

How to Add Natural Tracers to Your Hydrological Toolbox

Dr. Doug Burns

September 8, 2009

11:00 am

USGS Minnesota Water Science Center

Training Room

2280 Woodale Dr., Mounds View, MN

Natural tracers can provide another tool along with the common hydrological and water quality measurements to further our understanding of hydrologic systems. For example, the water isotopes $\delta^{18}\text{O}$ and $\delta^2\text{H}$ can help answer questions of volume and flux when two or more distinct sources of water are present in a watershed, and in many cases solute tracers can be applied to solve these same problems. Additionally, the temporal patterns of natural tracers can reveal the transit time of water along a groundwater flow path or through a watershed. Furthermore, measurements of the isotopic content of solutes such as nitrate, sulfate, and phosphate can provide insight to the source and the biogeochemical processes that most greatly affect solute flux in a hydrologic system. In this presentation, the use of tracer-based models to better understand the source, flow paths, and transit time of water will be discussed, with an emphasis on groundwater–surface water interactions. The presentation will include a discussion of the application of tracer-based approaches to the nitrogen cycle in watersheds, and the power of multi-tracer approaches for constraining sources and the processes that shape solute fluxes through hydrologic systems.

Sign up

There will be a sign-up sheet at the lecture for those who are interesting in applying for one hour Professional Development credit by the Minnesota Board of Architecture, Engineering, Land Surveying, Landscape Architecture, Geosciences, and Interior Design (AELSLAGID). We need an idea before the meeting about who plans to attend. **Please contact Lindsay Forbes (lforbes@usgs.gov) or by phone/voicemail (763-783-3100) with your name and affiliation. Please let us know if you plan to attend by Thursday, September 3rd**

Regards,
Jim Stark
Center Director

Douglas Burns – Brief Professional Biography: Doug's professional interests are in the fields of biogeochemistry and hydrology. He studied the effects of human activities and natural disturbances on water quality and quantity. Doug has worked as with the USGS in Troy, New York since 1987, and holds a Ph.D. in Water Resources Management from the SUNY College of Environmental Science and Forestry, an M.S. in Environmental Science from the Univ. of Virginia, and a BA in geology from Hope College. Current projects include (1) modeling processes that control the cycling and bioaccumulation of mercury in the Upper Hudson River watershed, and (2) effects of forest harvesting practices on water quality in the Catskill Mountain region. Doug has a long-standing interest in the effects of climate change on water resources and ecosystems, and has studied the regional response to climate change over the past several decades. Additionally, he serves as the Director of the National Acid Precipitation Assessment Program. Doug is the author of more than 60 scientific papers and reports.

Sketch map showing USGS Minnesota Water Science Center location north of the I-694 and I-35W interchange:

