Welcome to the final newsletter for the iCOASST project. The previous newsletters have:
· Provided a regular update on the project research and outcomes.
· Communicated with a wide range of interested parties.
· Encouraged discussion and debate about the iCOASST project.

What is the iCOASST Project?
This four-year project (2012 to 2016) is funded by the Natural Environment Research Council (NERC), with the Environment Agency as an embedded stakeholder. The consortium, led by Professor Robert Nicholls (University of Southampton), brings together leading UK universities, research laboratories and consultants in the fields of coastal geomorphology, engineering, oceanography and software development. More details can be found at www.icoasst.net.

Aims and Objectives
The aim of this project is to improve our capability to predict erosion and accretion around the coast and estuaries of the UK over 10 to 100 years. This is also designed to enhance strategic erosion and flood risk management, such as strategy studies and shoreline management.

Who will benefit from the project?
We envision the main beneficiary of this research will be Local Authorities and the Environment Agency (EA) in England and equivalent bodies around the UK, who have the main responsibility for delivering flood and coastal erosion risk management. Other beneficiaries include the Department for Environment, Food and Rural Affairs (DEFRA - UK Government), specialist consultants who undertake the Shoreline Management Plans (SMPs), local stakeholders (including community groups, commercial concerns and the general public) and the national and international research communities.

What’s new?
This final newsletter considers the legacy of the iCOASST project, including how the results will be made available and how activities will continue beyond the iCOASST project to support end-user application of these results.
The iCOASST (Integrating COAStal Sediment SysTems) project has been innovative in terms of its approach to the prediction of decadal to centennial (mesoscale) coastal geomorphic evolution and its emphasis on the development and dissemination of practical tools and methods to support the management of coastal erosion and flooding. As the project presents its final conference entitled “Decadal Coastal Simulation: UK and International Experience and Prognosis” at the Institution of Civil Engineers on 21st/22nd January 2016, it is useful to reflect on what we have accomplished and its legacy, both scientifically and in practice.

iCOASST has developed a hybrid and novel methodology that draws on and integrates distinct, but related areas of knowledge (see Figure below). This method has been tested and refined through case studies in Liverpool Bay (northwest England) and Suffolk (eastern England). Coastal and Estuarine System Mapping (CESM) provides the basis for a participatory approach to scoping management problems, aligning scientific and lay knowledge, and identifying geomorphic components and human interventions that need to be modelled at the mesoscale. Causal Loop Analysis provides further a priori insights into the most important feedbacks and the qualitative behaviours that we should expect to see emerge within quantitative process-based models. At broader spatial scales, Coastal Area Models have provided improved information on evolution and its emphasis on the development and integration of essentially new models (SCAPE+, MESO_i, and ESTEEM), whilst existing ASMITA and UnaLinea models have been coupled in Liverpool Bay. The model linkages use OpenMI (www.openmi.org), which is an interface standard that allows models to exchange data with each other on a time step basis. Initially it was proposed that model developers should implement OpenMI independently, but it was found to be more efficient to employ an OpenMI expert to work with each development group to design and facilitate OpenMI compliance from the beginning. The model compositions, with their transparent linkages between models, provide important insights into broader scale system behaviour. This experience also suggests the need for guidance and standards to support integrated modelling, including specifications for future model components. Integrated modelling is certainly non-trivial and incurs development and runtime costs. The iCOASST research allows us to better understand when it is worthwhile linking models and when it is not.

The legacy in scientific terms concerns our methods, models, and insights into integrated modelling. All the results of iCOASST will be available on the web site of the Channel Coastal Observatory (www.cco.org), as described in this Newsletter. This will include archived model results as well as model codes, documentation and methods, facilitating their scientific application. We have also engaged and exchanged extensively with the international science community, such as presenting at international meetings including at the Coastal Sediments 2015 conference (see Newsletter article). We are pleased to see significant international engagement at our final conference.

The legacy in management terms is also significant and this aspect will be drawn together in an EA-funded project that is an exemplar of how research and application can be made to work together effectively. This project is described in a Newsletter article entitled “Embedding iCOASST into practice”. More generally, the iCOASST project has engaged actively with a range of stakeholders in the UK. Conventional methods have been supplemented by more specific engagement with stakeholders associated with the two study regions. This has included initial workshops to inform them of the project, capture local knowledge, and discuss draft CESMs, followed by model-focused workshops that have sought to pursue a more participatory approach to model scoping, development and application. The potential for CESM to be used by maritime coastal authorities and their consultants is significant. For example, the CESM development process could be used with partners to formalise and/or refine local knowledge, align scientific and lay priorities (for example, in relation to key ‘coastal state indicators’) and to achieve a consensus understanding of the linkages and influences between processes and features. Final case study workshops are planned before Easter 2016, before the final project end in July 2016.
Embedding iCOASST into practice

Eleanor Heron (Environment Agency); Jonathan Simm (HR Wallingford) and James Sutherland (HR Wallingford)

Within the Environment Agency FCERM R and D programme we are funding a package of work to encourage uptake of the iCOASST deliverables and lessons into practice.

The main output from this work will be a package of end user focused reporting and guidance that clearly sets out the work of the iCOASST consortium and how its deliverables can be used to deliver operational shoreline management benefits to the Environment Agency, Natural Resources Wales and coastal risk management authorities. General lessons and advice about modelling coastal morphological evolution over decades or longer will also be included.

This reporting will include: sign post to guidance on:

- The generation and use of the Coastal Estuarine Systems Mapping;
- The selection and use of Coastal State indicators to improve coastal management decision making;
- The set up and running of the reduced complexity modelling software;
- Guidance on reduced complexity model selection, applicability, strengths and weaknesses, benefits over existing approaches in shoreline management planning and coastal / estuarine strategy studies;

The ambition is for the guidance to serve three levels of user:

1. The generally interested member of the coastal management community including local stakeholders and coastal risk management authority managers;
2. Coastal engineers who are not experts in modelling and may not use the modelling themselves but need to know more detail on the concepts, methodology, pilot site and outputs and how they might be used to improve decision making; and
3. The coastal modelling community who want a user guide on how to run the models and generate outputs.

Another aspect of this work will use the iCOASST reduced complexity models to explore how sensitive the flood risk system is to long term morphological change on the coast given different climate and coastal management scenarios.

There will also be activities to help facilitate better links between end users and the work of the iCOASST consortium including a webinar and a one day consultant workshop.

The work will be delivered by an HR Wallingford led team and has just started in January 2016.

Any enquiries should be directed to Eleanor.Heron@environment-agency.gov.uk or Jonathan.Simm@hrwallingford.com.
Last May over 10 members of the iCOASST consortium travelled to the west coast of the USA to attend the Coastal Sediments '15 conference. This conference is usually organised every four years and this time it took place on the shores of Mission Bay, located just north of the city centre of San Diego in the State of California. The Coastal Sediments conferences are well-known for bringing together a broad range of people, including coastal engineers, geologists, geographers, oceanographers, and others interested in the physical processes of coastal sediments and morphology changes. This year’s conference theme was “Understanding and Working with Nature” and was chosen by the organising committee to stimulate applications of interdisciplinary knowledge in solving both short-term and long-term coastal problems; a theme which is closely related to the overall goals of the iCOASST project.

The first day kicked off with two keynote presentations, one of which was given by Robert Nicholls who highlighted the impacts of human-induced sea-level rise on coastal evolution. The keynotes were then followed by nearly 260 presentations in four concurrent oral sessions and two poster sessions spread out over three days. It provided a stimulating environment in which the latest research findings could be shared.

Apart from the traditional sessions on topics such as beaches, barrier islands, river deltas, and shore protection, there were several special sessions that focussed on research areas of particular current interest. One of these special sessions was organised by some of the iCOASST members, entitled “Predicting Decadal Coastal Geomorphic Evolution”. This iCOASST session drew attention from coastal researchers from all over the world and presentations were given by leading scientists based in the USA, Netherlands, Sweden, and Japan. It also provided an excellent opportunity to present the iCOASST project and related research activities to the international scientific community. As such, a general overview of the iCOASST project was given, as well as presentations describing the new iCOASST models and the computer modelling that is currently underway for the Liverpool Bay and Suffolk case studies. All these talks sparked interesting discussions which were frequently continued during lunch or dinner, and even at the end of the conference there were lively discussions.

In addition, some of the iCOASST researchers took the unique opportunity to visit the Scripps Institution of Oceanography, one of the world’s oldest and largest centres for Ocean and Earth sciences. During a tour through the institution it was possible to see some of the facilities for coastal research. The rest of the morning was filled with talks given by both iCOASST and Scripps researchers, discussing recent advances in terms of improving predictions of decadal coastal change.

After a week in the Californian sun it was time again to head back to the UK. Inspired by all the discussions, everybody returned with plenty of ideas to explore and to feed back into the modelling work. At the same time it is great to know that we will be able to welcome some of the researchers we interacted with at our iCOASST International Conference that will take place at the Institute of Civil Engineers in London in January 2016.
Complementary to the previous article “Embedding iCOASST into Practice”, the outputs from the iCOASST Project will be disseminated via the website of the National Network of Regional Coastal Monitoring Programmes (operated by the Channel Coastal Observatory (CCO)): www.channelcoast.org/iCOASST.

The iCOASST web pages (see left) have been designed to provide a “one-stop shop” for information about the project, detailed descriptions of the products and a facility to download the models themselves. The pages are accessed via a series of drop-down boxes (containing either text or further tabs). The introduction comprises a succinct description of the purposes of the project and how the approach of the iCOASST modellers differs from that typical in practice today. The summary text pages provide a handbook for users to help them appreciate where and when the iCOASST methods are applicable.

The models can be downloaded from the individual Model pages (see SCAPE+ example below). Each model is accompanied by sample input and output files, to allow users to run the models for themselves.

The Coastal and Estuarine System Maps for the two trial areas (Suffolk and Liverpool Bay) are displayed on the CCO Map Viewer, where they can be viewed against current and historic aerial photography. The tool for users to undertake systems mapping themselves will be available for download.

The iCOASST output will be freely available under either the Open Government Licence (data) or General Public Licence (models). Users will be tracked by category of use (e.g. academic, consultancy, public authority) and country. In this way, the benefits of this research and web site to the coastal community can be effectively monitored.
Previous editions of the iCOASST newsletter are available to view online on the iCOASST website on http://www.icoasst.net/. A summary of the previous newsletters is provided below.

**Spring 2015 Newsletter**
- Estuary-Inlet open coast model compositions
- Coastal State Indicators
- Reduced complexity modelling
- Data Driven Modelling
- Stakeholder engagement.

**Autumn 2014**
- Hindcast scenarios for Liverpool Bay composition
- ESTEEM
- Object Framework
- Exchange Model
- SCAPE+

**Spring 2014**
- Conceptual coastline compositions
- Coastal Area Modelling in iCOASST
- Data Driven Modelling
- Raster Behavioural Approach
- iCOASST International Conference

**Summer 2013**
- Mapping the structure of coupled coast and estuary geomorphological systems
- The challenge of modelling decadal coastal morphology changes and the iCOASST formal approach
- Integrating environmental modelling using FluidEarth
- Coastal Systems Mapping
- Site Visits and Stakeholder Workshops

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