**17-23. Sediment transport modeling on event to million-year timescales and reach to watershed spatial scales**

Managing watershed processes and their associated sediment dynamics is an exceedingly complex problem. Fine sediment transport occurs at a range of timescales, from storm events to millions of years. In addition, the governing sediment transport processes and dominant sources can vary among watersheds, through time, and by event magnitude. Both erosion of particles and their subsequent storage is highly variable spatially, which has consequences for both sediment sources and residence times. Particles can be stored within the channel bed, point bars, in-channel deposits, and the floodplain. Critical questions remain. What are the most significant sources and processes for managing sediment? And what are the critical spatial and temporal scales relevant for a diverse group of stakeholders? Although we still lack the data and modeling tools to provide definitive answers to these questions, progress has been made in conceptualizing this multi-faceted problem and in methods we can apply (sediment budgets, fingerprinting, geochronology).

The goal research under this Opportunity is to advance the development of modeling tools that can help resolve some of the remaining critical questions regarding relevant temporal and spatial scales of fine sediment transport processes. The opportunity for research is broad and flexible and can be achieved through a myriad of approaches, depending on the postdoctoral fellow's interests and training. For example, recently published sediment budget-based approaches could be tested for regional suitability to enable expansion of spatial scales. There are a wide variety of relevant datasets and studies to be built upon including fingerprinting, sediment budgets and ages that will allow for model exploration. Relevant methods from existing watershed hydrologic models could also be tied to sediment budget-based approaches to incorporate shorter timescales. It is also possible for the Mendenhall Fellow to develop new approaches for sediment transport prediction at multiple scales.

**Proposed Duty Station:** Reston, VA.

**Areas of PhD**:  Geomorphology, geology, geophysics, hydrology, geotechnical engineering or related fields (candidates holding a Ph.D. in other disciplines, but with extensive knowledge and skills relevant to the Research Opportunity may be considered) (candidates holding a Ph.D. in other disciplines, but with extensive knowledge and skills relevant to the Research Opportunity may be considered).

**Qualifications**: Applicants must meet one of the following qualifications: Research Hydrologist; Research Oceanographer; Research Engineer; Research Geologist. (This type of research is performed by those who have backgrounds for the occupations stated above.  However, other titles may be applicable depending on the applicant's background, education, and research proposal.  The final classification of the position will be made by the USGS Human Resources specialist.)

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