Guidelines for Preparing Posters

Hydrology Days

Colorado State University
Guidelines for Preparing Posters

- Increasingly popular presentation form at conferences
- Advantages
  - Gives audience time to study details of interest
  - Permits informal or extended exchange between author and audience
  - Provides feedback to author
Poster Space

- Varies widely at different venues - check meeting guidelines well in advance
- For Hydrology Days
  - Single board, 4 feet high, 6 feet long; therefore your poster must not exceed 4’ x 6’
  - Tacks provided for mounting
  - Table space
Preparation the Poster

- Use eye-catching and attractive design
- Keep it simple
- Avoid clutter; make logical sequence obvious to audience
- Minimize amount of data and text presented
- Make everything bold and large
- Simplify concepts for those who do not hear your explanation
The Title

- Attractive, succinct, provocative
- Legible from 5 m -- bold, block letters at least 5 cm high
The Text

- Concise, legible, easily comprehended - minimum 16 point font
- Include:
  - Abstract
  - Brief introduction
    - problem statement
    - Aims of study
  - Results with minimal discussion
    - May present as figure captions
  - Conclusions
Figures and Photographs

- The larger the better
- Minimize the number: keep it simple
- High quality figures
  - Good color contrast
  - Bold, legible from 2 m
  - Clear labels, legible against background
- Clear sequencing
The Poster Session

- Stand by your posters during assigned time for discussion and questions
- In some cases, may be invited to give oral overview
  - use as invitation to audience
  - present as abstract
    - State problem, methods, principal conclusions
Type of Poster (Banner or Cards)

- **Banner** -
  - Simplest to mount
  - Harder to transport
  - See example on last slide
  - For a PowerPoint version, browse:
    - [http://HydrologyDays.ColoState.edu/PosterExampleHDs.ppt](http://HydrologyDays.ColoState.edu/PosterExampleHDs.ppt)

- “Cards” that fit in an oversized envelope
  - More time, materials required for mounting
  - Easy to transport in briefcase
  - Readily accommodates “guides”, such as strings to connect related objects
Additional ideas

- Provide extra information
  - Hang envelopes from poster board for reprints, business cards, etc.

- Some venues permit electronics
  - Show videos or computer simulations
  - Make added information available on computer
The Evolution of Landscapes and Hillslopes

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We present the mathematical and numerical development of a new hillslope hydrology model as well as sample applications. The new model is a distributed, physically and mechanistically based hillslope evolutionary model. The model couples the fully two-dimensional hydrodynamic equations for overland flow, Richards equation for infiltration, and a set of sediment detachment and transport equations. This model, based on the fundamental physics of the governing processes of hillslope hydrology, is used to test our ability to fully explain the fine scale processes and mechanisms leading to the development of erosion drainage networks. Sample applications are presented to show how the model is capable of capturing the interaction between overland flow, erosion and infiltration at very small scales and of modeling the evolution of hillslopes caused by spatially variable erosion caused by small scale variability of the hydraulic and soil properties. We also present analyses with respect to energy expenditure during hillslope evolution.

Finally, we show applications of the scaled-up model to describe watershed response at basin scales.

The Evolution of Landscape and Hillslopes

Specific Objectives

- Develop a physically based model of hillslope hydrologic response that includes coupling of overland flow, infiltration and sediment transport
- Develop an appropriately upscaled model
- Implement model to simulate effects of drought
- Assess effects of stochastic disturbances of the landscape

The Evolution of Landscape and Hillslopes

Overland Flow

- The overland flow component of the new model is a 2-D, fully hydrodynamic, mathematical description of the hillslope processes associated with overland flow on an infiltrating surface. This model allows for explicit representation of micro-topographic features and spatial variability infiltration characteristics.
- Mass Conservation equation
- Momentum equations

Infiltration (Richards Equation)

- Richards equation

Sediment Detachment and Transport

- The unit sediment transport capacity in the x direction (and analogously for the other directions) is defined by:
- The governing equation for bed elevation change as a function of time is:

Varying transport capacity ($q_0$ vs $e^t$)

Effects of spatially variable $q_0$. Runoff is shown to decrease significantly as the variation increases, clearly showing the importance of sub-grid scale interactions.

Effects of micro-topographic amplitude variation. Increasing amplitude of topographic relief decays the mixing limits and extends the recession times of the hydrographs.

DoD Relevance

- Countermeasure detection efforts - the identification of natural versus disturbed soil surfaces (i.e., mine areas)
- Natural surface variability needs more realistic and accurate hydrologic transport models
- Improved countermeasure detection with enhanced flood propagation models

Conclusions

- A two-dimensional overland flow model, with detachment and transport-limited erosion, predicts landforms resembling observed natural hillslopes.
- As observed in nature, simulated landscapes evolve towards stabilization:
  - the global rate of energy expenditure
  - the coefficient of variation of the total rate of energy expenditure per unit area
  - the total stream power and the total stream power
  - the longitudinal profile developed from slope area relationships that approximate optimally
  - the rates at which the energy characteristics are minimized are exponentially related to the rainfall input to the system because the work that can be done by a flow is exponentially related to that flow.
- In two-dimensional cases the model shows that the total global rate of energy expenditure and the total stream power approach a minimum throughout hillslope evolution but optimality in unit stream power and the distribution of local energy expenditure per unit area are highly variable and depend critically upon the threshold at which the concentrated flow paths are delineated.
- Hillslope development occurs at different rates spatially and temporally and therefore does not always approach optimality as a whole but should tend towards optimality.

Figures show:
- Model predicted flow paths (blue on green) for an experimental site for the same
- Model predicted flow paths for the same infiltration (red) for the same
- In addition to the patchy nature of the surface where infiltration is greater in vegetated soil, areas of greater infiltration due to surface interactions appear at the interfaces of bare soil and vegetated soil.