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The SEDIMENTARY Record

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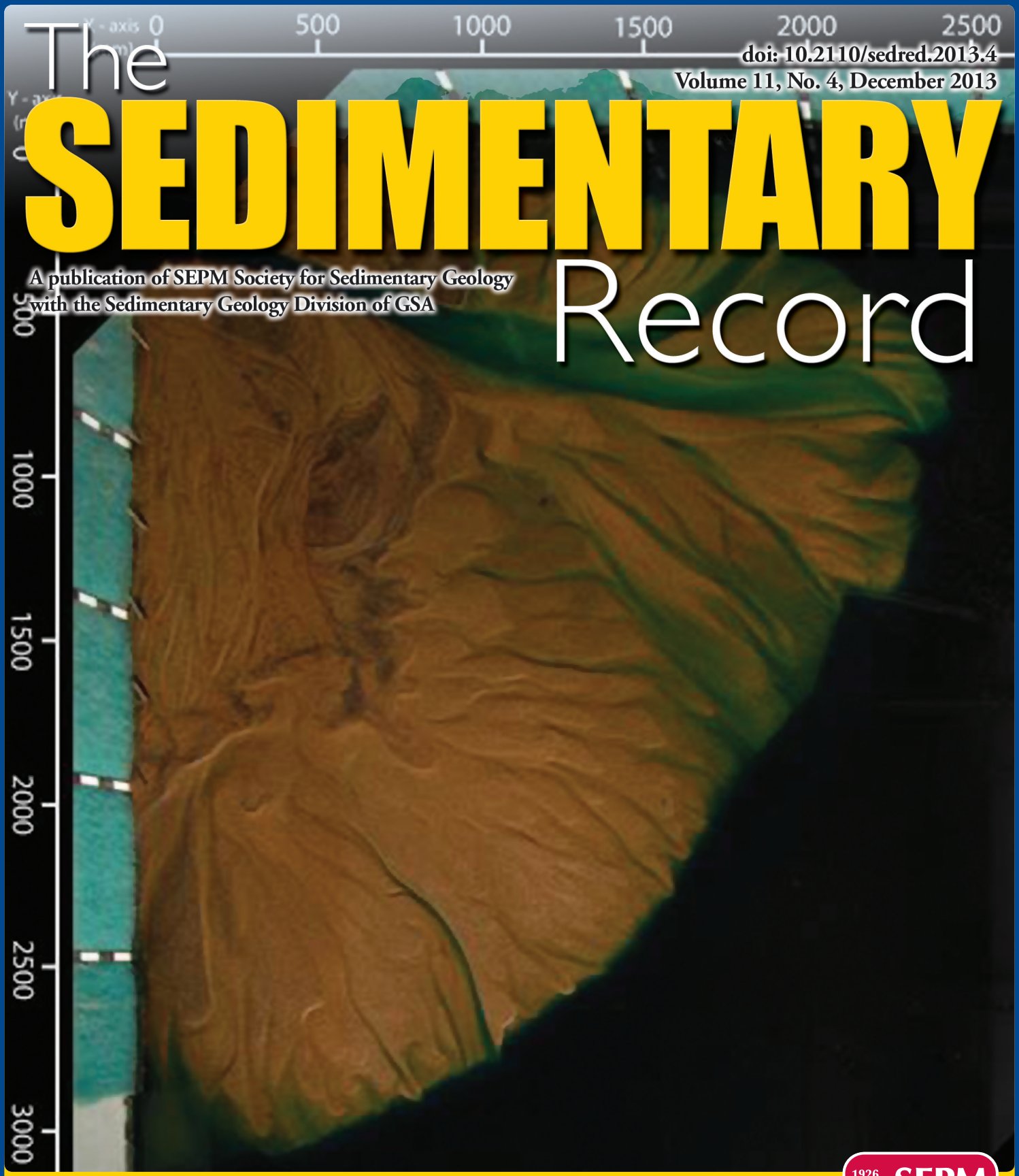

INSIDE: THE NATIONAL CENTER FOR EARTH-SURFACE DYNAMICS: VERSION 2.0

PLUS: BUILDING A SEDIMENT EXPERIMENTALIST NETWORK (SEN): SHARING BEST PRACTICES FOR EXPERIMENTAL METHODS AND DATA MANAGEMENT, PRESIDENT'S COMMENTS, RESEARCH CONFERENCES

1926 SEPM Society for Sedimentary Geology

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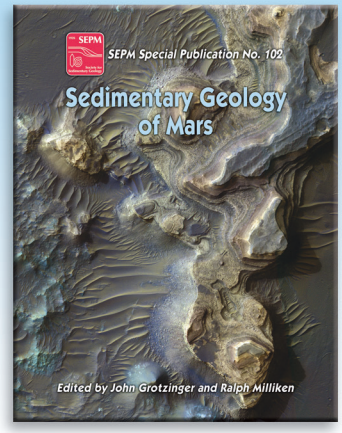
Special Publication #102

Sedimentary Geology of Mars

Edited by: John P. Grotzinger and Ralph E. Milliken



Often thought of as a volcanically dominated planet, the last several decades of Mars exploration have revealed with increasing clarity the role of sedimentary processes on the Red Planet. Data from recent orbiters have highlighted the role of sedimentary processes throughout the geologic evolution of Mars by providing evidence that such processes are preserved in a rock record that likely spans a period of over four billion years. Rover observations have provided complementary outcrop-scale evidence for ancient eolian and fluvial transport and deposition, as well as surprisingly Earth-like patterns of diagenesis that involve recrystallization and the formation of concretions. In addition, the detection of clay minerals and sulfate salts on Mars, coupled with large-scale morphologic features indicative of fluvial activity, indicate that water-rock interactions were once common on the martian surface. This is in stark contrast to the dry and cold surface environment that exists today, in which eolian processes appear to be the dominant mode for sediment transport on Mars. These issues and others were discussed at the First International Conference on Mars Sedimentology and Stratigraphy, held in El Paso, Texas in April of 2010. The papers presented in this volume are largely an extension of that workshop and cover topics ranging from laboratory studies of the geochemistry of Martian meteorites, to sediment transport and deposition on Mars, to studies of terrestrial analogs to gain insight into ancient Martian environments. These papers incorporate data from recent orbiter and rover missions and are designed to provide both terrestrial and planetary geologists with an overview of our current knowledge of Mars sedimentology as well as outstanding questions related to sedimentary processes on Mars.

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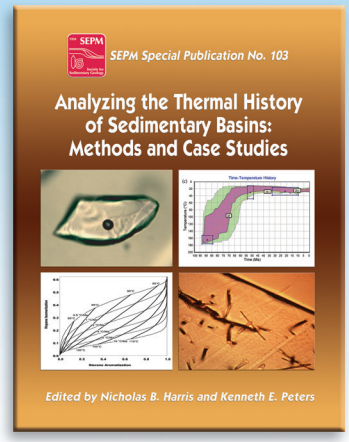

Special Publication #103

Analyzing Thermal Histories of Sedimentary Basins: Methods and Case Studies

Edited by: Nicholas B. Harris and Kenneth E. Peters

Thermal histories of sedimentary basins are critical sources of scientific and practical information. They provide us with windows into past and present tectonic processes and the configuration of the crust and mantle. Using records of present and past temperature distributions, we can identify and constrain interpretations of tectonic events, distinguish different basin types and interpret pathways of fluid flow. These insights can be used calibrate basin and petroleum system models and to interpret and predict the distribution of minerals and petroleum, diagenesis and reservoir quality, and the geomechanical properties of rock units. This volume summarizes the current state of the art for many modern approaches used to estimate paleotemperature. Many techniques are now available based on both organic and inorganic components in the rock. Even techniques that are now many years old, such as apatite fission track analysis, have undergone significant advances in the past decade. This volume provides comprehensive reviews of the fundamental science underpinning each method and the basic principles used to interpret data, as well as case studies illustrating practical applications and the complexity of paleotemperature interpretation. Geoscientists from all sectors will find this volume to be a valuable resource in their work.

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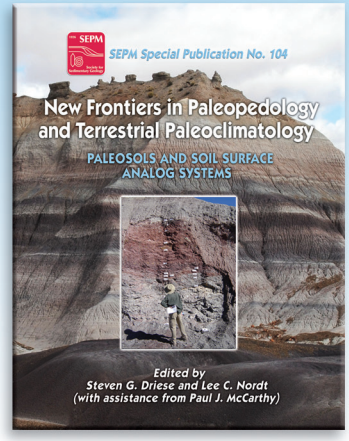
Special Publication #104

New Frontiers in Paleopedology and Terrestrial Paleoclimatology: Paleosols and Soil Surface Analog Systems

Edited by: Steven G. Driese and Lee C. Nordt, with assistance by Paul J. McCarthy



After initial breakthroughs in the discovery of fossil soils, or paleosols in the 1970s and early 1980s, the last several decades of intensified research have revealed the much greater role that these deposits can play in reconstructing ancient Earth surface systems. Research currently focuses on terrestrial paleoclimatology, in which climates of the past are reconstructed at temporal scales ranging from hundreds to millions of years, using paleosols as archives of that information. Such research requires interdisciplinary study of soils conducted in both modern and ancient environments. These issues and many others were discussed at the joint SEPM-NSF Workshop "Paleosols and Soil Surface Analog Systems", held at Petrified Forest National Park in Arizona in September of 2010. The papers presented in this volume are largely an extension of that workshop and cover topics ranging from historical perspectives, followed by lessons from studies of surface soil systems, with examples crossing between soils and applications to paleosols. The remainder of the volume begins with an examination of the relationship between paleosols and alluvial stratigraphy and depositional systems, and ends with three case studies of ancient soil systems. Because some readers may find the nomenclature rather "foreign" the editors have included a glossary of pedological terms at the end of this volume. These papers incorporate data from studies of surface soil systems as well as deep-time sedimentary rock successions and are designed to provide sedimentary geologists with an overview of our current knowledge of paleosols and their use in interpreting past climates, landscapes, and atmospheric chemistry.

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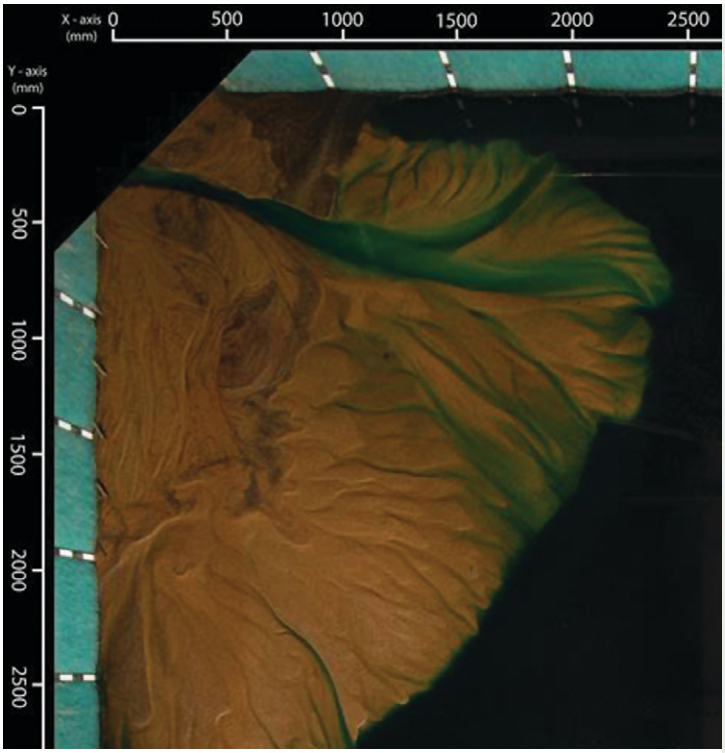

Cover photo: Overhead view of a tidal delta produced at St Anthony Falls Laboratory, University of Minnesota, Minneapolis by Dan Cazanacli and Sarah Baumgardner. The sediment is walnut-shell sand and the tidal range and amplitude were 20 mm and 60 s respectively. Vertical scale bars along the basin edges are spaced 0.5m apart.

CONTENTS

The Sedimentary Record (ISSN 1543-8740) is published quarterly by the Society for Sedimentary Geology with offices at 4111 S. Darlington, Suite 100, Tulsa , OK 74135-6373, USA.

The National Center for Earth-surface Dynamics: version 2.0

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INTRODUCTION

From 2002 to 2012, the National Center for Earth-surface Dynamics (NCED; http://nced.umn.edu) was funded by the National Science Foundation (NSF) as a Science and Technology Center (STC) focused on predicting the evolution of the coupled landscape-water-biotic-human system that comprises the Earth's surface. During that time, NCED carried out research (http://nced.umn.edu/publications) and also established a number of community-oriented initiatives in keeping with its status as the first-ever STC devoted to the integrated science of the Earth's surface. The research landscape has changed a great deal since 2002: a new focus group and a new journal devoted to Earth and planetary surfaces were launched at AGU, with parallel developments at EGU; work on creating a vision for the Earth sciences included a prominent role for surface dynamics in the 2009 NSF GeoVision report (NSF Advisory Committee for Geosciences 2009), together with two major surface-focused NRC reports (National Research Council 2010; National Research Council 2011); and a remarkable number of large-scale surface-focused initiatives launched in this period, including the Community Surface Dynamics Modeling System (CSDMS), National Center for Airborne Laser Mapping (NCALM), Critical Zone Observatories (CZO), Delta Dynamics Collaboratory (DDC), International Year of Deltas (IYD) (Foufoula-Georgiou et al. 2011); and the Sediment Experimentalist Network (SEN; see the companion article in this issue). It has been an exciting time!

In view of this growth, and of NCED's success in promoting and providing a stable, visible center for this diverse scientific community, the NSF programs most closely involved with NCED decided to support a continuation of its community-oriented activities. This new, much smaller center carries the same name, but we refer to it informally as "NCED2". NCED2, like the NCED STC, is headquartered at St Anthony Falls Laboratory (SAFL) of the University of Minnesota, Minneapolis. Here we provide a summary of NCED2's main activities and invite the community to join us in shaping and participating in the NCED2 program: by providing input on future themes, suggesting and joining in community experiments, participating in postdocs, visits to SAFL or affiliated facilities, and/or proposing your own ideas for using NCED2 to promote collaborative Earth-surface research. You can reach us via the website above or by contacting the us (the authors) directly.

Lessons from the NCED STC. The 10-year lifespan of the NCED STC gave us time to experiment with a variety of means of growing the NCED research network. Among the best ideas to emerge from NCED have been (1) its 'extended family' model for mentoring students and postdocs; (2) hosting community activities such as workshops and shared field and experimental facilities; (3) serving as a focal point to help catalyze and launch new programs; (4) hosting focused, ambitious research activities that afford opportunities for community participation through extended visits (e.g. the StreamLab community-experiment program (Singh et al. 2013; Wilcock et al. 2008)); (5) close integration of research with informal education and Native American education, by development of a long-term working partnership with key institutions and people; and (6) hosting workshops and summer institutes, both strongly focused on young scientists. The main goal of NCED2 is to expand, extend, and build on the successes of the NCED STC.

NCED2. The core of NCED2 is a set of linked programs open to participation by the broad ESD research community. The centerpiece of this effort (detailed below) is a program of research theme years focused on emerging research areas in Earth-surface dynamics. The theme years comprise a set of workshops, experiments, postdoc opportunities, visitor programs from undergraduate through faculty level, and informal education and Native American activities, all linked through that year's theme. These linked program components allow a broad range of surface scientists to collaborate in new ways, enhancing and accelerating their individual efforts to advance surface dynamics, as well as moving us closer to the vision of a quantitative, transdisciplinary, and predictive science of the Earth-surface environment – the scientific basis for predicting Earth's future in the face of changing climate and human influence.

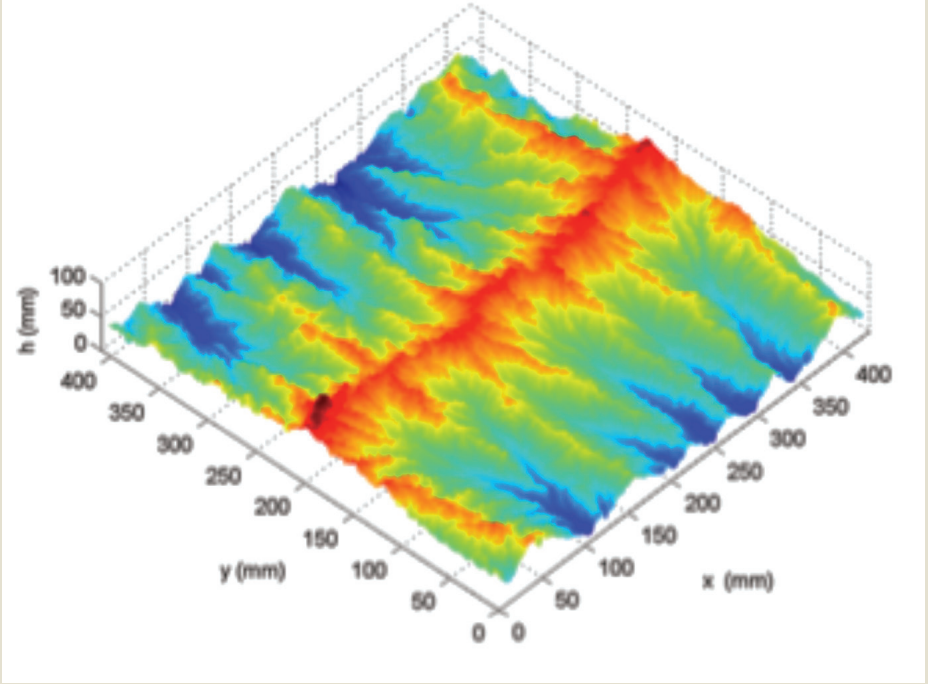

Figure 1: DEM of experimental erosional landscape formed under uniform precipitation rate and uniform uplift rate. Courtesy Arvind Singh, SAFL

THE NCED2 PROGRAM

The NCED2 program comprises a set of linked activities designed to make NCED2 a true research commons for Earth-surface dynamics. These components are unified by the core idea of theme years under which all NCED activities in a given year will revolve around a research theme chosen with input from the research community and our Advisory Board. The theme-year idea is based on the format developed by the University of Minnesota's very successful Institute for Mathematics and Its Applications (IMA) (www.ima.umn.edu). St Anthony Falls Laboratory (SAFL) provides a focal point for theme-year research via shared experiments, designed and run by the theme-year participants at SAFL and with the support of experienced SAFL staff. SAFL has just completed a major renovation, supported by NSF's Academic Research Infrastructure (ARI) program. Among other things, the renovation allows SAFL facilities to be shared virtually with the broader community, not only after the fact but also through real-time web-based participation in experiments. The main program components are summarized in the sections below:

Theme years. As discussed above, the basic idea is that all NCED2 activities in a given year revolve around a single broad theme. The themes will be selected by the Advisory Board each year with input from the broader community. Theme selection criteria are:

1. Potential impact and topicality
2. Suitability for NCED2 facilities and capacity
3. Community support and enthusiasm (e.g., early commitments to participate)
4. Breadth and potential to attract wide participation
5. Broader impact and relevance to society and policy
6. Potential for fostering interdisciplinary research across NSF programs and Divisions

To get things started, we launched NCED2 with the theme *Subsurface to surface: recovering dynamics from stratigraphic records.* For future years we are open to community input; for the second full year of operation we have proposed the theme *Complexity and predictability of geomorphic systems.* We invite our colleagues to contact us with input on these and ideas for future themes (suggestions from junior colleagues are especially welcome).

Community experiments. Theme year community experiments focus on that year's theme, and are designed to provide data and a unifying experience for NCED2 participants. They can focus on a range of environments, from eroding uplands (Fig. 1) to deltas Figs. 2, 3) and the submarine realm. The advent of the Sediment Experiment Network (SEN; see article in this issue) even opens the way to doing sets of community experiments in parallel. We also aim to coordinate the experiments with theoretical research (Fig. 3) such that they are mutually informative and inspiring; and with field programs to complete the triad of field-experiment-theory. As with SEN, this effort is greatly enhanced by the advent of sustained, long-term field sites such as the Wax Lake Delta FESD site (WLD) funded by NSF's Frontiers on Earth Surface Dynamics (FESD) program, the Minnesota River Basin Observatory funded by NSF's Water Sustainability and Climate (WSC) program, and Critical Zone Observatories (CZOs (Anderson et al. 2008; Brantley et al. 2007)).

Figure 2: Overhead image of a weakly cohesive experimental delta. Courtesy John Martin, Shell.

Synthesis Postdocs. Postdoctoral researchers will be the heart of the NCED2 program. The postdoc program is based on the NCED STC's 'synthesis postdoc' program, originally designed to nucleate small, innovative research teams within NCED, anchored by a dedicated postdoc. The new postdoc program is open to all, and we especially encourage junior faculty to consider teaming up with more senior colleagues to participate. Detailed guidelines are available on our website (www.nced.umn.edu), but the main elements are:

1. NCED2 provides partial support (a target of 50% with some flexibility) of postdoc salary for 1-2 years. The remaining support must be provided by at least two researchers who form the team that will co-mentor the postdoctoral researcher.
2. Postdocs will be expected to participate in the NCED2 theme-year program for that year.
3. Postdocs will be encouraged to spend some time in residence at SAFL to participate in theme-year activities (e.g. community experiments, summer institutes); our aim is to have as many postdocs as possible for a given year in residence simultaneously to promote collaboration.
4. Postdoc support is open to all. Postdoc teams will be selected with input from the NCED2 advisory committee via a brief application; details are available on the website.

Graduate Students. NCED2 has limited funding to help graduate students to participate in NCED2 theme-year activities by paying for subsistence and travel to SAFL. Participation is open to the research community, by application.

Undergraduate students. NCED2 provides opportunities for undergraduates to participate in theme-year research via our ongoing REU on Sustainable Land and Water Resources and NCED2's undergraduate summer intern programs, which are built on interdisciplinary student and mentor teams that support students from diverse backgrounds to explore research using NCED methods. Undergraduate teams can participate in research at NCED2 sites, such as SAFL and affiliated field sites (e.g., Wax Lake Delta and the Minnesota River Basin), and also at tribal colleges (Salish Kootenai College) and native reservations (Fond du Lac Band of the Lake Superior Chippewa).

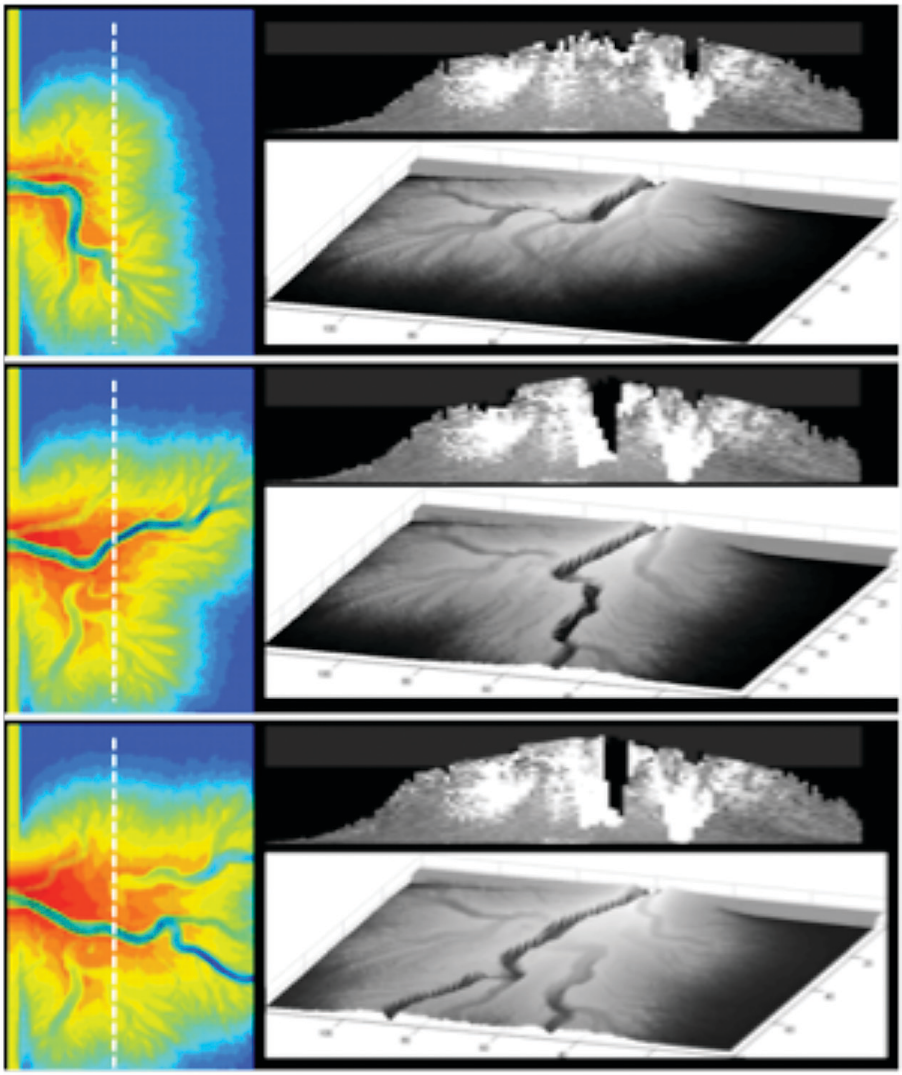

Figure 3: Stages in development of a delta from a reduced-complexity model, showing surface topography and stratigraphy. Courtesy Man Liang, University of Texas.

Visiting faculty support. NCED2 can provided limited subsistence costs and technical support (but not salary) for faculty to visit SAFL for 1-6 months to participate in theme-year research. Highest priority goes to pre-tenure faculty. Participation is by application and is open to the research community.

Workshops. These continue the NCED STC's successful targeted workshops such as *Stochastic Transport and Emergent Scaling on the Earth's surface (STRESS) and Mathematical Modeling of Geomorphic Free and Moving Boundary Problems.* The format is an intensive workshop for ~25 people over 2-3 days. We anticipate supporting 1-2 workshops per year.

SIESD. In 2008 the NCED STC launched the *Summer Institute for Earth Surface Dynamics (SIESD)*, which has proven extremely popular with its target participant group of young researchers

Figure 4: The Future Earth exhibit under development, Science Museum of Minnesota.

(advanced grad through junior faculty). The NCED2 version is similar to the present SIESD but with focus on each year's theme, and is held in August each year.

Science Museum of Minnesota (SMM). SMM links NCED2 research activities to informal education through three ongoing programs:

Earth Buzz: SMM originated Science Buzz in 2002 to design and test digital and exhibit templates that permit museums to rapidly add current science content to their exhibit floors. It has since grown into an online destination with a national audience and a physical presence on the exhibit floors of 15 U.S. museums. Earth Buzz is a subset of Science Buzz, which focuses on environmental issues. SMM and NCED2 faculty work with interested NCED2 graduate students and postdocs to help them learn how to translate their knowledge into blogs that are interesting and accessible to Earth Buzz's online audiences and to visitors who access the Earth Buzz kiosks installed in 11 museums around the U.S.

Future Earth: SMM opened its Future Earth exhibit (Fig. 4) in April 2012. This exhibit emphasizes the many ways in which humans now surpass natural processes in driving global change; that innovation of all kinds is needed for people to thrive on a human-dominated planet; and that humanity collectively has the wherewithal to address these challenges because Earth now is home to the healthiest, wealthiest, best educated, most creative, innovative and interconnected cohort in history. One of the exhibits in Future Earth is a small theater where people can view short video interviews of individuals with interesting perspectives on the challenges of a human-dominated planet and the solutions needed in the Anthropocene. Each year, SMM and the NCED2 Research Advisory Committee will identify one graduate student or post-doc to be interviewed and filmed by Twin Cities Public Television and produced into a short 2-3 minute video for use in the Future Earth exhibit and posted online on Earth Buzz and other prominent video-sharing websites.

Museum Assistantships. This continues a program launched in 2004 by the NCED STC in which NCED graduate students served for a term as scientific assistants at the museum. The topics of these assistantships, termed Museum Assistantships (MA), were determined by mutual agreement among the SMM, the student, and the student's adviser. MA work involved, for instance, design of exhibits in their research areas, working with SMM staff and the public, and developing appropriately simplified versions of computer models for inclusion in SMM exhibits. Under NCED2, SMM and NCED faculty expect to recruit one museum assistant per academic year to pursue innovative means by which NCED2 research can be communicated to the broad public.

NCED Native Partners Program. The Native Partners program (Fig. 5) under NCED2 focuses on 1) expanding the current *gidakiimanaaniwigamig* (Our Earth Lodge) program to reach new reservations through teacher professional development and advice and support for informal science programs; 2) working with the UMN STEM Center and other partners to build curriculum and programs focused on Climate Change impacts and adaptations in native communities; 3) working to build a knowledge transfer network on water issues for native communities that will focus on interaction with key personnel in reservation resource management departments and other groups such as the American Indian/Alaska Native Climate Change Working Group; 4) expanding our Faculty-to-Faculty program to support hydrology teaching at tribal colleges nationally with a suite of materials that focus on using data in the hydrology classroom. NCED2 is also working with the Consortium for the Advancement of Hydrologic Science, Inc. (CUAHSI) to build capacity at tribal colleges and in native communities to discover, use, store and share water data; and 5)

Figure 5: Lively discussion during the final poster session of 2013 summer REU experience

continuing to push for better coordination of efforts focused on increasing Native American participation in the geosciences that build on our system of alliances, which culminates in the Geoscience Alliance, where stakeholders from many communities can collaborate.

Virtual NCED2. The proliferation of social media platforms (e.g. blogging, LinkedIn, Twitter, Facebook), including professional connections, networks, and dialogue, present an opportunity for NCED2 to extend its reach in new ways that are faster and more interactive than traditional communication modes. We will work to use these new media in substantive ways. NCED's strong research reputation would make our virtual presence a natural nexus for rapid exchange of research insight and ideas, attracting new students and creating a larger community for researchers and students. Thus, one central feature of NCED2 is a *virtual research commons* where NCED2 participants – postdocs, graduate students, and other participants – can exchange ideas and information, for instance by blogging about their theme-year research findings and experiences. A forum of this kind was proposed by participants at an NCED-led AGU town hall in 2011, and we see it as an exciting new venue for exchanging ideas and creating new collaborations. Aside from providing a means for us to contribute to conversations that are already occurring in the virtual realm, engaging in these platforms raises NCED2's visibility not only to other scientists, but the public at large.

We close this short introduction to NCED2 with some thoughts about how in a broad sense a center like NCED2 can contribute to moving Earth-surface science forward. We feel strongly that 'managed' research is a bad idea – the strength of basic research and its potential to contribute to society rest on respect for the value of individual creativity, serendipity, risk-taking, unexpected results, and learning from failure. The role of a center like NCED2, in this view, is not to provide direction so much as to provide opportunity. In particular, we learned during the NCED STC that joint research across a large group of scientists works best when it is coordinated, but not orchestrated; when the center provides general themes and guidelines but then mainly works to create a "research commons" in which people can collaborate and pursue their ideas as they see fit. Shared facilities are one great way to do this – simply being in the same place, working with a collegial group on interesting and broadly related problems creates a setting in which collaborations arise and flourish organically. Given our location, we have a particular emphasis, shared with the SEN group (see the companion paper in this issue) on experiments, and especially on opening the door to experimental surface dynamics to our colleagues who have yet to experience it. But we also look forward to bringing the NCED approach to field and theoretical surface science, working to integrate the three approaches in new and fruitful ways, and continuing to build rich, two-way links with informal-education and Native-American programs. We developed the program outlined above with these ideas in mind, and in the hope that NCED2 can give to the wider Earth-surface community some of what it gave to the researchers who participated in the STC. But ultimately this is a community based effort: we designed version 2.0 based on our experience with the STC, but versions 2.1 and up will be designed by all of you.

ACKNOWLEDGMENTS

NCED2 is supported by the National Science Foundation via award number EAR-1246761, for which we are extremely grateful. We also thank all who participated in the original NCED STC; they have taught us far more than they realize about the pleasures of collaborating in a large research center. Finally, we are grateful to Leslie Hsu and Rudy Slingerland for their constructive and thoughtful reviews of this paper.

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Building a Sediment Experimentalist Network (SEN): sharing best practices for experimental methods and data management

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INTRODUCTION

Laboratory experiments in geomorphology and sedimentology provide compelling visualizations and insight into processes that shape the landscape and generate stratigraphy. Taking water and sediment as the basic ingredients, experiments produce physical analogues to mountain, valley, river, delta, and submarine environments, offering rich information on the linkages between modern processes and the sedimentary record of Earth history (Paola et al., 2009). However, contemporary experiments produce large volumes of dark data in ad hoc formats (i.e., data that are not in digital format or not accessible from the internet). These data are therefore impractical to other Earth scientists who could reuse them and accelerate the pace of discovery. Because cross-disciplinary communication and collaboration are becoming critical for providing rich new research opportunities (e.g. Montanez and Issacson, 2013), we must find a community-scale solution for improving data preservation and re-use.

We describe a new effort to determine and address needs and promote consensus responses of scientists and educators in the Sedimentary Experiment community. The initiative will coordinate community discussion and activity to help facilitate best practices in experimental methods and in the storage, archiving, and dissemination of experimental data. This will result in a more informed, capable, and efficient scientific enterprise. This article summarizes the motivation, current activities, implications, and avenues for broad participation of the group that is spearheading this effort, the Sediment Experimentalists Network (SEN).

DATA RESCUE

Modern technology is changing rapidly and is constantly inundating our vocabulary with terms like big data, interoperability, the cloud, and altmetrics (alternative metrics for the impact of scholarly work, including tweets, blog mentions, bookmarks, shares, citations in Wikipedia, and so on). In parallel, evolving laboratory technologies allow larger amounts of data to be collected at ever faster rates. Resolution of digital photos, videos, and topographic scanning has been increasing rapidly. Just as LiDAR (Light Detection And Ranging) has expanded opportunities but generated new challenges for Digital Elevation Models, laboratory sensing technologies producing terabytes of data have inspired but overwhelmed Earth-surface experimentalists' capacities for scientific interpretation. Data from these laboratory experiments come from diverse sources including images, lasers, sonar and doppler acoustics, physical samples, and an innumerable array of unique devices. What portion of

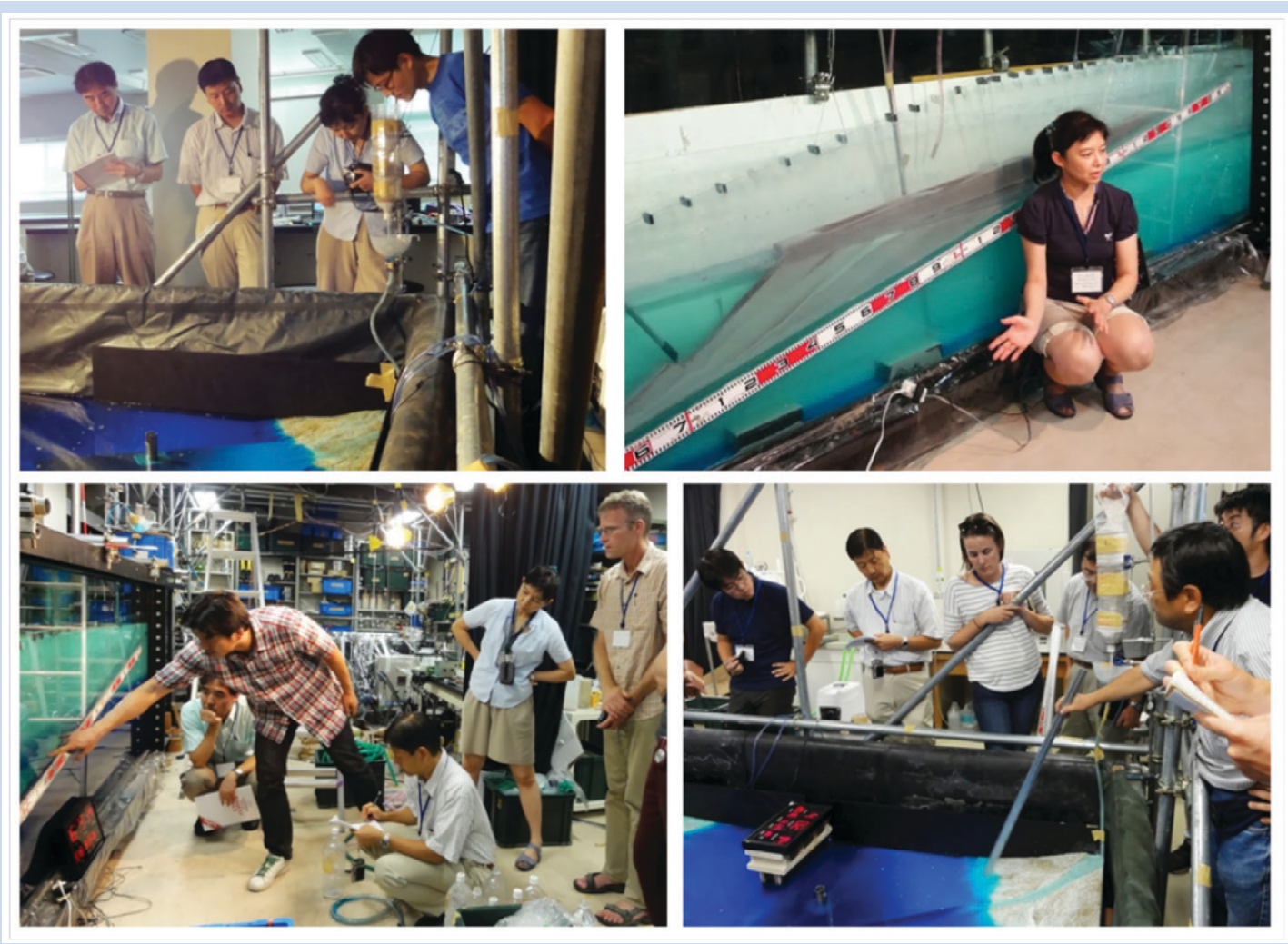

Figure 1: Community experiments at the 2013 Stratodynamics Workshop.

these data will eventually make it to the public domain through publication or the internet? Currently, the answer is very little. Unanalyzed, hidden, or forgotten data are a wasted resource that have been paid for by hard-earned grants. Other potential data users, such as modelers and field scientists seeking calibration and validation for their work, are losing out on an opportunity to reuse knowledge.

Surface process laboratories pose unique challenges to data and tool sharing. Some larger laboratories have staff to help run experiments, but commonly single graduate students are in charge of the design, execution, and archiving of experiments and experimental data. In the best-case scenario, plans, tools, and data end up in a repository like the National Center for Earth Surface Dynamics Data Repository (http://repository.nced.umn.edu), where metadata are logged and archived with the data. In a worst-case scenario, nothing more than a paper referencing a small subset of the total data collected is ever released to the public. Even well-documented datasets can be hard to compare and reuse. This has created a culture in which most studies use mostly new data (collected at great cost of time and money) and older data are rarely analyzed further. In order to improve this situation, change must start in the planning stages of the experimental process and in the training stages of new scientists.

Experimentalists acknowledge that the current situation is wasteful of time and knowledge. In two recent town hall gatherings at the AGU Fall Meeting, participants expressed basic questions such as "Who can we consult for best practices?" and "Where is a centralized resource?" In response to these comments, in late 2011 the Sediment Experimentalists group initiated a contact list of interested investigators. We invited anyone who wanted to be part of a self-educating community of experimentalists. Our goal is to provide information about resources and current activities that advance experimental research and learning. One tool used to promote knowledge of ongoing experiments is the Sediment Experimentalists Fusion Table (address (http://goo.gl/bi4ng)). This has served as a quick and easy tool to share information about existing and in-progress experiments, including contact information and links to data.

Coincident with the formation of the Sediment Experimentalists, the NSF-spearheaded EarthCube initiative has been taking shape. EarthCube "aims to transform the conduct of research through the development of community-guided cyberinfrastructure to integrate information and data across the geosciences." In mid 2012, EarthCube began funding a series of End-User Domain workshops in order to collect requirements from the scientific community to spread to the cyberinfrastructure community. With the support of EarthCube, an inaugural workshop with broad international participation was held on 11-12 December 2012 at the Morphodynamics Laboratory, University of Texas, Austin. The workshop brought together on-site and virtual participants with experimental, modeling, and field expertise in the disciplines of Earth-surface processes, geomorphology, and stratigraphy. The primary goals of the workshop were (1) to convene participants to consider grand challenges in morphodynamics, geomorphology, and stratigraphy that can be addressed using physical experiments; (2) to share current and potential advanced experimental technologies to meet these challenges; (3) to generate, develop, and frame innovative ideas on community standards for data and metadata related to sediment experiments; and (4) to explore solutions to meet needs for data dissemination. Breakout group discussions addressed current and future needs for the community's grand challenges. Such focused dialogue enhances the ability of our community to respond to current and future opportunities. International ties and future commitments were forged. A detailed report is available at http://goo.gl/rwzmMr.

The 2012 workshop included an experiment in the University of Texas Sediment Transport and Earth-surface Processes (STEP) basin. The participants communicated actively from the design stage of the experiment and showed the greatest interest in the effect of sediment supply changes on deltaic surface processes and stratigraphic development under back-tilting subsidence. The experiment was broadcast using webinar equipment and on-site and virtual participants interacted dynamically during the experimental runs. Data for the runs were posted at the Sediment Experimentalists Fusion Table available to the public for further analysis projects. The workshop demonstrated the feasibility of collaborative experiments with multiple institutions addressing research questions together as a group.

A second workshop was held on 28-30 August 2013 at Nagasaki University, focusing on stratodynamics - a research framework for understanding sedimentary processes, geomorphology, and genetic stratigraphy using morphodynamics. The international workshop brought together participants for talks, poster sessions, discussion sessions, and community experiments. Four community experiments illustrated concepts from topics of active research (Figure 1). One experiment developed deltas over different bathymetry to examine shoreline response. A second demonstrated cyclic steps using a bimodal sediment source and high-density fluid flux. A third produced bedforms from density currents traveling from a less dense to a more dense layer. The fourth showed the reaction of a delta to a rising sea level. The community experiments served multiple roles - discussion and education for experimentalists and non-experimentalists, the chance for

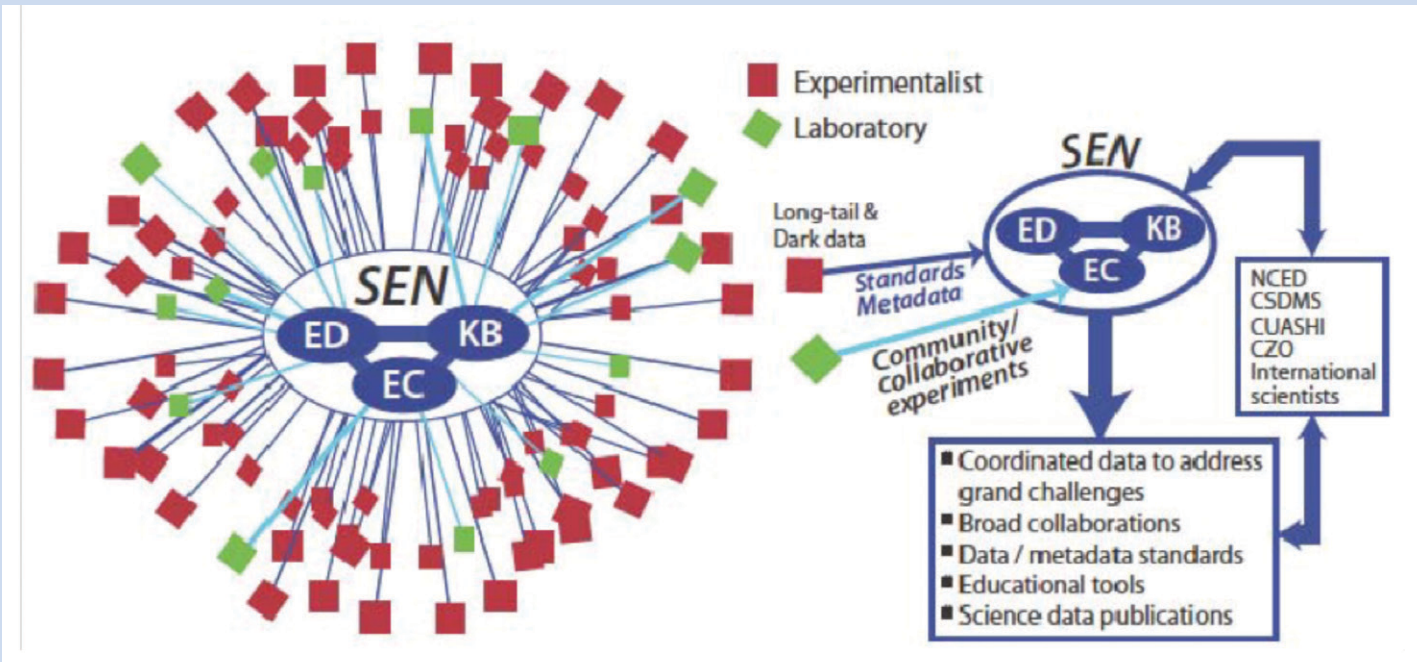

Figure 2: The main components of SEN and expected synergies.

participants to learn experimental methods by setting up the runs, and hands-on experience producing the type of data that SEN strives to document and preserve.

Discussions from the town halls and workshops emphasized commonly cited needs: There is no centralized place to deposit information and data. There are no widely-agreed upon standards or guidelines to facilitate interoperability and reuse. One participant suggested a phone hotline for data questions, and others expressed the need for a forum where cross-disciplinary discussions could occur. There is wide recognition that rebuilding of tools is a waste of time, but no one prioritizes proper data management in the heap of existing daily tasks. Although many of these needs are similar across different disciplines, the pathway toward meeting these needs may require specialized, though interoperable, disciplinary solutions.

THE PATH FORWARD

Using feedback from the previous discussion, we have identified three areas for future activities of the Sediment Experimentalist network: (1) a Knowledge Base (SEN-KB), (2) Standards/Education (SEN-ED), and (3) Community Experiments (SEN-EC) (Figure 2). The Knowledge Base will provide a centralized place for people to post and request experimental data and methods descriptions. The Standards and Education group will provide training, especially for early career scientists, in order to promote a culture of data sharing and data stewardship. The Community Experiments activities will offer a testbed for collaborative work involving data and tools sharing among many investigators spanning a range of career stages and geographic locations, including educators and international scientists.

Big data is already transforming many aspects of our society, from social networking to global business. Earth-surface scientists, whose resources are limited, cannot afford to be left behind in this wave of technological transformation. In an idealized future of seamlessly-networked geophysical data, it is not unreasonable to expect vast improvements in scientific productivity and application to resolving societal challenges. However, many obstacles lie in the path toward this ideal. These challenges are not just technical; they also require serious thought about such questions as how to provide proper attribution both for original creators and secondary users of experimental datasets. Our hope is that data and knowledge will be rescued from inaccessible dark data storage, and more frequent communication between investigators will accelerate learning and production of results and analysis.

We welcome all comments and participation with the goal of properly representing the community that uses data from surface process experiments. Please join us by visiting https://sites.google.com/site/sedimentexperimentalists/.

ACKNOWLEDGMENTS

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Accepted November 2013

PRESIDENT'S COMMENTS

The last SEPM strategic planning session was held in February of 2009. For a summary, see the President's Comments in the June, 2009, v. 7, no. 2 issue of *The Sedimentary Record*. Since that time, much has changed for geologic societies, including SEPM, in terms of how they go about fulfilling their missions. In light of this, a strategic planning meeting will be held in May of 2014.

At the 2009 meeting, six major issues were discussed and recommendations for actions were made. The issues were:

1. SEPM Financial Status
2. Membership Health
3. Governance of SEPM
4. Communicating the Science
5. Marketing SEPM
6. Partnering with other Societies

Additionally, in 2009, a forum was held with current and potential new SEPM student members at the GSA Annual Meeting in Denver CO (see the President's Comments in the September, 2009, v. 7, no. 3 issue of *The Sedimentary Record*). In conjunction with the forum, paper copies of a survey were distributed at the forum, in which students were asked to rank the importance of member benefits. The survey was also made available on the web to other students not attending the forum. The results of the survey showed the following ranking, with the most important listed first:

1) journals
2) book discounts
3) short courses
4) student grants
5) research conferences
6) field trips
7) networking
8) *The Sedimentary Record*

At the time of the 2009 meeting, SEPM was in the middle of transitioning journals to all digital formats, and there were many unknowns as to how this would impact future revenues. Book publications were a major focus and had yet to be on a firm path towards digital availability. Membership health was a major issue with discussion focusing on declining membership numbers that were being seen in SEPM, as well as in other geologic societies. An emphasis was placed on finding ways to make SEPM more attractive to students, young professionals, and gaining a higher international profile.

In looking back at 2009, we see that many of the recommendations resulted in positive steps forward, some of the same issues remain, and new challenges have emerged. The latter is exemplified by the changes involved with journal publications, including the issue of open access. Historically, SEPM journals have been a major benefit of membership. The results of the 2009 student survey indicated journals were the top member benefit, and I suspect a survey of all SEPM members at that time would have shown a similar high ranking for journals as a membership benefit.

Our journals, now completely digital, are available through other outlets that have recently emerged, such as Geoscience World (GSW), an aggregate of electronically available geoscience journals. Institutions (e.g. libraries) can pay a fee for access to all journals in the GSW database. This means that individuals who previously joined societies for access to journals can now potentially access them for free through their institution. Subsequently, uncertainties arise as to how that affects the status of journals being the top draw for existing and potential new SEPM members. As was the case in 2009, SEPM membership continues to decline. How much of the decline is attributed to journals being available from other sources, such as GSW, is uncertain, but it certainly contributes. Since journal subscriptions have provided the bulk of revenue that is used to support the other society functions (field trips, research conferences, short courses), the concerns associated with journals also include the impact on financial health of SEPM.

With the journals being just one example in the rapidly changing environment for geoscience societies, a fundamental issue now facing SEPM concerns keeping its relevance and value to members, and a strategic plan should start with revisiting the basics of mission and membership. What are, or should be, benefits of membership? What do members, or potential members, want from their society now and in the future? These fundamentals can formulate the basis for subsequent discussion that focuses on specific plans and recommendations that position SEPM to best serve members, remain relevant, and fulfill its mission.

As we now start to organize the 2014 strategic planning meeting, I encourage feedback from members so that your ideas and issues can be considered as the agenda is formulated.

Evan Franseen, SEPM President

SEPM Society for Sedimentary Geology
"Bringing the Sedimentary Geology Community Together"
www.sepm.org

AAPG/SEPM Hedberg Research Conference

First Announcement and Call for Papers

Latitudinal Controls on Stratigraphic Models and Sedimentary Concepts

Dates and Location: September 28-October 1, 2014, Banff, Alberta, Canada

Conveners:

Carmen M. Fraticelli, ExxonMobil, Houston, TX

Paul Markwick, GETECH Group plc, Leeds, United Kingdom

Allard W. Martinius, Statoil, Stavanger, Norway

John Suter, ConocoPhillips, Houston, TX

Conference goals:

By design, the conference will provide an opportunity for geologists, stratigraphers, engineers, geophysicists and academics to gather, share knowledge, and identify opportunities for further collaboration.

The primary goals of this conference are:

1. Identify differences in depositional processes between high and low latitude systems.
2. Define how such variability affects hydrocarbon play elements.
3. Define the differences in stratigraphic models and sedimentary concepts that arise due to differences in latitude.
4. To search for insights that may be applicable for subsurface interpretations & petroleum exploration.
5. To identify revisions to models, including the application of new techniques such as Earth System Modeling, to improve stratigraphic and sedimentary models.

Abstract Submittal:

Extended abstracts are currently being solicited. Abstracts can be up to 4 pages in length, including optional figures. Specify that your abstract is for the AAPG/SEPM 2014 Banff Hedberg Research Conference. Include all co-authors' names (including contact information for the primary author). An abstract cover sheet is required for all submitted abstracts. Log on to http://www.aapg.org/education/hedberg/2014/banff/format.cfm, or contact Debbi Boonstra at AAPG to obtain this cover sheet. (dboonstra@aapg.org)

Please submit abstract to both:

Michele Tomlinson
SEPM
Phone: 405-701-5046
mtomlinson@sepm.org

AND

Carmen M. Fraticelli
ExxonMobil
Phone: 713-278-8070
cm_fraticelli@aol.com

STRATI 2015
2nd International Congress on Stratigraphy

July 19-23, 2015; Graz, Austria

First Announcement

The congress follows the invitation by the International Commission on Stratigraphy (ICS) of the International Union of Geological Sciences (IUGS) to be held in Graz (Austria), July 19-23, 2015. The congress will be open to all topics in stratigraphy. The technical program will range from the Archean to the Holocene, across all techniques and applications of stratigraphy and the discoveries that the stratigraphic record reveals about the Earth system. In addition, it will also serve as the primary venue for ICS business, for ICS subcommissions to meet and awarding the ICS stratigraphy prizes.

Venue and organization:

The congress will take place on campus of the University of Graz, Austria. It will be organized by the Institute of Earth Sciences of the University of Graz in cooperation with other Austrian Earth Sciences institutions representing the Austrian Earth Science community (e.g., Geological Survey of Austria).

Chair: Werner E. Piller, Professor at the University of Graz, chair of the Austrian National Committee of Geosciences, the Austrian Commission on Stratigraphy and the Austrian National Committee for the IGCP. The organization and logistics will be guaranteed by the local organizing committee.

Pre- and Post-Congress field trips will be offered covering different areas and time slices.

Location:

Graz is the second largest city of Austria and a well suited location for organizing international conferences. Graz is also well known for cultural highlights, which is reflected in its status as a UNESCO World culture heritage site. Graz is located about 200 km south of Vienna and can be reached by plane (from Vienna, Munich, Frankfurt, Stuttgart and Zurich) or by train.

The congress will be sponsored by ICS and co-sponsored by SEPM.

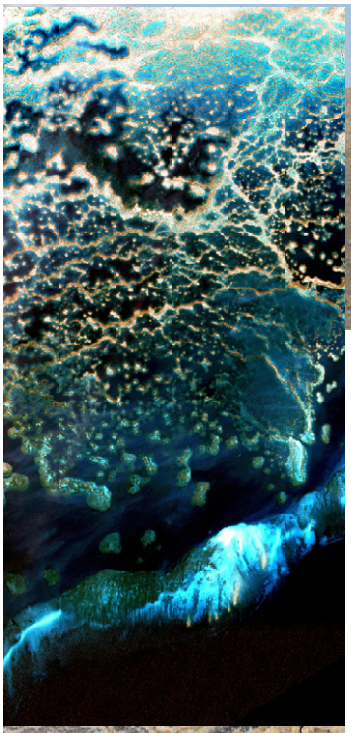
The First Circular will be distributed early 2014.

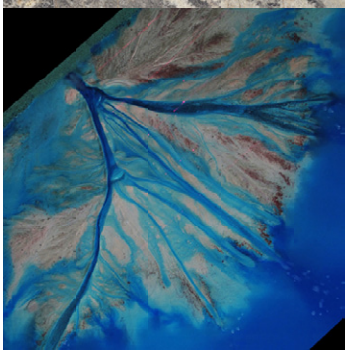
Contact: werner.piller@uni-graz.at

SEPM Research Conference

Autogenic Dynamics of Sedimentary Systems

August, 3-6, 2014 in Grand Junction, CO, USA
(2.5 days of presentations & discussion plus a 1-day field trip)





Recent advances demonstrate that physical, chemical, and biological systems exhibit internal "autogenic" dynamics that produce organized sedimentary patterns ranging from pore to basin scales.

This interdisciplinary research conference will share and discuss numerical, experimental, and field approaches to identifying, quantifying, and modeling autogenic dynamics through time and in a wide range of physical, chemical, and biological sedimentary systems.

Program themes:

1. Identification and quantification of autogenic & self-organizing patterns in sedimentary systems.
2. Driving mechanisms of autogenic dynamics.
3. Self-organization in biologically grown sedimentary systems.
4. Using numerical models of autogenic processes to improve prediction of spatial variability in sedimentary systems.
5. Relationship between autogenic & allogenic dynamics.

Abstract Submission Opens February 8, 2014
(http://geode.colorado.edu/~SEPMRC)

Registration opens Febuary 8, 2014 at www.spem.org

For more information, contact the conveners:
David Budd, University of Colorado, Boulder, budd@colorado.edu
Elizabeth Hajek, Penn State University, hajek@psu.edu
Sam Purkis, Nova Southeastern University, purkis@nova.edu