CSDMS Newsletter - September 2024

Wed, Sep 11, 2024 at 11:15 AM



ON THE SURFACE

CSDMS Newsletter September 2024

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New dbSEABED Data Component

dbSEABED is an information system for marine substrates, i.e. the composition and physical properties of the seabed (<u>https://instaar.colorado.edu/</u> <u>~jenkinsc/dbseabed/</u>). This system employs very large amounts of, and diverse observational data, and applies math methods to integrate/harmonize the data. Spatially gridded data is the main form of output. The scope is the global ocean across all depth zones, which is supported by approx. 6 million described sites. The current page serves only the data for the Gulf of Mexico region.

The CSDMS Data Component can access and subset datasets from the system and wrap them with Basic Model Interface (BMI). This allows marine substrates datasets to be easily coupled with other datasets and models that expose a BMI.

- source repository: <u>https://github.com/gantian127/bmi_dbseabed</u>
- · documentation: <u>https://bmi-dbseabed.readthedocs.io/en/latest/</u>
- · data description: https://csdms.colorado.edu/wiki/Data:DBSEABED



Register Now!

Please join us for the <u>CSDMS 2024 Fall Webinar Series</u>. Registration link/details are provided below.

Earth Surface Processes Institute Student Project Presentations

September 17th, 2024 @ 10:00AM MDT

Vivian Grom, Louisiana State University & Pedro Silvestre, Queens College CUNY

"DEM Data Compared to Synthetic Data in LEMS: Study Case on Teton Fault, Wyoming"

Larry Syu-Heng Lai, University of Washington

"Fluvial Sedimentary Response to Large Deep-seated Landslide Events"

Katrina Cruz Magno, Stanford University & Prati Regmi, North Carolina State Uni

"Simulating Wildfire Ash Transport Following a Precipitation Event by Coupling DORADO and Overland Flow"

Sarah Brannum, Louisiana State University

"Impact of Vegetation Coastal Resiliency on Aeolian Dunes and Coastal River Deltas"

REGISTER

Migrating Stripes and Pulses that Race to Oblivion: Exploring Gravel Bed River Morphodynamics with the Landlab

NetworkSedimentTransporter

November 7th, 2024 @ 10:00AM MST

Allison Pfeiffer, Western Washington University

Changes in river channel geometry and grain size can alter flood hazards and impact habitat, yet our ability to predict how perturbations will manifest as channel change remains incomplete. While flume studies are commonly employed to study the downstream effects of sediment pulses, these physical experiments cannot incorporate pulse material abrasion, a property that field observations suggest may be important in many natural landscapes. I use the Landlab Network Sediment Transporter (NST) to explore multi-grain size sediment transport dynamics at the channel scale. The NST is a CSDMS Newsletter - September 2024

morphodynamic model that allows for Lagrangian tracking of collections ('parcels') of sediment grains through a river channel, evolving the elevation and grain size distribution of the river bed. In this talk, I will present an exploration of gravel-bedded river morphodynamics using a simple model configuration with two goals: first, to explore migrating channel bedforms and grain patches that emerge from standard sediment transport calculations, and second, to explore the effects of bed material abrasion and sediment density on the downstream evolution of a gravel sediment pulse. With hundreds of 'parcels' of sediment per reach of river, uniform channel characteristics, and initial bed sediment recycled to the upstream boundary, I configure the model like a 50 km numerical recirculating flume. Allowing the channel to evolve under constant flow conditions, initially small differences in the grain size distribution of model links differentiate into coarse and fine zones that gradually migrate downstream. This emergent behavior, which mimics downstream migrating bedforms in natural channels and flumes, is controlled in the NST by the sediment transport hiding function. Next, I explore the downstream transport of sediment pulses, incorporating bed material abrasion and variability in sediment density, resembling that found in volcanic mass wasting deposits of the Pacific Northwest. I find that these properties speed the initial downstream propagation of the pulse, but limit its downstream endurance. The NST model provides us an opportunity to explore the complex interactions of heterogeneous sediment in the evolution of gravel river systems.

REGISTER

CSDMS Human Dimensions Group - Virtual Coffee Hour

November 37th, 2024 @ 10:00AM MST

Moira Zellner, Northeastern University and Katherine Anarde, North Carolina State University

In response to the CSDMS community's interest, the Human Dimensions group is excited to host a virtual Coffee Hour on community engagement in earth systems science and policy projects. Please join us for our first Coffee Hour, which will include an engaging panel on the topic: "Engaging diverse stakeholders in earth-systems modeling projects." We recognize the importance of working collaboratively with stakeholders in scientific

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projects (e.g., for knowledge co-creation, for guidance, and for implementation of solutions derived from the research), but we are not traditionally trained to do so. Rigorous scientific practices can sometimes be alienating and extractive, eroding the trust between the scientific community and the public that is necessary for the advancement of science, policy, and human wellbeing. We discuss here the challenges involved in community engagement and possible ways to overcome them.

Our panelists are <u>Leilah Lyons</u>, NSF, <u>Laura Schmitt Olabisi</u>, Michigan State University, and <u>Mehana Vaughan</u>, University of Hawaii. The Coffee Hour will begin with a short introduction by each panelist, followed by a set of questions by the facilitators, and concluding with a period of open questions and discussion with the audience.

REGISTER

Previous CSDMS-sponsored webinars are <u>archived here</u> and available for viewing anytime. If you have suggestions for future webinars, please contact <u>csdms@colorado.edu</u>.

Introducing Brain Island



Geologic change takes time—and that's one of the reasons we use simulation models to study it. To help visualize geologic change from source to sink, the CSDMS Integration Facility has created a prototype online simulator called "Brain Island".

Brain Island (also known as the Earthscape Simulator) is a perpetually running computer model that models geological evolution on an imaginary island. The simulation is meant to serve two purposes. The first is to provide a visualization of geologic change through processes such as tectonic uplift and subsidence, isostatic adjustment, sea-level variations, and erosion and sedimentation, both on land and in the adjacent ocean. The second is to inspire conversation among the research community about how these "source-to-sink" processes are represented mathematically and computationally, what processes might be missing or incompletely represented, and how we might improve on the model.

Check out the prototype here: <u>https://csdms.colorado.edu/wiki/lsland</u>

Comments and feedback are encouraged! Join the conversation here:

https://github.com/gregtucker/earthscape_simulator/issues

CSDMS Community News



The recipient of the 2024 CSDMS Annual Meeting Poster Award is <u>Nilay Iscen</u>, University of Minnesota. Nilay was awarded for her presentation, <u>"Evolution of Long-profiles of a Sand-bed</u>

<u>Alluvial River Network</u>" using an updated network model approach (GRLP v2.0.0-alpha) Congratulations Nilay!



CSDMS is also happy to announce that **Isamar Cortes, Cardiff University and Luke McGuire, University of Arizona**, are the recipients of this year's Terrestrial Working Group Spotlight Award. Isamar was recognized for her work in Open-source software: expansion,

advocacy, and education (Code to Communicate: <u>https://github.com/</u> <u>CodeToCommunicate/CoCoLessons</u>). Luke was recognized for his creatively efficient modeling of hillslope hydrology and debris flows; post-wildfire landscape change and his generosity with time and knowledge.

CSDMS is pleased to announce that Katherine Anarde, Department of Civil,



Construction and Environmental Engineering, North Carolina State University, has agreed to serve as Co-Chair of the Human Dimensions Focus Research Group. Katherine is a coastal engineer and geomorphologist that combines observational and numerical approaches to investigate coastal hazards.

New Blog - Layers of New Jersey

Check out Greg Tucker's most recent blog on the unique geomorphology of New Jersey (<u>https://csdms.colorado.edu/wiki/Between_the_Bytes</u>).

Stay Tuned for a New Learning Module this Fall

As part of CSDMS 4.0, we are building new, extended learning modules to serve novices and experts alike. Online users are guided through a series of tasks that enable them to pose and answer common challenges in surface dynamics modeling using real-world examples. We are excited to announce that the first module will be hosted and available on the EarthscapeHub this Fall.

The first module guides users in simulating potential impacts of 'extreme' rainfall using the Landlab modeling library. The 2013 Colorado Floods and Landslides provide a motivational use-case. The module is structured around four chapters that sequentially build on each other (Problem Setup, Building a Rainfall Generator, Simulating Soil Moisture and Runoff Dynamics, and Evaluating Slope Stability). Users work through a series of Jupyter Notebooks at their own pace (~10-15 hours) where they learn and practice analyzing time series data, building and populating Landlab model grids, coupling Landlab components in a model, and working with data components.

Monitor social media for when this first module goes live. We will be actively soliciting feedback to both improve the first module and guide the development

of two new modules in the coming years.

CSDMS Community Teaching and Research Resources

CSDMS Workbench - https://csdms.colorado.edu/wiki/Workbench CSDMS Model Repo - https://csdms.colorado. edu/wiki/Model_download_portal Open Earthscape Jupyter Hub - https://csdms.colorado.edu/wiki/JupyterHub CSDMS EKT Labs - https://csdms.colorado.edu/wiki/Labs_portal Office Hours (via Zoom) with a CSDMS Research Software Engineer - 9AM on Wednesdays. To register - https://csdms.colorado.edu/wiki/OfficeHours CSDMS Help Desk - https://csdms.github.io/help-desk/

Join us on Bluesky, Mastadon and X!

Be the first to know about all the new resources!! For new products, job postings, events, breaking science, training opportunities and more, please follow us <u>@CSDMS.bsky.social</u> on Bluesky,

@CSDMS@fediscience.org on Mastodon and @CSDMS on X.





CSDMS is an NSF sponsored program



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