sediment-biological interactions, and nearshore sediment processes, to improve regional sediment transport models. Participants agreed that this research should then be applied to develop better coastal protection and to understand the effects renewable energy devices might have in coastal and estuarine sediment transport.

A wide range of topics that could address the above priorities were discussed and can be found in a full account of the workshop on the NERC Oceans 2025 Web page (http://www.oceans2025.org/SOFI_Workshops.php). Recurring themes throughout the workshop included the effect of different biota on sediment transport (i.e., when and where does biostabilization or bioturbation occur, and does the gradient in biological impact increase for decreasing particle size); the effects of turbulence, including wave turbulence, on sediment transport; and the effect of mixed sediments on erosion, consolidation, and bed forms. Other important topics were the effect of density gradients and stratification on sediment pathways and sediment fluxes in estuaries and coastal oceans and the need to identify key processes responsible for nearshore cross- and along-shore transport, potentially through field-scale process studies and numerical modeling. The specificity of these research priorities indicated broad agreement among participants on the necessary direction for future sediments research. The outcome of the workshop will be used for the development of a future NERC Theme Action Plan (http://www.nerc.ac.uk/research/themes/).

—Alejandro J. Souza, Paul S. Bell, and Laurent Amoudry, Proudman Oceanographic Laboratory, Liverpool, UK; E-mail: ajso@pol.ac.uk

Taking the "Boulder" Step From Static to Dynamic Geoid

2009 Workshop on Monitoring North American Geoid Change; Boulder, Colorado, 21–23 October 2009

PAGE 46

As coastal communities are increasingly affected by sea level rise and flooding from extreme weather events, and as less evident (yet significant) tectonic shifts reshape the North American continent, the need for elevation data that are accurate, consistent, updated, and easily accessible has become critical. Currently, however, the vertical datums in North America are defined by tide gauge and leveling observations, which inevitably become outdated and are costly to replace or repeat. Therefore, two North American governments (Canada and United States) have resolved that the next generation of their national vertical datums will be geoid-based and accessible through Global Navigation Satellite System (GNSS) technology.

To adequately serve as the reference surface for a future vertical datum, the geoid must be modeled accurately and its changes over time must be monitored. But what mix of tools and techniques could fulfill this requirement? To address this question and to plan for a campaign to monitor North American geoid change, experts from North America (including United States, Canada, and Mexico) and Europe specializing in satellite and terrestrial gravimetry as well as satellite positioning convened in Colorado.

Most presentations showed that snapshots of continent-wide geoid changes are observable by terrestrial gravity data and by the satellites Gravity Recovery and Climate Experiment (GRACE) and Gravity field and Steady-State Ocean Circulation Explorer (GOCE). However, it was agreed that further investigation of their optimal combination is needed given the smoothing algorithms and signal attenuation to which the latter two are subject. Further, GRACE and GOCE missions are due to expire over the next few years—this will be a significant loss to geoid change monitoring.

Hydrology stood out as a critical topic as participants sought to evaluate its impact on geoid change. Presentations demonstrated that continental-scale hydrology can have long-period signals (e.g., caused by droughts or deluges) that cause real geoid change. On the other hand, modeling and removal of the impact of local hydrology on terrestrial gravimetry have proven more challenging given its geographic specificity. It was surmised that in the event that local hydrological modeling was unsuccessful, its gravimetric noise contribution would average out over the decades-long span of the project.

Ultimately, a primary goal will be to model the dynamic geoid, taking into account deep tectonic mass changes (such as the continental uplift seen in the region of Hudson Bay and southern Canada) while separating out the small-scale or episodic geophysical (e.g., water table or magma) changes and weather phenomena. The means by which absolute and relative gravity surveys and GNSS campaigns (both episodic and continuous) can best be combined to facilitate detection of these large-scale geoid changes constitutes a significant aspect of the project formulation, as will attempts to evaluate their consistency with analogous GRACE- and GOCE-implied geoid change results.

In support of this goal, a steering committee was mandated to design a suitable gravity/GNSS campaign to monitor areas of regional geoid changes.

At present, the U.S. National Geodetic Survey and Canada's Geodetic Survey Division are most suitably equipped to participate in the campaign; however, other researchers, agencies, and countries are invited to participate. Further information can be found at http://www.ngs.noaa.gov/GRAV-D/meetings.shtml.

—Dru Smith, National Geodetic Survey, National Oceanic and Atmospheric Administration, Silver Spring, Md.; E-mail: dru.smith@noaa.gov; and Karla Edwards, Satellite Positioning and Inertial Navigation Laboratory, Ohio State University, Columbus

Residents, Decision Makers, and Scientists Discuss Volcanic Hazard in Colombia

Knowledge Sharing and Collaboration in Volcanic Risk Mitigation at Galeras Volcano, Colombia; Pasto, Colombia, 6–11 July 2009

PAGE 46

Galeras volcano, located in southwestern Colombia, imposes several hazards on the surrounding population: pyroclastic flows, lahars, ashfall, and shock waves. The current hazard map shows three zones: high, medium, and low (see A. D. Hurtado Artunduaga and G. P. Cortés Jiménez, *J. Volcanol. Geotherm. Res., 77,* 89–100, 1997). The pyroclastic flow hazard on this map defines the Zone of High Volcanic Hazard (ZAVA) for civil authorities.

Current activity of Galeras has provoked two contentious issues related to hazard management: (1) Decision makers announce an evacuation order of ZAVA whenever the volcanic alert reaches a high level, and (2) the Colombian government initiated a relocation program for the inhabitants within ZAVA (Colombian Decrees-Laws 4106 and 3905). However, communities within ZAVA refuse to obey both the evacuation orders and the relocation process. To help resolve this situation, the University of Nariño (Colombia) and the State University of New York at Buffalo organized a workshop, which was sponsored by the U.S. National Science

Foundation. A daily average of 92 people attended, including residents of ZAVA, decision makers, Colombian technical and scientific personnel, international scientists and researchers, students, and academics from the University of Nariño.

The workshop established a bridge between principal parties by initiating a dialogue to reduce the level of polarization. Progress toward a resolution was aided by requiring all parties to listen to one anothers' perceptions throughout the entire week of the workshop. Sufficient time was allowed for presentation of various positions as well as for expressions of concern, agreement, and disagreement at the end of each talk. Involvement of affected communities was not considered passively; indigenous people and farmers also presented their visions and opinions.

The workshop highlight was a session on the final day led by Jacqui Wilmshurst (University of Sheffield, United Kingdom), bringing together all of the actors, including representatives of the Colombian Geological Survey (Ingeominas); the mayor of Pasto; the Regional Emergency Management System; students and academics from the University of Nariño; international students and scientists; and community members of Mapachico, Jenoy, and La Florida. This session identified points of agreement among parties that could serve as starting positions toward finding acceptable solutions in areas of conflict and identified topics of strong disagreement that could not yet be resolved. One of the main problems identified was the application of the rules and laws about the resettlement dictated by the national government. The general agreement was that the various parties must seek an open dialogue to facilitate resolution of these conflicts.

This atypical workshop, in which scientists sat together with decision makers and the general public, showed that full and frank information sharing with sincere attempts to understand different viewpoints can provide an important step toward resolving conflicts in crisis situations.

—Michael F. Sheridan, Center for Geohazards Studies, State University of New York at Buffalo; E-mail: mfs@buffalo.edu; and Gustavo Cordoba, University of Nariño, Pasto, Colombia

ABOUT AGU

William E. Dietrich Receives 2009 Robert E. Horton Medal

William E. Dietrich was awarded the 2009 Robert E. Horton Medal at the AGU Fall Meeting Honors Ceremony, held on 16 December 2009 in San Francisco, Calif. The medal is for "outstanding contributions to hydrology."

PAGE 47

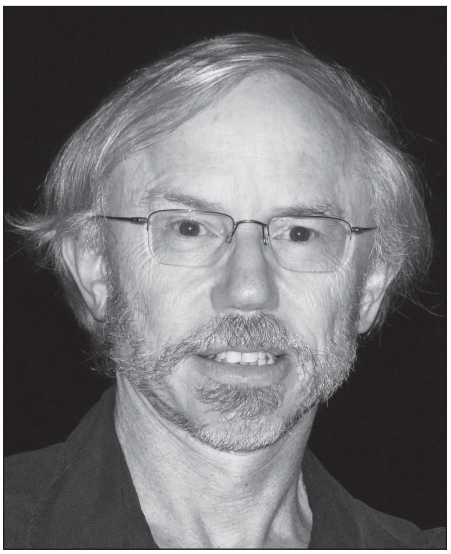
Citation

It is truly a pleasure to introduce William Dietrich of the University of California at Berkeley as the 2009 Horton medalist for his outstanding contributions to the geophysical aspects of hydrology. That citation pales by comparison with Bill's accomplishments, for no one comes close to the impact Bill has had in modernizing the field of geomorphology. He maintains the same unflagging energy and creativity in research, teaching, and professional service that have earned him international fame as the most productive, diverse, and influential geomorphologist in the world today.

This influence begins with his superb combination of skill in field observation and his ability to apply mechanistic principles to the analysis of empirical results to construct theories of landscape evolution. His career began with studies of river channel mechanics and of mass wasting in the coastal mountains of Oregon and California. He and his graduate students have extended his discoveries in both of those topics through field studies, laboratory experiments, and analysis of digital topography. They introduced innovations in each field, including high-resolution field measurements of flow and sediment transport, cosmogenic isotope measurement of regolith formation and transport, chemical tracers of floodplain sedimentation patterns, and lidar-resolution measurements of topography. Bill's group expanded its field, laboratory, and numerical simulation studies to understand regolith formation, runoff processes, sediment transport, channel mechanics, floodplain sedimentation, and bedrock incision by streams and debris flows, typically being the first investigators to demonstrate the utility of a technique for extending landscape theory. Their studies continue to expand into hyperarid landscapes, including Mars.

The novelty and range of Dietrich's studies begin with his innate curiosity about landscapes and their relevance for humans and other biota. He constantly shares his knowledge openly, and he is relentlessly inquisitive about other disciplines. His friendly demeanor and generosity, especially with young scientists, make him a hero in the discipline, and induce similar behavior among his large and productive group of former graduate students.

Bill is an exemplar of the AGU commitment to "unselfish cooperation in research." He worked tirelessly within the Erosion and Sedimentation Committee of the Hydrology section to promote geophysical approaches in geomorphology, and to organize special sessions with other sections, leading to seminal interdisciplinary initiatives. These efforts continue and have expanded into other community-building efforts such as the National Center for Earth-surface Dynamics, the National Center for Airborne Laser Mapping, and National Research Council and National Science Foundation committees. His most influential community-building activity must surely lie in organizing the Gilbert Club, an annual gathering of geomorphologists that he established in 1983. At that event, Bill is at his tireless best—reporting scientific results, asking penetrating questions, including specialists from other fields, promoting the role of young researchers, making sure the program runs and that someone has ordered lunch and dinner—essentially driving the field forward with his physical and intellectual energy.



William E. Dietrich

Bill is a model for all we aspire to be as members of this Union, and as worthy a recipient of the Robert Horton Medal as I can imagine.

—Thomas Dunne, University of California, Santa Barbara

Response

Robert E. Horton is a hero to all geomorphologists. He lit the candle that guided us to quantitative inquiry. He observed, quantified, analyzed, performed field experiments, and proposed theories linking hydrology,