



Introduction to the special issue: The field tradition in geomorphology



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ARTICLE INFO

Article history:

Received 19 May 2013

Received in revised form 4 June 2013

Accepted 7 June 2013

Available online 15 June 2013

Keywords:

Binghamton Geomorphology Symposium

Preface

Field work

Jackson Hole

Wyoming

ABSTRACT

In recognition of the critical role of field observations in the ongoing development of our discipline, the 43rd annual Binghamton Geomorphology Symposium (BGS) celebrated *The Field Tradition in Geomorphology*. By organizing a conference devoted to this theme, we sought to honor the contributions of pioneering, field-based geomorphologists and to encourage our community to contemplate how field work might continue to provide unique insight into a new, more technologically-driven era. For example, given recent advances in remote sensing methods such as LiDAR, what kind of added value can field work provide? Similarly, how can field-based studies contribute to societally relevant, large-scale questions related to climate change and sustainable management of the Earth system? Motivated by such questions, the 2012 BGS was convened in Jackson Hole, WY, a new, Western location that enabled participation by Rocky Mountain and west coast research groups underrepresented at previous Binghamton symposia. Also, in keeping with the field tradition theme, the 2012 BGS emphasized field trips, including a rafting excursion down the Snake River and an overview of the tectonic and glacial history of Jackson Hole. The on-site portion of the symposium consisted of invited oral and poster presentations and contributed posters, including many by graduate students. Topics ranged from an historical overview of the development of geomorphic thinking to long-term sediment tracer studies to a commentary on the synergy between LiDAR and field mapping. This special issue of *Geomorphology* consists of papers by invited authors from the 2012 BGS, and this overview provides some context for these contributions. Looking forward, we hope that the 43rd annual BGS will stimulate further discussion of the role of field work as the discipline of geomorphology continues to evolve, carrying on the field tradition into the future.

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1. Introduction

Geomorphology is fundamentally concerned with the surface of Earth, the physical processes that act upon the surface, and the manner in which these processes vary across space and over time to create distinctive landscapes. As a line of scientific inquiry, the origins of geomorphology date back to ancient Greece, and since that time basic field observations of land form and various agents of process have played a central role in developing first a conceptual and eventually a more quantitative understanding of the surficial environment. Because humans interact with, and influence, this environment on a daily basis, geomorphology is relevant to everyone, and anyone who has ever contemplated a hillslope or stream channel has dabbled in geomorphology. The field tradition in geomorphology is, thus, well-established — it is a tradition to which we have all, to some degree, contributed.

To honor and commemorate this tradition, the 43rd annual Binghamton Geomorphology Symposium (BGS) convened September 21–23, 2012, in Jackson Hole, WY. To recognize the significance of

field observations, field work, and field experience to the discipline, the theme of the meeting was *The Field Tradition in Geomorphology*; this special issue provides a compilation of papers presented, in oral and poster form, at the three-day symposium. Because the BGS is widely recognized as a leading international conference devoted specifically to geomorphology and has been held each year since 1970, “the Binghamton,” as the meeting is affectionately known, has itself become a cherished tradition within the geomorphic community. The 2012 BGS kept this tradition alive by honoring the field tradition that defines geomorphology. This theme provided an opportunity to reflect upon the history of the discipline, acknowledge key contributions made by a generation of pioneering geomorphologists dedicated to quantitative analysis of field data, and to consider the role of field-based inquiry as the geomorphic research community moves forward in a new, more technologically-driven era.

The theme of the 2012 BGS also was quite timely. A number of prominent geomorphologists — most notably Luna Leopold, M. Gordon “Reds” Wolman, Stan Schumm, Mel Marcus, Harold “Duke” Winters, Donald Johnson, and Jim Knox, to name but a few — have passed away recently, and devoting some time to reflect on their work, and the contributions of field-based researchers in general, seems an appropriate means of honoring the field tradition established by these pioneers. This is also an important time to look forward, however, as the

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discipline is currently experiencing a period of great change. In recent years, for example, geomorphology has gained prominence through its application to Mars and other planets (e.g., Lamb et al., 2008; NRC, 2010; Kleinhans, 2011). Similarly, geomorphologists increasingly are called upon to address questions of environmental change and sustainability, for which an understanding of surface processes is critical (NRC, 2010). Moreover, powerful new methods of data acquisition (e.g., LiDAR) and analysis (e.g., numerical modeling) are transforming geomorphology and already have enabled a number of important advances (Bishop et al., 2011). As additional tools are developed and applied, the role of field observations and field work must evolve as well, and the Binghamton Symposium provided a forum for discussing ways to maintain, nurture, and enhance the field tradition during a time of great change within the discipline.

To be more specific, the 2012 BGS provided an opportunity to begin considering a series of important questions on the past, present, and future of geomorphology. Among these are the following:

1. How can the discipline honor an empirical, ground-based past, embrace a theory-driven, computationally intensive future, and build upon a foundation of traditional field observation as a new era of research on Earth and planetary surface processes unfolds?
2. As this progression takes place, what is the added value of field work, given that more detailed, more reliable measurements of form and process can now be obtained efficiently, with minimal time in the field, or even remotely, without visiting a site at all?
3. Similarly, what can we gain via field observation that cannot be derived from computational models and numerical simulations that have come to provide increasingly realistic representations of landscapes and the manner in which they evolve over time?
4. To what extent can field-based inquiry contribute to societally relevant, large-scale questions related to climate change and sustainable management of the Earth system?

Part of our motivation for organizing this conference was to encourage our community to ponder these issues and engage in a dialog regarding the field tradition and the future. The 2012 BGS featured a lively exchange of memories, ideas, and unique perspectives and we hope that ongoing discussion of these topics will serve to further invigorate geomorphology. More specifically, we encourage researchers to identify productive synergies between traditional field observation and new measurement and modeling technologies, as articulated by Roering et al. (2013-in this issue) and Church (2013-in this issue). In this manner, the 2012 meeting continued the long tradition of BGS contributing to the growth and development of geomorphology.

Similarly, we expect that another important outcome of the 2012 BGS will be enhanced interaction between geomorphologists and workers in other areas of study. By reflecting upon the field tradition and the future of our own discipline, we hope to establish a shared vision and sense of identity that will allow geomorphologists to more effectively contribute to interdisciplinary studies and address larger-scale questions related to sustainable resource management. Thus, although the 2012 BGS primarily catered to the core geomorphic community, these proceedings will also inform ecologists, managers, and others who stand to gain from longstanding and more recently developed methods and insights from geomorphology.

As part of this general community-building effort, we actually broke with tradition by introducing a new geographic location – the 2012 BGS was held in Jackson Hole, WY. Previously, the BGS primarily had been an eastern phenomenon, and Wyoming is the farthest west the conference has ever been held. This new venue encouraged participation from research groups in the Rocky Mountains and on the West Coast that had been underrepresented at previous Binghamton symposia and, thus, fostered interactions among geomorphologists from across the country. International participants also were numerous, representing Canada, the United Kingdom, Australia, France, Switzerland, and Brazil. In addition, the spectacular landscape of Jackson Hole, together with the

theme of the meeting, provided ample rationale to make the symposium itself more field-oriented, featuring two full-day field trips described below.

These trips also helped to ensure that the field tradition would be passed on to the next generation of geomorphologists. The 2012 BGS involved established, senior personnel and also younger, up-and-coming researchers. Graduate students and early-career faculty were actively recruited to the symposium so that they might better appreciate the field tradition and be inspired to carry it forward through their own work. Although oral presentations and featured posters were by invitation, an open poster session gave students and faculty of varying rank an opportunity to showcase their work at a conference that was smaller, more focused, and more personal than the annual meetings of large professional organizations (e.g., the Association of American Geographers, or AAG, the Geological Society of America, or GSA, and the American Geophysical Union, or AGU). In total, 119 participants attended the conference, including 57 graduate students.

2. Rationale for the symposium

The key objectives of the 2012 BGS were to provide a venue to reflect upon the field tradition in geomorphology and to discuss the added value of field work when used in combination with more advanced methods of data collection and analysis. The conference served to foster an introspective evaluation of the historical development, current status, and future prospects of geomorphology. We believe that this assessment will help the geomorphic community to appreciate its scientific heritage and draw upon this proud tradition as researchers in the field pursue an ambitious agenda that is highly relevant to society (NRC, 2010). Similarly, we hope that the 2012 BGS will stimulate geomorphologists to strategize and identify ways in which traditional field observations might benefit from, and also enhance, more recently developed techniques, ultimately leading to novel insight on Earth surface processes.

Beginning with the first symposium, held in Binghamton in 1970, the BGS has served as a unique means for geomorphologists to gather and participate in focused discussions on a particular topic (Table 1). This series of meetings has played an important role in our community because geomorphologists tend to be housed in a range of different academic departments, including geography, geology, civil engineering, and, more recently, environmental science. Similarly, because geomorphologists generally attend conferences associated with their home departments (i.e., AAG for geography and GSA for geology), opportunities to meet and discuss geomorphology at conferences are limited. The purpose of the BGS series is to provide this type of opportunity and encourage the kind of intellectual exchange so critical to keeping a scientific discipline lively, energetic, and well-integrated. The 2012 symposium fulfilled this objective by bringing together senior researchers, early career scientists, and graduate students from across the country, including a much stronger contingent from western states, and around the world. The 27th Binghamton Symposium on *The Scientific Nature of Geomorphology* occurred a quarter century ago (Table 1) and the 2012 meeting allowed scholars representing various facets of the discipline, from mountain to coastal geomorphology, to revisit this theme by discussing the field tradition and the role of field work in future research. Because geomorphology is increasingly recognized as an important component of the Earth system central to biophysical interactions and various management issues, the proceedings of the symposium also will inform a broader community comprised of geographers and geologists as well as ecologists and resource managers.

To ensure that the overarching objectives of the symposium would be achieved, we pursued a pair of specific aims. The first goal of the 2012 BGS was to bring together the geomorphic research community to reflect upon the field tradition that has defined the discipline and to discuss the added value of field work as geomorphologists adopt more advanced, technologically and computationally-driven methods of data collection

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