H41D-0303 0830h POSTER

Physical Modeling of Sediment Transport in Steep Boulder-Bed Channels

Blowsen Yager (yager@geomorph.berkeley.edu)

James W Kirchner1 (kirchner@geomorph.berkeley.edu)

William E Dietrich1 (bill@geomorph.berkeley.edu)

1Department of Earth and Planetary Science, University of California, Berkeley, CA, United States

2Waterways Experiment Station, Vicksburg, MS 39180, United States

Use of Morphology-based Gravel Budgets to Anticipate the Locations of Channel Instability on the Lower Duchesne River, Utah

David A Guennemi1 (435 797-1790; dguennemi@ucr.edu)

Jennifer C Schmidt2 (435 797-1790)

1Department of Earth and Planetary Science, University of California, Berkeley, CA, United States

2Watershed Science Program, Utah State University, Logan, UT 84322-5400, United States

Channel instability, such as meander bend cutoffs and downstream migration of confluences, within a floodplain of the Duchesne River have historically occurred where local accumulations of gravel have created an elevated area above the floodplain, and short vertical drops in the channel's gradient and force flow over point bars. The spatial distribution...
of lateral channel instabilities can be anticipated by the use of morphological-based gravel budgets developed from geographic information system (GIS) analysis of aerial photographs and field observations. A field study was conducted over a decade-scale time interval between 1936 and 1997. The mapping of streams, gravel deposition, and net changes in gravel storage were evaluated for individual subdrains along a 19-km stretch of river. Net transfers of gravel to the active channel are associated with subsequent downstream channel instabilities. Net gravel storage decreased to the point of better control of channel instability on the lower Duchesne River than on the upper Duchesne River, which contained gravel erosion and deposition.

Historical reconstruction of channel activity derived from this work were applied to development of habitat maintenance and flow recommendations for the lower Duchesne River. This river is inhabited by endangered native fish species whose habitat needs depend on the continuation of dynamic channel processes.

H41D-0390 0830h POSTER
Predicting Change in Sediment Transport Rates in the Wake of the Creation of the Los Alamos Canyon and Potential of a Physically-based Approach

H. Evan Castle1 (520 670-6380 x 145; castle@watec.army.mil), John Hager1, Wendi Newman1, Brian Dade1, Lars Pierce1, Bob Curry1

1Watershed Institute California State University Monterey Bay, 100 Campus Center, Seaside, CA 93955-8081, United States

In the past year, we have measured suspended sediment concentration and load at 50 sites in California's Coastal Zone region. The sites were manually sampled multiple times during the major storm events of the 2000-2001 winter. How then do we convert this volumetric data set into load of sediment across different locations? Storm event size varied throughout the region, so statistical techniques are explored to determine the magnitude and associated ground acceleration as well as the potential distance from the source of sediment. We have determined the drainage basin's response to any particular event. We also present a method of identifying the location of sediment and storminess which illustrates the relationship between geology and the importance of geomorphic processes. The unique extreme event types individually and when they occur together in time. The results of our analyses contribute to the understanding of the magnitude and frequency of geomorphic processes in humid tropical mountain belts in the US, and can potentially be used to describe hydrologic response to change.

H41D-0311 0830h POSTER
Sediment source analysis through in-stream monitoring of sediment loading at many sites

Fred Watson1 (fred_watson@cumb.edu); Thor Anderson1; Joel Casagrande1; Wendi Newman1; Julian Hager1; Joy Larson1; Bronwyn Pickert1; Alana Oskim1; Lars Pierce1; Bob Curry1

1Watershed Institute California State University Monterey Bay, 100 Campus Center, Seaside, CA 93955-8081, United States

Many contemporary sediment-budget studies lack two things: a first-hand understanding of the behavior of the system, and high-frequency data during storm events. In a study designed to understand sediment source areas, we have approach these deficiencies through manual sampling, almost exclusively during storm events. Manual sampling lends to better understanding. Frequently, the researchers finds oneself standing in streams observing phenomena that contradict their pre-project-based expectations. We refer to the situation in our case study as of system behaviour. The case study we present reflects this discrepancy through high-frequency data of suspended sediment concentration, differing levels of land-transport connectivity, and the seasonal and interannual low-water and flow interaction in and water and sediment flux. In drier regions with episodic rainfall, event sampling is essential. During one season, we sampled 13 sites in a 316 km2 watershed about 50 times each. The sampling times were targeted to capture changes in stage. Many points immediately adjacent the hydrograph peak, once a day during snowmelt and once after the return to pre-event conditions. The same number of samples spread out over a longer time can provide to a grossly inaccurate representation of the system by the data. We have determined that it is necessary to reasonably accurately characterize of total annual load at each site. A static, simple model was then used to apply this total to different land use sources, and in-channel sources.

H41D-0313 0830h POSTER
Magnitude and Frequency of Sediment Transport During Earthquake and Typhoon Events in Taiwan

Simon J. Dansby1 (44-222-333408; dansby@cam.ac.uk); Niels Hovius1

1Department of Earth Sciences, University of Cambridge, Downing Street, Cambridge CB2 1HQ, United Kingdom

Processes of sediment mobilization and transport on hillslopes and in rivers in many humid, tropical mountain belts are dominated by typhoons and earthquakes. These events are believed to be especially effective at mobilizing sediment when they occur closely in time. We examine this assertion using a twenty-five year record of stream discharge, sediment yield, and suspended sediment for several drainages in Taiwan's Eastern Central Range, Taiwan. The data are analyzed in terms of discrete events. Sediment discharge is correlated with indices of storminess and seismic activity for locales in mountainous and relatively flat terrains. We also present a regional analysis of rainfall, seismicity and storminess which illustrates the relationship between high sediment discharge and storminess, which itself depends on the history of a system, is shown to be critical in determining the drainage basin's response to any particular event. We also present a method of identifying the location of sediment and storminess which illustrates the relationship between geology, seasonality and geomorphic processes in humid tropical mountain belts in the US, and can potentially be used to describe hydrologic response to change.

H41E MC: Hall D Thursday 0830h Recent Advancements and Future Prospects in Hydrologic Remote Sensing

Presiding: P. Houser, NASA-GSFC; M. F. Jasinski, NASA Headquarters

H41E-0340 0830h POSTER
Measurement of Soil Moisture on 50 m Postings Using InSAR

Dennis R. Patulnik1 (303-444-0094; dennis.r.patulnik@nasa.gov); Matt Nolan2 (907-474-2467; matt.nolan@uaf.edu)

1Vexcel Corporation, 4909 Nautilus Ct, Boulder, CO 80301, United States

2Institute of Northern Engineering, University of Alaska Fairbanks, Fairbanks, AK 99775, United States

We are developing a new method for measuring soil moisture at 50 m in spatial resolution using differential SAR interferometry (DiSAR). Analogous to stereo-oscopic imaging techniques, two ERS-2 satellite acquisitions are used to determine relative changes in microwave echo path length on a scale of millimeter resolution for determining ground displacement due to earthquakes, subsidence, and vegetation. In our study area in stationary, we were able to show how the coherent state phase delay of the microwave radiation inside the soil. Postrreatment of the bias correction to the soil dielectric which is in turn closely related to soil moisture.

H41F 0830h POSTER
The value of manual, event-based sediment sampling in local-scale sediment budget studies

Joel Casagrande1 (joel.casagrande@cumb.edu); Wendi Newman1; Julian Hager1; Thor Anderson1; Wendi Newman1; Don Kaczalower1; Adrian Rocha1; Wright Cole1; Joy Larson1; Bronwyn Pickert1; Alana Oskim1; Lars Pierce1; Bob Curry1

1Watershed Institute California State University Monterey Bay, 100 Campus Center, Seaside, CA 93955-8081, United States

Many contemporary sediment-budget studies lack two things: a first-hand understanding of the behavior of the system, and high-frequency data during storm events. In a study designed to understand sediment source areas, we have approach these deficiencies through manual sampling, almost exclusively during storm events. Manual sampling lends to better understanding. Frequently, the researchers finds oneself standing in streams observing phenomena that contradict their pre-project-based expectations. We refer to the situation in our case study as of system behaviour. The case study we present reflects this discrepancy through high-frequency data of suspended sediment concentration, differing levels of land-transport connectivity, and the seasonal and interannual low-water and flow interaction in and water and sediment flux. In drier regions with episodic rainfall, event sampling is essential. During one season, we sampled 13 sites in a 316 km2 watershed about 50 times each. The sampling times were targeted to capture changes in stage. Many points immediately adjacent the hydrograph peak, once a day during snowmelt and once after the return to pre-event conditions. The same number of samples spread out over a longer time can provide to a grossly inaccurate representation of the system by the data. We have determined that it is necessary to reasonably accurately characterize of total annual load at each site. A static, simple model was then used to apply this total to different land use sources, and in-channel sources.