Regional to global scale changes in the water cycle remain a significant source of uncertainty in projections of climate and land use change impacts. The strong potential for water cycle change to contribute to feedbacks involving the carbon cycle and atmospheric energy budget makes understanding future water cycle change even more critical. In this talk I will describe how my research group is working to integrate spatially distributed isotopic data with spatially models, ranging from simple geostatistical models to fully coupled Earth systems models, to improve our understanding of the water cycle, its dynamics, and its change through time. I will provide examples of our latest research on water cycle processes in the modern Earth system and 50 million years in the past, during Earth’s last great global greenhouse climate state. The results suggest regional patterns of water cycle impact that highlight the potential large-scale implications of climate and land use change for natural and human-dominated ecosystems.

Research Interests:

Gabe Bowen’s research explores the boundaries between the Earth sciences and biosciences, using light stable isotope chemistry in combination with a range of other data types to address research problems related to climate change and human interaction with the environment. Through interdisciplinary collaborations he is developing new analytical and data analysis methods that extend the boundaries of traditional stable isotope geoscience; measuring and interpreting temporal and spatial isotopic variation in the sedimentary rock record to understand the coupling of biogeochemical, climatological and biological change during Earth’s history; and measuring, modeling and interpreting spatial and temporal isotopic variation to understand spatially distributed processes in modern Earth systems. Specific areas of emphasis include: understanding the biotic impacts of past global change through reconstructing global and regional patterns of continental paleoclimate change over timescales of 102 to 106 years in fossiliferous sedimentary rock sections; elucidating carbon/water cycle coupling during past global change through multi-proxy biogeochemical study of Cenozoic continental and marginal marine rocks; identifying, quantifying, and monitoring changes in water cycle processes at regional to global scales through monitoring and modeling of water isotopes; developing and applying (geo)statistical tools and models for tracing the geographic movement and ecology of animals, humans, and products; and developing web-GIS cyberinfrastructure for spatial modeling in support of biogeochemical, ecological, and global change research and education.

April 11, 2011
4:00 – 5:00 pm
295 Frederick Albert Sutton Building
Host: Barb Nash, Geology & Geophysics
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