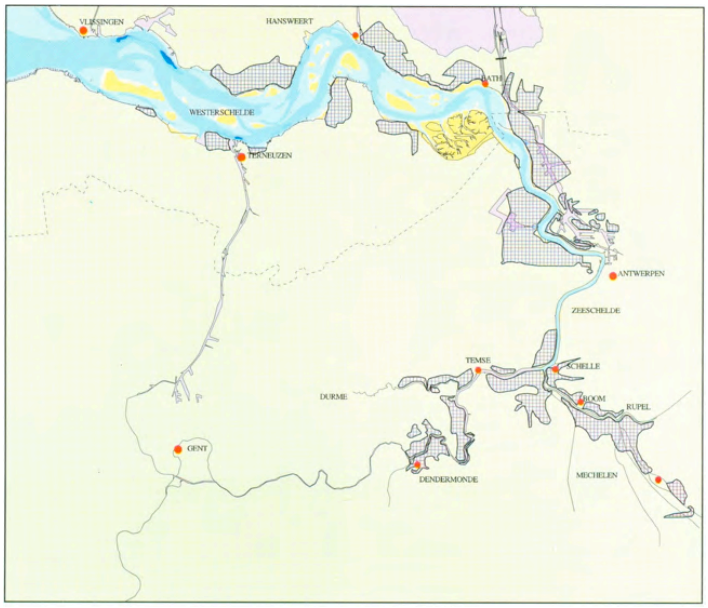


Figure 2. Extend of the floods along the Scheldt during the devastating storm flood of February 1st 1953 (from Meire et al., 1995).

In response to this storm, the Dutch Government decided to carry out the so called Delta plan. This ambitious plan of coastal protection foresaw in the closure of most of the estuaries of the Delta area, reducing the overall length of the coastline from 700 to 80 km. Only the Nieuwe Waterweg and the Western Scheldt were not closed in order to guarantee the accessibility of the ports of Rotterdam and Antwerp respectively. Along the Western Scheldt, the Dutch part of the Scheldt estuary, dikes were reinforced and heightened to 9.00 m NAP (NAP is the Dutch ordonance level and is close to mean sea level, TAW the Belgian ordonance level (0 m TAW equals -2.33 m NAP)) and should be able to withstand a storm with a return period of once in 4.000 years. In Flanders it was only after the stormflood of 1976 when Ruisbroek was flooded that the government decided to carry out the Sigma plan along the Seascheldt, the Flemish part of the Scheldt estuary (decided by the Government on February 18, 1977). The aim was to achieve a similar protection level as with the Delta plan. The strategy differed however fundamentally. In addition to dike strengthening and heightening and a storm surge barrier near Antwerp, the Sigma plan foresaw in the construction of flood control areas (FCA). Flood control areas are low laying polders, next to the estuary, which are surrounded by a ring dike. The river dike is lowered so that water can overflow the dike during a storm tide. In this way, when the tidal wave reaches its peak, a lot of the energy can be dissipated and a large volume of water can be stored in the polders, reducing the high water level more upstream. At low water, the water stored in the polders flows back to the estuary through sluices in the dike in order to restore the storage capacity of the polders for the next high water (Fig. 3).

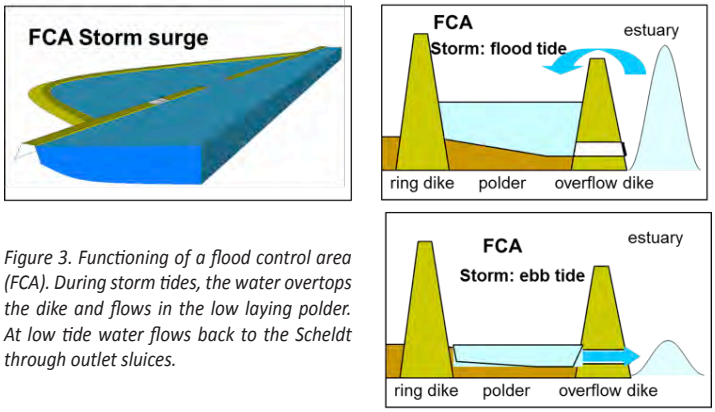


Figure 3. Functioning of a flood control area (FCA). During storm tides, the water overtops the dike and flows in the low laying polder. At low tide water flows back to the Scheldt through outlet sluices.

The location of the FCA's along the estuary is of crucial importance. If they are too close to the mouth, their impact will be small, if they are situated too far upstream, their impact will be negligible in more downstream parts. In Fig. 4 the cumulative surface of FCA's along the Flemish parts of the estuary are shown. It is clear that their surface increases upstream and the first FCA is situated about 100 km from the mouth of the estuary. Next to the location the functioning of a FCA depends on the level of the river dike. If this is this is too low, the polder starts to flood too early loosing part of its efficiency, if the river dike is too high, the flooding starts to late and not enough water can be stored. Also the length of the river dike is important as of course more water can flow over a long than a short dike. So location, volume, length and height of the river dike determine the functioning of FCA's.

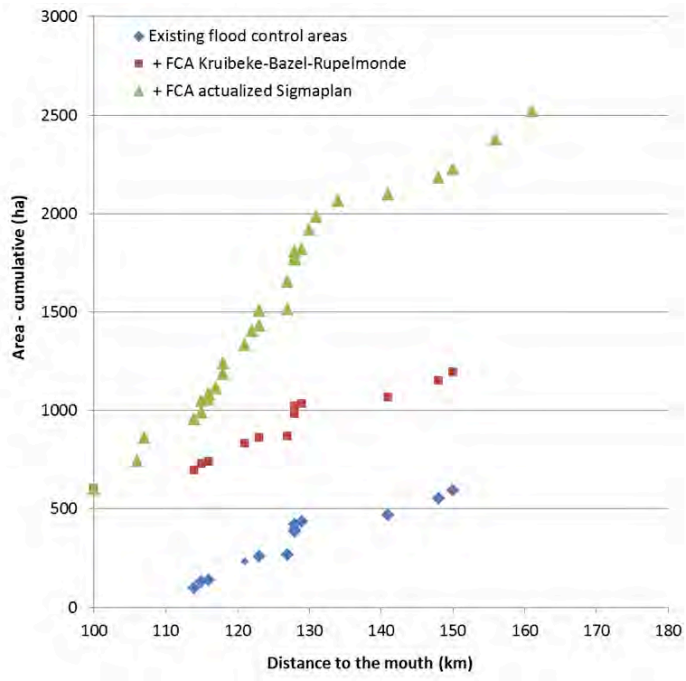


Figure 4. Cumulative surface of flood control areas along the Scheldt, the present situation, after completion of the large flood control area Kruibeke-Bazel-Rupelmonde and after the completion of the updated Sigma plan.

The impact of the FCA's on the water levels is very significant. In Fig. 5 the water levels along the estuary are plotted for 3 situations: the null alternative (the original Sigma plan), the present situation (2006) and after the completion of the whole updated Sigma plan (see further). The fact that the present situation is sometimes worse than the null alternative is due to the fact that the largest FCA (Kruibeke Bazel Rupelmonde) of nearly 600 ha is not finished yet (see also Fig. 3). From the graphs it is clear that as the storm becomes more severe, the impact of FCA's on water levels becomes more pronounced and can result in a reduction of high water levels by somewhat less than one meter.

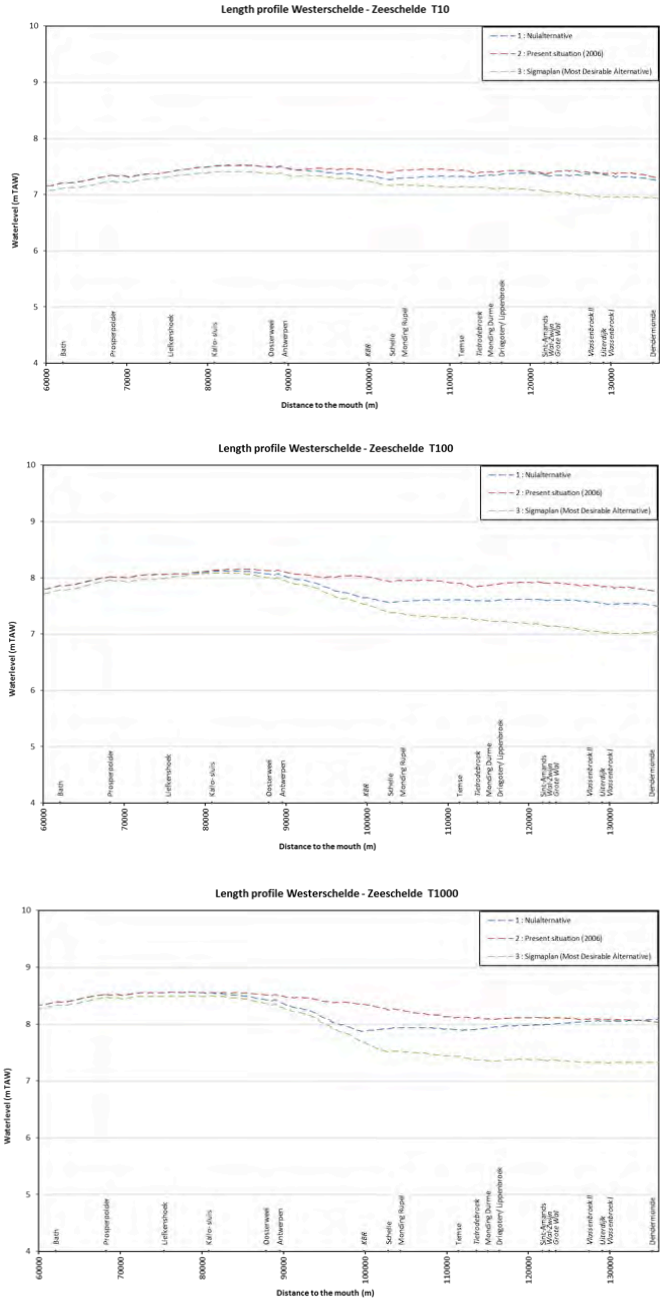


Figure 5. Simulated water levels for three storm surges (with a return period of 10, 100 and 1000 years) for the null alternative (the original Sigma plan), the present (2006) situation and the situation after finishing the updated Sigma plan.

In 2005, the original Sigma plan of 1977 was updated to take sea level rise into account as well as the new concepts of integrated water management. As such, the aim of the Sigma plan changed significantly as it was extended from a plan only aimed at flood control to a plan contributing to a more holistic integrated water management. The Sigma plan no longer only aimed at flood protection but at an integrated management taking into account safety against inundations as well as ecological functioning (naturalness), navigation and port access and recreation (Anonymus, 2006). In the updated Sigma plan, the construction of the storm surge barrier is postponed for an indefinite time and new extra FCA's were designated to accommodate storm floods. In total more than 2500 ha of FCA's will be realized and more than 500 km of dikes will be reinforced. As next to safety, naturalness and the functioning of the system as well as navigation and recreation became incorporated in the Sigma plan new types of management measures were incorporated in the plan as well. The Sigma plan is indeed innovative in several ways. First of all, already in 1976, room for the estuary, in the form of FCA's, was a crucial pillar of the plan whereas the mainstream approach in other estuaries at that time was exactly the opposite: embankments of floodplains and closure of estuaries. More recently, with growing insights into the ecological functioning, the concept of FCA's was brought one step further by combining the flood control function with tidal marsh restoration by allowing a tidal exchange between the estuary and the FCA. As the FCA are very low relative to the high water level in the estuary and enough storage capacity for accommodating flood water is needed, only a strongly reduced tidal range is allowed in the FCA. This is realized by adding an inlet sluice in the dike where water enters the polder during high tide and leaves the polder again during ebb tide through the outlet sluices, which are also necessary to empty the polder after a storm flood (Fig. 6). The size and location of the inlet sluice is chosen in such a way that in the FCA a reduced tidal regime is realized with an amplitude which is between 30 and 100 cm. This allows the development of an estuarine ecosystem in the FCA and in the meanwhile keep the storage capacity for storing flood water. A pilot project, Lippenbroek, is operational since 2006 and detailed monitoring showed the successful development of a tidal marsh (Maris et al. 2007, Jacobs et al. 2009, Teuchis et al. 2012, Vandenbruwaene et al. 2012, Beauchard et al. 2013). Since 2012 a similar but bigger project is implemented in Bergenmeersen (De Beukelaer-Dossche, M. & D. Decleyre, 2013) and another one will soon be operational in the major FCA Kruibeke-Bazel-Rupelmonde. A total of 1600 ha of FCA's will be subject to reduced tides by 2030.

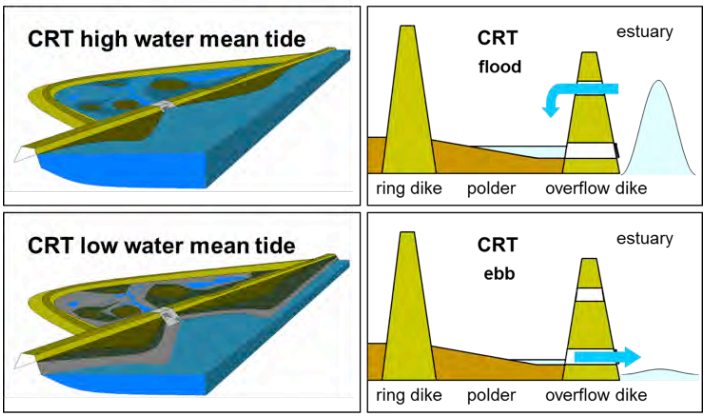


Figure 6. Functioning of a flood control area with controlled reduced tides (CRT). At flood tide, water enters the area through inlet sluices and at ebb, the water flows back to the estuary through outlet sluices. In the FCA, the tidal range is much reduced compared to the estuary itself.

The achievement of the good ecological status of the Natura 2000 sites and the restoration of a resilient ecosystem is now an inherent part of the plan and as such next to FCA's with controlled reduced tides also projects of managed retreat and restoration of non-tidal wetlands in the river valley are an integral part of the updated Sigma plan. Similar to managed realignment in the UK and elsewhere, river dikes will be displaced in landward direction along the Scheldt (Hedwige-Prosperpolder, 450ha) and along the Durme (Groot Broek and Klein Broek, 100ha). The most extensive non tidal wetland development projects are located in the Kalkense Meersen (600ha), along the river Nete (850ha) and the river Durme (100ha). These restoration projects will greatly increase the delivery of ecosystems services by the estuary. Indeed the created tidal and non tidal wetlands will add to water purification, sedimentation, biological production and many others and can be seen as an example of ecosystem based adaptation to increasing flood risks (Temmerman et al. 2013).

Another innovative aspect is that the updated Sigma plan is not following any longer an absolute safety level but a risk approach which aims at limiting the total damage rather than risk of flooding. This can be achieved by using the approach « risk = probability x vulnerability ». In the Flemish flood risk methodology the consequences of floods are assessed in terms of economic risk (expressed in euro/year) and human loss (expressed in casualties/year). In the process of actualization of the Sigma plan, the impact of different large infrastructure works, i.e. the heightening of dikes, the creation of new controlled flood areas, the construction of storm surge barriers,… was assessed, resulting in the so-called "Most Desirable Alternative". This is a combination of measures that leads to a minimal risk and realizes the necessary ecological restoration. A societal cost benefit analysis showed that adding the ecological restoration projects increased the total costs, but also resulted in more benefits delivered by the ecosystem services, so that it was economically the best strategy leading to the shortest pay back time (Broeckx et al. 2011, Bulckaen et al. 2006). During the whole process of updating the Sigma plan and deriving the "Most Desirable Alternative" stakeholder involvement and communication was a crucial element leading to a successful implementation.

The "Saint Nicholas" storm.

Is the Sigma plan fit for purpose? That is of course the crucial question, a question that can only be answered during a real storm. On December 3th 2013 a first storm warning was given, predicting extremely high water levels for December 6th as this was again a combination of spring tide and a NW storm over the North Sea. In Flanders and the Netherlands the storm was announced in the news as the "Sinterklaas" storm, called after Saint Nicholas that is locally celebrated on the 6th of December. Flanders Hydraulics Research predicted on Thursday morning water levels between 7.10 and 7.30 m TAW for the high water of Friday morning December 6th. At 05:35 December 6th a water level of 7,23 m TAW was measured in Antwerp (see fig. 7), 1,49 m higher than the predicted astronomical tide of 5,74 m TAW. This water level was one of the highest recorded since 1953. The next high water of Friday evening was already lower, 6,73 (predicted 6.7 – 6.9) m TAW, 0,8 m higher than the astronomical tide of 5,93 m TAW.

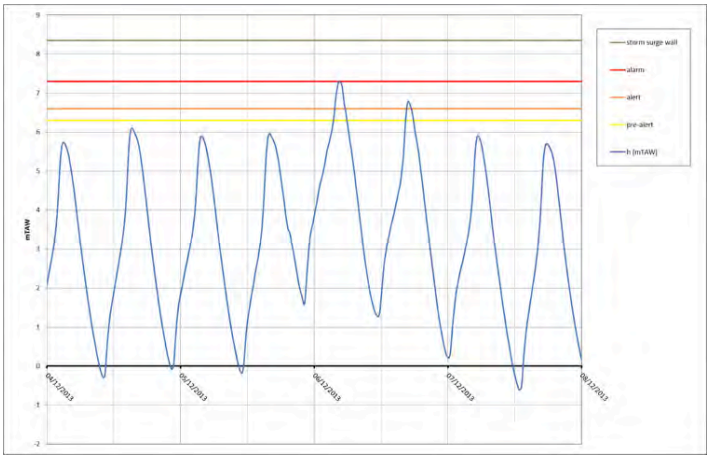


Figure7: Measured water levels in Antwerp during the Saint Nicholas storm. (Yellow line: pre- alert level of 6,3 m TAW; orange line: alert level of 6,6 m TAW (start of storm surge procedure); red line: alarm level of 7,3 m (critical inundations possible); 8,30 m TAW: height of storm surge wall in Antwerp.

Was the Sigma plan fit for purpose?

This storm set the Sigma plan and the water board to the test. The inundation areas worked as predicted and all of them except the most upstream along the river Durme were filled partially (see pictures, fig. 8). Except for some smaller problems, such as some leakage near sluices or constructions, no inundations nor major damage occurred.

Figure 8 Aerial pictures of flood control areas (left Groot Schoor and right Lippenbroek, both in Hamme) during storm high water in the morning of December 6th 2013. (copyright Flanders Hydraulics Research, Hydrological Information Center).

Based on this information the partial realization of the Sigma plan can be assessed as successful to protect the Scheldt valley from flooding during the storm of December 6th 2013. However we must realize that this was "only" a once in twenty years storm and the ambition is of course to have a better safety against floods. Moreover, the storm of December 6th did not coincide with a long period of rain that would certainly have caused even higher water levels, especially in the upper part of the estuary towards Ghent and Lokeren due to the higher fresh water discharges.

Therefore the realization of the remaining part of the Sigma plan is of utmost importance. The major FCA, Kruibeke-Bazel-Rupelmonde was not yet operational due to juridical problems to move some pipelines,…. The following 10 years another 12 FCA's will be realised along the Scheldt, and its tributaries. Six of them will be implemented (partially) with reduced tidal exhange so that they can develop as tidal mudflat and marsh ecosystems.

Conclusion

The visions about water management changed significantly over the last decades and evolved towards a more holistic integrated management taking into account the different aspects of the water system. These ideas have been implemented in the Sigma plan where classical and ecological engineering have been integrated. It has been shown that this ecosystem based approach, accounting for the ecosystem services delivered by the estuary, is economically and societally most beneficial (Broeckx et al., 2011). Indeed next to an environmental impact assessment, a societal cost benefit analysis was made taking into account not only the classical costs of the engineering works and benefits such as avoided damage cost but also the costs and benefits related to ecological restoration. The costs of tidal marsh restoration include the loss of agricultural land, extra sluice constructions etc. The benefits are the delivery of ecosystem services such as water quality regulation, flood control, erosion regulation pollination, maintaining nursery populations and habitats, production of raw materials, etc. Valuating these ecosystem services showed that, although the total cost of the plan including ecological restoration is higher, the payback time was clearly shorter. Previous studies have shown that the ecological restoration in a FCA with controlled reduced tides is successful and the performance for flood control was proved once more during this Saint Nicholas storm.

The growing insights into the close interaction between morphology, hydrodynamics and ecological functioning and the many feedback mechanisms in estuaries together with the growing need for flood protection due to sea level rise and growing populations living in flood prone areas, new management strategies taking into account safety, economic development and ecological functioning are badly needed. The success of the measures within the Sigma plan both from a safety and an ecological point of view strengthens the view that an ecosystem based approach even in densely populated areas (Temmerman et al. 2013) is possible and the most sustainable option.

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For more information see:-

http://www.sigmaplan.be/en

http://www.tide-toolbox.eu/

The Consolidated Radio-isotope Facility (CORiF), Plymouth University, UK

The Consolidated Radio-isotope Facility was commissioned in December 2006 using infrastructure investment from the then HEFCE SRIF. The University, and former Polytechnic, has carried out measurement of radionuclides for about 40 years and, therefore, a solid foundation existed for an enhanced radio-analytical capability. The new instrumentation included state-of-the-art gamma spectrometers, liquid scintillation counters and associated sample processing and preparation facilities. The operation and maintenance of the instruments is serviced by highly skilled technical officers. The main instrumentation includes:

- High purity EG&G Ortec gamma spectrometers, one well detector and two planar detectors built to ultra-low background specification for 210Pb, with flexibility to analyse liquid and solid samples ranging from 0.5 g to 1 kg.
- Two Beckman Coulter automated liquid scintillation counters.
- COY anaerobic chamber for manipulations in oxygen-free conditions.

Gamma Spectometry in CORIF

LSC in CORIF

The CORiF is licensed, by the Environment Agency, to hold and dispose of alpha, beta and gamma emitting radionuclides which are used to support a wide range of applications in research and consultancy. In 2007, the CORiF acquired ISO9001 certification to support its range of analytical services related to internal and external research contracts and to enhance training. Examples of CORiF research include:

- **Sediment, soil and peat geochronology over the past 100 years:**

The dating of a sediment core requires activity concentrations of the fallout radionuclides ^{137}Cs, ^{210}Pb, and ^{241}Am. These can be used to provide a temporal framework for interpretation of sedimentological evidence for recent environmental change e.g. sea level changes in the 19th and 20th centuries, including sea level acceleration that followed the industrial revolution wherein robust age models over the past 120 years using fallout radionuclides are important (Leorri et al., 2013; Gehrels et al., 2012). Determining the geochronology of peat deposition, using fallout radionuclide activity concentrations, is also important in respect of their role as archives of recent environmental change (Parry et al., 2013). CORiF routinely undertakes gechronological analysis of material from lakes, saltmarshes, floodplains and peats.

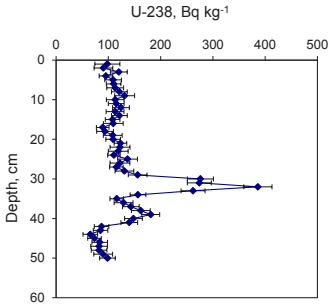
Interpreting gamma spectra in CORIF

- **Tracer Studies:**

The potential for micro-plastic fragments(<5 mm diameter) to cause harm to organisms in the marine environment is of growing concern because they degrade into smaller pieces and have a greater bioavailability to a wider range of organisms via ingestion. However, there are few studies of the sorption mechanisms of persistent organic pollutants and this study aims to provide information on contaminant sorption behaviour using 14C-labelled phenanthrene, DDT, d-2-ethylhexyl phthalate (Bakir et al., 2014).Other tracer studies involve the impact of tritium (3H) (Jha et al., 2005) and nickel (as 63Ni) (Millward et al., 2012) on the marine organism Mytilus edulis. Tritium is a pure beta-emitter although the energy of the beta particle is relatively low there is evidence that it impacts the DNA of the organism which can be determined using advanced techniques for measuring DNA strand breaks using, for example, the Comet Assay (Jaeschke et al., 2011).

- **Contaminated Land:**

Research on the potential mobilisation, by seawater, of radioactive technetium from anoxic sediments stored in contaminated land is of importance due to the effects of sea level rise (Eagling et al., 2012). This work has been extended to studies of the possible migration of ^{90}Sr and U(VI) in interstitial waters associated with sediments from Dounreay, Scotland (Eagling et al., 2013).The catchment of the River Fal SW England is extensively mineralised and has been impacted by heavy metal mining, including uranium and radium. A redundant uranium mine is under on-going investigation due to its spoil tips on the floodplain of the Fal, suggesting the river may have been a source of uranium, and its decay products, to the



estuary (Moliner-Martinez et al., 2004).

- **Soil and sediment redistribution and catchment ecosystem protection:**

Sampling in agricultural catchments for soil erosion

Another key area of our work focuses on use of radioisotope, stable isotope and other tracers to explore the downstream impacts of catchment disturbance by, for example, agriculture and wildfire (Smith and Blake, 2013; Smith et al., 2013, Owens et al, 2012; Blake et al., 2012) and the effectiveness of management strategies. CORiF scientists have pioneered use of7Be for the high-resolution quantification of soil, sediment and particulate phosphate redistribution in the landscape (Blake et al., 1997, Blake et al., 2009). Current collaborative research in Demark focuses on retention of sediment in degraded and restored floodplains to contribute to European policy-making on river restoration and management. In the context of managed re-alignment approaches to coastal management, restored salt marshes and wetlands to improve biodiversity, flood mitigation, sediment and nutrient retention and carbon sequestration. The CORiF has developed a method using 7Be as a natural radioactive tracer tool (Taylor et al., 2012; 2013) alongside in-situ monitoring for high-resolution quantification of event-based sedimentation rates, and those associated with particle-bound contaminants, in restored saltmarsh environments. Recent joint research has been conducted on floodplains in Borneo to use fallout radionuclides in the assessment of the impact of logging over the past 100 years on the transport of soils by rivers in the tropical rainforest (Blake et al., in revision).

Sampling the floodplains of rivers in Borneo

Analytical Services

CORiF offers a wide range of ISO9001 certified research and consultancy services to external academic, public and private sector clients. Data quality is assured via regular participation in international proficiency tests (IAEA, NPL) and research links with the IAEA Coordinated Research Programme on soil and sediment redistribution in river basins and sediment geochronology. Key services include:

- Determination of activity concentrations of fallout radionuclides (^{137}Cs, ^{210}Pb, ^{241}Am) in cores of sediment, soil or peat and interpretation for high resolution geochronology;
- Determination of low-level gamma-emitting radionuclides (^{7}Be, ^{137}Cs, ^{210}Pb) to quantify soil erosion , sediment budgets and sediment provenance;
- Identifying and quantifying suspect gamma-emitting radionuclides in contaminated liquids and solids from contaminated land, such as those associated with redundant mining operations.
- Tracer studies using alpha, beta emitters monitored using advanced liquid scintillation counting. Uptake and release of radionuclides by sediments and suspended particles and ecotoxicological impact on flora and fauna.
- Non-radiometric analyses of long-lived radionuclides such as ^{238}U and ^{232}Th are carried out by our sister ISO9001-accredited laboratory using ICP-MS.

The Consolidated Radio-isotope Facility is ISO9001 accredited and undergoes external bi-annual inspections. A condition of ISO9001 accreditation is that PhD and MSc/MRes students (and PDRAs) are required to undertake formal training in the handling of radionuclides and the analysis of radioactive samples relevant to their research. They develop and augment their skills with time as determined by the conditions implicit in the CORiF Competency Matrix. This approach to good laboratory practice guarantees students advanced skills in instrumental analysis and interpretation which gives them enhanced opportunities when seeking employment.

For further information on our research, consultancy and analytical services please contact: **Dr Will Blake, School of Geography, Earth and Environmental Sciences, Portland Square, Plymouth University, Plymouth, PL4 8AA, UK.**
Tel: +44 1752 585969; E-mail: wblake@plymouth.ac.uk; Website:www.geog.plymouth.ac.uk/corif/

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Book Review

Estuaries of Australia in 2050 and Beyond

Edited by: Professor Eric Wolanski, James Cook University, Townsville, QLD, Australia; In: 'Estuaries of the World', Series Editor: Jean-Paul Ducrotoy, Institute of Estuarine and Coastal Studies, University of Hull, Hull, UK.

Published by Springer Verlag, 2014. ISBN 978-94-007-7018-8 / 978-94-007-7019-5 (eBook) Price : 105.49€ / 83.29€ (eBook)

This nicely illustrated book is a wonderful mix of case studies, geographical descriptions, h socio-economic anecdotes, and fundamental physical, biological, chemical and environmental science - and much more besides. It is written at a level where most readers, specialist scientists or not, will have no difficulty following the text and appreciating the arguments. As a summary of the historical, the current, and the anticipated status of Australian estuaries, on a level that can be appreciated by almost everybody, it is excellent. As expected, the 'physical' chapters are the most technical, but even there the mathematical descriptions are kept to an absolute minimum, or consigned to a short appendix, where they can be readily skipped over without loss of essential information by those less interested in mathematical details.

I will give you a few details about the work and its contents. This book: 'Estuaries of Australia in 2050 and Beyond', in the series: 'Estuaries of the World' addresses the question: Is Australia's growing human population and economy environmentally sustainable for its estuaries and coasts by 2050? It begins with an impressive Prologue by The Right Honourable Malcolm Fraser, AC CH, former Prime Minister of Australia, 1975–1983, and it is valuable to repeat a small part of his Prologue here:

'This book offers science-based solutions to achieve ecologically sustainable development. It is a wake-up call that every Australian estuary faces present and future socio-economic and environmental problems with various scales. This book shows that we have much to learn by understanding the lessons from the past and from each other as they apply to the wide variety of Australian estuaries in order to ensure that future developments do not occur at the cost of the environment. To help achieve this outcome, this book demonstrates how to use science to balance the socio-economic imperatives with the ecological needs of the estuaries so that they can deliver the full range of ecosystem services – such as a high quality of life – that the population expects.'

The first Chapter: 'Estuaries of Australia in 2050 and Beyond – A Synthesis' by Eric Wolanski and Jean-Paul Ducrotoy, sets the scene for Australian estuaries and their geographical settings and provides a brief a description of the book's contents, but it is also more. In places it is moving, in particular its plea for greater efforts to ensure the ecological health of Australian estuaries for future generations, and in other places it motivates indignation, as in its section on 'conflicts of interest'. The chapter summarises detailed studies of a number of important Australian estuaries and bays in order to answer the original question posed by the book. The case studies are divided into three classes based on human impact: (a), estuaries that experienced the full pressure of historical developments; (b), estuaries in the process of being degraded, and; (c), estuaries that still are relatively pristine. For (a), the chapters are concerned with the Sydney Estuary, the Coorong/Murray-Darling Estuary, Port Philip Bay and the Tamar Estuary, Tasmania; for (b), they are the Gold Coast Broadwater, the Hawkesbury Estuary, the Burdekin Flood Plains, Moreton Bay, the Ord River Estuary, Brisbane peri-urban estuaries, South Australia's gulfs, Hervey Bay and Darwin Harbour; for (c), they are the Mary River Estuary and Flood Plains in the Northern Territory, and Deluge Inlet in Queensland.

I will give the chapter titles and their authorships, together with a very brief description of what I think are two or three of the key points that the authors have highlighted from their various contributions, in order to give you a flavour of their contents. Although my mode of presentation in what follows may be rather mundane and somewhat repetitive, i.e. – title – authors – two or three points: (a), (b), (c) - I can assure you that the individual contributions most certainly are not.

In Part 1 (estuaries that experienced the full pressure of historical developments), the first Chapter is: 'Sydney Estuary, Australia: Geology, Anthropogenic Development and Hydrodynamic Processes/Attributes' by Serena B. Lee and Gavin F. Birch; (a), in 2006 there was closure of the Sydney commercial fin fish and prawn industries due to high concentrations of dioxins detected in fish and prawn tissue; (b), storm water runoff represents the major contemporary source of estuary contamination; (c), these contaminants end-up in the estuary's bed. The second Chapter is: 'the Murray/Coorong Estuary: Meeting of the Waters?' by Jochen Kämpf and Diane Bell; (a), the natural environment of the river has been severely degraded over the last 150 years through extensive water extraction used for irrigation and the construction of barrages; (b), modifications to the system have been so detrimental and far reaching that a return to natural conditions is an almost impossible task. The third Chapter is: 'Port Phillip Bay' by Joe Sampson, Alan Easton, and Manmohan Singh; (a), the population here could double by 2050, putting pollution and water-supply pressures on the environment; (b), global warming could cause regular flooding of bay-side areas. The final chapter in this section is: 'Past, Present and Futures of

the Tamar Estuary, Tasmania' by Joanna C. Ellison and Matthew R. Sheehan; (a), the upper estuary channel was dredged from the late 1870s until the 1960s and during this period contamination increased due to organic and inorganic wastes from industrial, mining and domestic sources, as well as heavy metals from mining industries in the catchments, combined with high sediment yields; (b), there are significant threats to native species' habitats from introduced-species in the estuary; (c), community preference is for an upper estuary that resembles its early twentieth century dredged state, rather than how it was first described 200 years ago.

In Part 2 (estuaries in the process of being degraded), the first chapter in this section is: 'Gold Coast Broadwater: Southern Moreton Bay, Southeast Queensland (Australia)', by Ryan J.K. Dunn, Nathan J. Waltham, Nathan P. Benfer, Brian A. King, Charles J. Lemckert, and Sasha Zigic; (a), the Broadwater has important biodiversity values that have led to areas of it being listed as an international Ramsar site; (b), it provides a vital function in the provision of feeding, spawning and nursery sites for recreationally and commercially important finfish species; (c), protection requires a reduction of pollutant loads from urban and agricultural storm-water run-off, golf courses and industrial infrastructure/areas. The second chapter is: 'Hydrodynamics and Sediment Transport in a Macro-tidal Estuary: Darwin Harbour, Australia' by F.P. Andutta, X.H. Wang, Li Li, and David Williams; (a), transport of sediment was estimated for the dry season, when river discharge was negligible, and numerical simulations also were made; (b), mangrove areas may trap fine sediments for long periods, which will have important consequences if these sediments carry pollutants. The third chapter is: 'The Ord River Estuary: A Regulated Wet-Dry Tropical River System' by Barbara J. Robson, Peter C. Gehrke, Michele A. Burford, Ian T. Webster, Andy T. Revill, and Duncan W. Palmer; (a), the lower Ord River is a wet-dry tropical river that is one of the few heavily regulated rivers in Australia's tropical north, providing water for hydroelectric production and irrigation; (b), plans involve an increase in the area of irrigated land surrounding the lower Ord River and its estuary. The fourth chapter is: 'South Australia's Large Inverse Estuaries: On the Road to Ruin' by Jochen Kämpf; (a), the biggest threat to ecologic health of South Australian gulfs is the planned massive industrialization of the Upper Spencer Gulf region; (b), a number of seawater desalination plants are proposed for the region, the biggest immediate environmental hazard of desalination brine discharges being the development of deoxygenated dead zones. The fifth chapter is: 'Turbulent Mixing and Sediment Processes in Peri-Urban Estuaries in South-East Queensland (Australia)' by Hubert Chanson, Badin Gibbes, and Richard J. Brown; (a), small peri-urban estuaries may provide a useful indicator of potential changes that may occur in larger systems with growing urbanisation; (b), there is potential for some smaller peri-urban estuaries to be used as 'natural laboratories' to gain information on estuarine processes. The sixth chapter is: 'Hervey Bay and Its Estuaries' by Joachim Ribbe; (a), this is a large, low inflow and predominantly hypersaline system in which a continuing trend towards drier and warmer conditions may lead to an intensification of hypersaline and possible inverse circulation states of the Bay; (b), physical processes associated with climatic trends and variability are likely to impact more dramatically on the natural environment of the region than direct human activities. The seventh chapter is: 'Moreton Bay and Its Estuaries: A Sub-tropical System Under Pressure from Rapid Population Growth' by Badin Gibbes, Alistair Grinham, David Neil, Andrew Olds, Paul Maxwell, Rod Connolly, Tony Weber, Nicola Udy, and James Udy; (a), the decline in ecosystem health within the Bay and its estuaries is significant and management responses have been implemented to reverse this; (b), whether the current rate of change is too rapid for the system to satisfactorily adapt cannot be determined currently. The eighth chapter is: 'Water Resource Development and High Value Coastal Wetlands on the Lower Burdekin Floodplain, Australia' by Aaron M. Davis, Stephen E. Lewis, Dominique S. O'Brien, Zoë T. Bainbridge, Christie Bentley, Jochen F. Mueller, and Jon E. Brodie; (a), this combines northern Australia's largest and most intensively developed agricultural floodplain with one of the largest concentrations of high value freshwater, estuarine and marine wetlands in Australia; (b), the establishment of water resource schemes to support this extensive irrigated agriculture threaten the integrity of the downstream receiving wetlands. The final chapter in this section is: 'The Hawkesbury Estuary from 1950 to 2050' by Peter Collis; (a), eutrophication is a feature of the Hawkesbury-Nepean River estuary that drains Sydney's western suburbs; (b), the river system has been degraded with occasional outbreaks of floating flowering plants (macrophytes) in the upper Nepean and blue/green algae at the saltwater-freshwater interface, and 'red tides' of toxic diatoms near the mouth of the estuary; (c), ongoing urbanization and the wet-weather inflow of degraded storm water results in sediments, nutrients and many other contaminants reaching the estuary.

In Part 3 (estuaries that are still relatively pristine), the first chapter is: 'Deluge Inlet, a Pristine Small Tropical Estuary in North-Eastern Australia' by Marcus Sheaves, Ka´tya G. Abrantes, and Ross Johnston; (a), the inlet is protected by National Parks, World Heritage and Wild Rivers legislation; (b), its habitats and rich biodiversity make it an important nursery for many species; (c), current threats are from increasing fishing and boating pressures, and effective governance will be needed to ensure continuation of its near pristine condition. The second and final chapter in this section is: 'Recent, Rapid Evolution of the Lower Mary River Estuary and Flood Plains' by David Williams; (a), the coast has receded during the last 50 years and the estuary's channels have expanded and become deeper and wider and tributary channels have grown, invading previous freshwater environments; (b), by 2050 the Lower Mary River Estuary may have grown to become similar to neighbouring estuaries of the Northern Territory.

Although what I have tried to do above is give you an idea about the general contents of the various chapters, the authors, editor and series editor go to great lengths to ensure that the focus of these studies remains on the original question. In addition, the editors provide summaries of the state of the environment and the management strategy for a number of other estuaries and coastal

waters. They provide a valuable synthesis of multidisciplinary scientific knowledge to suggest what Australian estuaries may look like in 2050 based on socio-economic decisions that are made now, and the changes that are needed to ensure sustainability. They do suggest that tentative answers to the original question: 'Is Australia's growing human population and economy environmentally sustainable for its estuaries and coasts by 2050?' based on the socio-economic decisions made now, may be (1), possibly 'yes' in large cities as long as the population is pro-active in demanding a high quality of life, which implies healthy waterways, and (2), 'probably not' in rural and remote areas and especially so in the tropics. But they hope that this pessimistic prediction turns out to be incorrect and point out that Australia has a number of eminent estuarine scientists to help propose and guide future strategies.

Reg Uncles
Plymouth Marine Laboratory

The 43rd Annual General Meeting of the Estuarine and Coastal Sciences Association

will be held on **10th April 2014** at 13:00 in the Premier Lecture Theatre, Management Centre, Bangor Business School, College Road, Bangor, Gwynedd, Wales, UK LL57 2DG

IMPORTANT NEWS FOR MEMBERS!

Individual member reduced subscription to the journal Estuarine, Coastal & Shelf Science

Online access for only £44 per year

ECSA and Elsevier, the publishers of the excellent and informative journal, Estuarine, Coastal and Shelf Science (ECSS) have agreed an exciting new arrangement to allow individual ECSA members to have online access to ECSS at a vastly reduced rate. Online access for a calendar year can be yours for only £44. This represents tremendous value. Although ECSA has had links with Elsevier and ECSS for many years, this is the first time we have been able to offer this benefit to members. You can view a free sample issue on the Elsevier website at http://www.journals.elsevier.com/estuarine-coastal-and-shelf-science/, and see the breadth and depth of papers published in the journal. You can also find some open access papers.

Access to ECSS would run concurrent with the ECSA membership year (April to March). Members joining after April but wishing to take the journal would have online access for the whole year.

For members who wish to take up this option, there is no need to make separate arrangements or payments. You can simply choose the option on the ECSA website for ECSA membership with ECSS online access and make one simple payment. www.ecsa-news.org

Please note that this offer is only available to individual members and not institutional members or sponsors.

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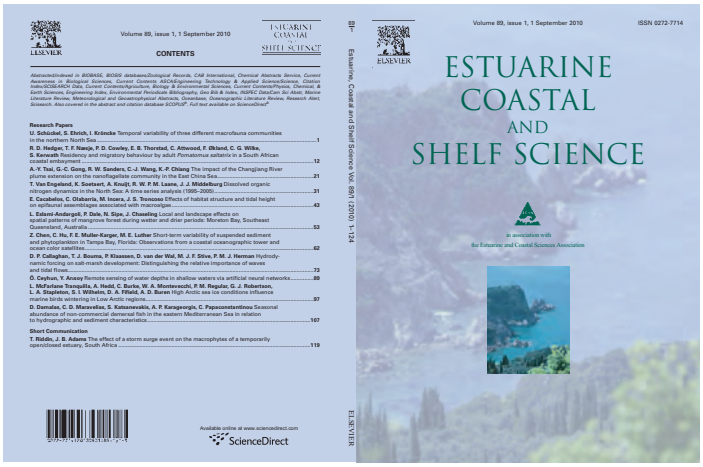

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Short communication

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Special Issue

Pressures, Stresses, Shocks and Trends in Estuarine Ecosystems
Tim Jennerjahn and Steve Mitchell (Guest Editors)

Effects of human activities: Response of the physicochemical environment

Effects of human activities: Biotic response from organism to ecosystem level

Volume 131, 10 October 2013

Volume 132, 1 November 2013

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Special Section: Nutrients, Food Web and Tropho-Dynamic Processes

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We have introduced an additional way to pay your subscriptions to ECSA. See the button for the PayPal facility on the ECSA website which you will be able to click to bring up the PayPal payment facility. If you already have a personal PayPal account you will know how easy it is to make a payment which will be automatically debited to whichever bank or credit card account you have linked to your PayPal account. Even if you do not have a PayPal account you can still make a one-off payment using this facility simply by entering the details of the credit card or bank account to which you wish to charge your payment. We are introducing this system to make it easier for people who have difficulty making payments to ECSA, particularly from banking systems outside the United Kingdom, and because of the increasing bureaucracy and cost to us of processing payments from overseas. PayPal is a secure server so your personal details are secure. We could not otherwise operate a secure payment system from our website without going to a service company such as PayPal which specialises in this. If you are already paying us by the old method of a standing order from a UK bank account you are very welcome to continue to pay your ECSA subscription in that way.

Martin Wilkinson, ECSA Treasurer

Announcement

The Coasts and Estuaries of North and mid- Wales

Bangor University, 8-10 April 2014

The ECSA 2014 spring local meeting will focus on the coasts and estuaries of North and mid-Wales. This region extends from the River Dee in the North (which forms the boundary with England) to Aberystwyth and Cardigan Bay in the south and includes the North Wales coast, Anglesey and the Menai Straits, the Llyn Peninsular and the coast and estuaries of midWales. The region contains some of the most distinctive marine areas in Great Britain ranging from spectacular estuaries with extensive intertidal areas to the rocky shores of Anglesey and the Llyn Peninsular.

Abstracts are invited on the following topics:

- **The biology and ecology of coastal habitats**
- **Hydrology, sedimentology and geomorphology in the coastal zone**
- **Fisheries and aquaculture**
- **Nutrients and pollution**
- **Management of the coastal zone**
- **Marine energy**
- **Socioeconomic utilisation of the coastal zone**

Speakers are expected from Bangor University, the Centre for Ecology and Hydrology, Dŵr Cymru/Welsh Water, Gwynedd Council, National Oceanographic Centre, Natural Resources Wales, the University of Aberystwyth, Bangor, the University of Hull, Swansea University, the Welsh Government and the shell-fish industry.

VENUE

Premier Lecture Theatre, The Management Centre, Bangor Business School, University of Bangor, College Road, Bangor, Gwynedd LL57 2DG.
Access details, a map and information on parking can be found at:
http://www.bangor.ac.uk/management_centre/

TIMETABLE

Tuesday 8th April 2014

14.00 -17.00 (approx.) An optional field trip looking at some of the more interesting sites in the Conwy catchment and on the Menai Straits.
Evening free.

Wednesday 9th April 2014

08.30-09.00 registration – coffee available
09.00 – 17.00 Conference Day 1.
For members, the ECSA AGM will be held during the lunch break.
19.30 Conference Dinner (optional extra)

Thursday 10th April

09.00 – 13.00 Conference Day 2
14.00 – 17.00 Workshop on the Health of Estuaries and Marine Systems, lead by Professor Mike Elliott, (Institute of Estuarine and Coastal Studies, Hull) and Professor Teresa Fernandes (Heriot- Watt University) This will be free to delegates, but advance notice of an intention to participate would be appreciated.

ACCOMODATION

Delegates requiring accommodation will need to make their own arrangements. There are many hotels and guest houses in Bangor and the surrounding area. Subject to availability, accommodation is also available in student residences. This is competitively priced at £35.20/night for Bed and Breakfast.
Details of the student accommodation available during the meeting may be found at:
http://www.bangor.ac.uk/accommodation/halls/jmj.php.en
Please note that accommodation bookings must be made directly with Sharon Hughes at the University.
s.hughes@bangor.ac.uk

TRAVEL

By road, Bangor is readily accessible via the A55 North Wales Expressway.
There is a good rail service to Bangor station with through trains from London, Birmingham, Cardiff, Manchester and Chester.

Andrew Wither
ECSA
National Oceanography Centre, 6 Brownlow Street, Liverpool, L3 5DA

Message to members

From The Membership Treasurer

Subscription renewals

Dear Member,
ECSA greatly values its members, as without you there is no Association. So I'm afraid I must remind you it is the time of year for subscription renewal. Current rates are shown in the table below. As you know, we raised the subscription last year, but this year it remains the same. The 3-year student rate has proved popular, and represents very good value for students.

Unfortunately this year we have stopped the credit card payment option, as it had become uneconomic and did not represent good value for ECSA. I'm sorry if this inconveniences anyone, but Paypal has proved a very popular and straightforward option. This can be done through the Membership section of the ECSA website (www.ecsa-news.org). Alternatively you can still pay by cheque, bank transfer or bank standing order.

Standing orders:- Some members have forgotten to adjust their standing order payment to the new rate. Please remember to do this for the 1st April.

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iii) **Paypal**: Payment can be made online via Paypal. For new members, please ensure that you also send a completed application form to the Membership Treasurer.

Receipts are available on request for any member who needs one. Please contact me for a receipt or for an invoice if this is required.

PLEASE ensure that you complete a form legibly with all the appropriate information at the time of joining, otherwise you will not be able to receive the Bulletin and newsletters.

Welcome to new members

Welcome to this year's new members. It has been a busy year for ECSA, with successful meetings, such as ECSA53 in China. We welcome all our new members, and hope they will be with us as long as many of our long-standing members, whose continuing support is greatly appreciated.

ECSA has members in over 30 nations spread across the globe, so is very much an international society. This is reflected in the spread of meetings, workshops and symposia in which ECSA plays a role.

Your contact details: It is vital that we have up to date contact details for you. You are missing out on the e-newsletter if we don't have your current email address. There are quite a few members for whom I have no email address, so do please get in touch if you have one. If you are not sure if we have the correct mailing address for the ECSA Bulletin for you, please contact me at clare.scanlan@sepa.org.uk to check. Please also remember to update any mailing address details.

Why not recruit some friends or colleagues? We know the Association does valuable work, but it needs **you** to ensure it happens.

Clare Scanlan
Membership Treasurer
clare.scanlan@sepa.org.uk

SEPA,
Inverdee House,
Baxter Street,
Aberdeen AB11 9QA
UK
Tel: +44 (0)1224 266617

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ECSA Bulletin

The ECSA Bulletin is produced twice a year. Material for the Bulletin must be submitted to the Editors by December 1 or June 1, for issues appearing in January and July respectively. We would be pleased to receive short articles and notices of publications and meetings. Information on change of address, and applications for membership should be sent to the Membership Treasurer and not the Editors, correspondents or publishers.

Bulletin Editor
Jean-Paul Ducrotoy
Institute of Estuarine & Coastal Studies
University of Hull, Hull, HU6 7RX (UK)
Tel: +33 0322 238 074
Mobile: +33 0633 874 524
e-mail: jean-paul.ducrotoy@hull.ac.uk

MembershipTreasurer
Dr Clare Scanlan
Senior Marine Ecologist
SEPA
Inverdee House, Baxter Street
Torry, Aberdeen AB11 9QA (UK)
e-mail: clare.scanlan@sepa.org.uk

ECSA Web Master
Karen L. Nicholson
Institute of Estuarine & Coastal Studies
University of Hull, Hull, HU6 7RX (UK)
e-mail: k.l.nicholson@hull.ac.uk
Tel: (+44) 1482 463167

e-newsletter Editor
Dr Anita Franco
Institute of Estuarine & Coastal Studies
University of Hull, Hull, HU6 7RX (UK)
e-mail: a.franco@hull.ac.uk

Workshop Organiser
Teresa F. Fernandes
Napier University, Edinburgh EH10 5DT (UK)
e-mail: tfernandes@napier.ac.uk

Association's *Editor of Estuarine, Coastal & Shelf Science*
Mike Elliott
Institute of Estuarine & Coastal Studies
University of Hull, Hull, HU6 7RX (UK)
e-mail: mike.elliott@hull.ac.uk

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Dr Clare Scanlan
SEPA
Inverdee House, Aberdeen AB11 9QA, UK
e-mail: clare.scanlan@sepa.org.uk

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Professor Victor de Jonge
Institute of Estuarine & Coastal Studies
University of Hull, Hull, HU6 7RX UK
v.n.de.jonge@planet.nl

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Estuarine and Coastal Sciences Association (ECSA)

The Estuarine and Coastal Sciences Association (ECSA) is a direct continuation of the Estuarine and Brackish Water Sciences Association (EBSA). The association was founded in 1971, and is the major European focus for the communication of research and scholarship in estuarine science. Membership is open to all who are interested in estuarine and coastal marine science, whether in Europe or further afield. The association holds local meetings, where work relevant to one specific estuary or coastal site is presented, and international symposia, where work applicable to a chosen theme of estuarine and coastal science is presented. Many of the symposia have been published. The association has caused to be published Handbooks of Methodology for estuarine studies, and Synopses of the British and European fauna, which are available to members at reduced rates. The association has an associated journal, *Estuarine and Coastal Shelf Science*, which is available at greatly reduced rates to members.
The *ECSA Bulletin* is distributed to all members, free of charge, twice a year; this is supplemented by newsletters and association information and links are updated regularly on the ECSA website. The association has a small grants scheme for younger scientists.

Further details and memberships forms from:

ECSA Membership Treasurer,
Dr Clare Scanlan,
Scottish Environment Protection Agency (SEPA),
Inverdee House,
Aberdeen AB11 9QA, Scotland, UK

or from the ECSA website:

www.ecsa-news.org/joiningECSA.htm