



Coastal Working Group

<http://csdms.colorado.edu/wiki/Coastal>

Newsletter No. 2, October 2014

News, Communication & Engagement

Whether you are an active coastal researcher or interested CWG member, this newsletter is for you. Send anything to me, Chris Thomas (cwt@bgs.ac.uk). This will go out roughly monthly or so, or as required.

Coastal Working Group

All the information about the CWG can be found at: <http://csdms.colorado.edu/wiki/Coastal>.

Coastal Working Group Chair:

A. Brad Murray, Duke University, NC.

CWG Goals

- *Evaluate present knowledge of processes in coastal environments including the human component of those systems*
- *Identify numerical models presently in use and Identify gaps in knowledge and areas where model development or improvement is needed.*
- *Work with the community to populate the CSDMS model toolkit with models of all sorts, ranging from analytical and simplified numerical models that can be shared with the scientific community in stand-alone form, to numerical models that can be linked to models of other environments, via CSDMS, to allow new sorts of questions to be addressed.*
- *To motivate and support populating the toolkit by catalysing collaborations (and proposals) to address interesting and relevant science questions requiring model development and/or model coupling (via Basic Model Interfaces) across different environments, including coastal, terrestrial and marine domains.*

Newsletter #2

First – an apology: this newsletter is *much* later than I anticipated...it's been a busy time.

Second – thanks very much to everyone who has taken the trouble to send me the variety of material included below. I hope everyone finds it useful in some way. Please do continue to send me anything you think will be of interest.

Third – I'm aiming to get another newsletter out by mid-November, particularly with the annual geophysical festival that is AGU looming large on the horizon. With that in mind, the next edition will have an AGU focus. If you're presenting and want some prior advertising, *please* send me details: names, title, session. I won't be going this year, so if you are – hope you enjoy!

Meetings

See <http://csdms.colorado.edu/wiki/Meetings> on the CSDMS website for general listings of meetings.

9th Symposium on River, Coastal and Estuarine Morphodynamics, 2015 Peru.

Abstract deadline is the end of October: for other details, see

<http://csdms.colorado.edu/wiki/MeetingOfInterest:Meeting-105>

<http://www.creamazonia.org/rcem2015/>

Publications

From Capitán de Navío Jose Contreras at Servicio de Hidrografía y Navegación, Caracas, VENEZUELA.

<http://www.dhn.mil.ve>

Jose is currently technical manager of a research project funded by Fonacit. The main objective is the creation of the Numeric Models Unit (UMN, Spanish acronym), for the simulation of swell and marine currents. The work has been undertaken using Delft3D and SMC-Espanha. The first stage of this project has already concluded. Jose is now formulating the second stage of the project (2014-2015). An outline of the work as supplied by Jose is included at the end of the newsletter.

From Professor Svetlana Kostic at the Computational Science Research Center, San Diego State University (skostic@mail.sdsu.edu; <http://eon.sdsu.edu/~kostic/>).

Kostic, S. 2014 *Upper flow regime bedforms on levees and continental slopes: Turbidity current flow dynamics in response to fin-grained sediment waves*. **Geosphere**

The paper examines the hydrodynamic response of fine-grained sediment waves on levees and continental slopes to a wide range of turbidity current conditions and demonstrates that they most likely form and evolve as submarine upper flow regime bedforms.

Covault, J.A., Kostic, S., Paull, C.K., Ryan, H.F., & Fildani, A. 2014 *Submarine channel initiation, filling, and maintenance from seafloor geomorphology and morphodynamic modeling of cyclic steps* **Sedimentology** **61** (4), 1031-1054.

Numerical modeling is combined with interpretations of sea-floor and shallow subsurface stratigraphic imagery to investigate the San Mateo canyon-channel system offshore of southern California. The dominant mode of San Mateo channel maintenance during the Holocene is interpreted to be thalweg reworking into aggrading cyclic steps, whereas an incipient, proto-San Mateo channel is found to consist of a series of net-erosional cyclic steps that nucleated out of sea-floor perturbations across the tectonically active lower slope.

From Professor Stefano Lanzoni, in the Department of Civil, Architectural and Environmental Engineering, University of Padova, Italy. <http://www.dicea.unipd.it/en/stefano-lanzoni>.

Van Oyen, T., Carniello, L., D'Alpaos, A., Temmerman, S., Troch, P. & Lanzoni, S. 2014. *An approximate solution to the flow field on vegetated intertidal platforms: Applicability and limitations*. **Journal of Geophysical Research: Earth Surface**, **119**, doi:10.1002/2013JF003064.
<http://onlinelibrary.wiley.com/doi/10.1002/2013JF003064/abstract>

From Ehab Mesehle, Director of Natural Systems Modeling and Monitoring at The Water Institute of the Gulf. <http://thewaterinstitute.org/who-we-are/staff/Ehab-Mesehle>

Allison, M., Ramirez, M. & Mesehle, E. 2014. Diversion of Mississippi River Water Downstream of New Orleans, Louisiana, USA to Maximize Sediment Capture and Ameliorate Coastal Land Loss. *Water Resources Management*, 28, 4113-4126.

From Professor Laura Moore, Dept. of Geological Sciences, University of North Carolina, Chapel Hill (moorelj@email.unc.edu; <http://cecl.web.unc.edu/laura-moore/>)

Moore, L.J., Patsch, K., Williams, S.J., and List, J.L. 2014. Barrier Islands Poised for Geomorphic Threshold Crossing in Response to Rapid Sea-Level Rise: Insights from Numerical Model Experiments, Chandeleur Islands, Louisiana, USA, **Marine Geology**. DOI: 10.1016/j.margeo.2014.05.022

Duran Vincent, O. and Moore, L.J., 2013. Vegetation controls on the maximum size of coastal dunes **Proceedings of the National Academy of Sciences**, DOI:10.1073/pnas.1307580110.

From Juan F. Paniagua-Arroyave, University of Florida.

Kline, S. W., Adams, P. N. & Limber, P. W. 2014. The unsteady nature of sea cliff retreat due to mechanical abrasion, failure and comminution feedbacks. *Geomorphology*, 219, 53-67.

Limber, P. W., Murray, A. B., Adams, P. N. & Goldstein, E. B. 2014. Unraveling the dynamics that scale cross-shore headland relief on rocky coastlines: 1. Model development. *Journal of Geophysical Research: Earth Surface*, 119, 2013JF002950.

Limber, P. W. & Murray, A. B. 2014. Unraveling the dynamics that scale cross-shore headland relief on rocky coastlines: 2. Model predictions and initial tests. *Journal of Geophysical Research: Earth Surface*, 119, 2013JF002978.

Research Snapshots

Recent Successes

Congratulations to Kenny Ells, who graduated with PhD from Duke University in the summer and is now undertaking post-doctoral research.

Opportunities

For work, research, sabbaticals, training, etc. Just give me one or two lines and a URL if available. It'll get mirrored on the CSDMS website too.

For general job advertisements see: <http://csdms.colorado.edu/wiki/Jobs>

MSc

PhD

Post-doctoral

Positions

Funding and grant opportunities

Consortia and other partnerships

Moves

Dr Kenny Ells is now undertaking post-doctoral research as Visiting Research Assistant Professor at his *alma mater*, the University of North Carolina, Wilmington. He can be contacted at ellsk@uncw.edu.

I will be taking a three-month sabbatical at Duke University, NC, from January to March 2013, where I'll be working with Brad Murray, and Laura Moore and colleagues at University of North Carolina, Chapel Hill, NC.

Contact me via cwt@bgs.ac.uk, or cwt10@duke.edu

Software

From Tian-Jian Hsu (Tom), thsu@udel.edu. Associate Professor, Civil & Environmental Engineering Department, University of Delaware, Newark, DE, 19716.

A multi-dimensional numerical model for sediment transport based on the two-phase flow formulation has been developed. This numerical model is developed through the open-source CFD library of solvers, OpenFOAM and this new solver is called twoPhaseEulerSedFoam. The open-source code along with a user manual were released via CSDMS code repository in early September.

Scientific progress made in modeling large-scale coastal hydrodynamics and morphological evolution has clearly been facilitated by the development of many open-source coastal modelling systems such as ROMS, DELFT3D, and many others. However, such open-source models are lacking for researchers studying small-scale, intra-wave coastal processes. Our numerical model aims to address this critical research infrastructure issue in the context of non-cohesive sediment.

With closures of particle stresses and fluid-particle interaction, this new two-phase model for sediment transport is able to resolve processes in the concentrated region of sediment transport and hence does not require conventional bedload/suspended load assumptions. The numerical model is developed in three spatial dimensions, but this version is only valid for the Reynolds-averaged two-dimensional vertical formulation (with $k-\epsilon$ closure) for sheet flow in steady and oscillatory flows. Future releases of this code will include fully-validated 3D turbulence-resolving capability.

This code will only be released via the CSDMS Software repository. However, Tom has further information at http://www.coastal.udel.edu/~thsu/simulation_data.htm, where there is a link to the code on the CSDMS website.

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Soberanía e independencia científica para la Defensa Nacional
Universidad Militar Bolivariana de Venezuela

Proyecto Creación de la Unidad de Modelos Numéricos (UMN) para Simulación de Oleaje y Corrientes Marinas

El **Centro de Investigación Estratégico Nacional en Ciencias y Artes Militares (CIENCIA)** promueve la investigación científica y tecnológica desde la Universidad Militar Bolivariana de Venezuela (UMBV) a través de estrechas coordinaciones interinstitucionales con el **Ministerio del Poder Popular para Ciencia, Tecnología e Innovación (MPPCTI)** mediante la presentación ante la **Comisión Técnica Evaluadora (CTE)** de proyectos especiales para el desarrollo nacional impulsados por científicos, investigadores e innovadores de la Fuerza Armada Nacional Bolivariana (FANB).

Creación de la Unidad de Modelos Numéricos (UMN) para Simulación de Oleaje y Corrientes Marinas

Es necesario indicar que dentro de las plurales actividades de investigación de la UMBV se encuentran aquellas de la Escuela de Estudios Tácticos Navales (Meseta de Mamo, estado Vargas), donde se exploran las realidades de las aguas jurisdiccionales venezolanas y entre ellas aquellas dedicadas a la oceanografía, hidrografía, entre otras. Esta escuela dicta la especialización y maestría en Hidrografía y sus egresados (civiles y militares) se desempeñan a bordo del Buque Oceanográfico "Punta Brava" (BO-11) y en el Servicio de Hidrografía y Navegación (SHN) de la Armada Bolivariana, y otros laboratorios flotantes y en tierra a nivel nacional.

Objetivos

Este proyecto es una iniciativa del Servicio de Hidrografía y Navegación de la Armada Bolivariana, que a través del investigador militar, Capitán de Navío José Contreras Peña, sugiere **fortalecer el cálculo científico para analizar los datos de oleaje y corrientes marinas en la República Bolivariana de Venezuela, con el propósito de mejorar las capacidades de suministro de información de oleaje y corrientes marinas para el desarrollo de los planes de desarrollo de la nación.** Igualmente, el proyecto incluye la elaboración de material didáctico sobre procesos costeros y de los fundamentos para la simulación numérica de oleaje y corrientes marinas.

El proyecto tiene una duración de 18 meses, y está fundamentado en estricto cumplimiento al contenido de los instrumentos rectores de la

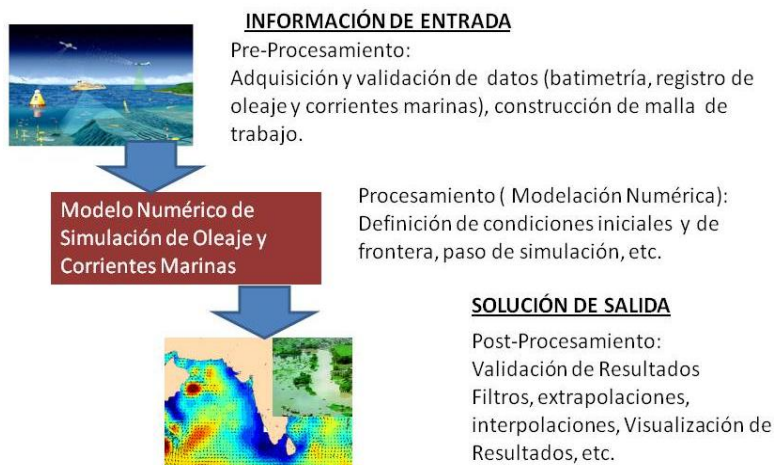
investigación, especialmente a aquellos descritos en la Constitución Nacional de la República Bolivariana de Venezuela, en los lineamientos establecidos en el primer plan socialista: Plan Nacional Simón Bolívar (2007-2013), en el Plan Nacional de Ciencia, Tecnología e Innovación (2005-2030), en el Plan de Desarrollo para la Fuerza Armada Nacional Bolivariana (Plan Sucre) y en las necesidades de investigación emanadas por el Ministerio del Poder Popular para la Defensa (MPPD) y del Ministerio del Poder Popular para Ciencia, Tecnología e Innovación.

Alcances

Mediante el estudio teórico de las aproximaciones matemáticas para simular el oleaje y corrientes marinas que aborda este proyecto, se hará uso y manejo de los siguientes modelos numéricos:

- Sistema de Modelado Costero (SMC)
- The Princeton Ocean Model (POM)
- Wave Prediction Model (WAM)
- Simulating Waves Nearshore (SWAN)

Con un costo de Bs. 298.904,00, las actividades medulares de este proyecto se **fundamentan en apoyar a las líneas de investigación del postgrado de hidrografía para oficiales en el área de simulación numérica de los procesos costeros**, producir material didáctico dirigido a los cursos básico, medio y avanzado de hidrometeorología para sargentos y generar aplicaciones de modelación numérica para las actividades operativas del Servicio de Hidrografía y Navegación.



La ilustración muestra un esquema clásico de los procesos de simulación numérica de oleaje y corrientes marinas. Para el desarrollo de este proyecto de investigación se empleará la infraestructura de captura de datos existentes en las estaciones hidrográficas del SHN de la Armada Bolivariana ubicadas en Punto Fijo, Edo. Falcón; Puerto Cabello, Edo. Carabobo; Pampatar, Edo. Nueva Esparta y Puerto Ordaz, Edo. Bolívar.

Las aplicaciones generadas por este proyecto de investigación serán de especial valor en la predicción de oleaje y corrientes marinas, requeridas para las actividades operativas por otras instituciones del estado como: **Bolivariana de Puertos, Instituto Nacional de Espacios Acuáticos (INEA), PDVSA, y otras instituciones públicas y privadas.**