

Future of Water Resources Systems Analysis: The Science of Sustainable Water Management

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Abstract. This is a time of great opportunity for hydrology and water resources research. Societal need for improved water management and concerns for the long-term sustainability of water resources systems are prominent around the world. The continued susceptibility of society to the harmful effects of hydrologic variability, pervasive concerns related to climate change and the emergent awareness of devastating effects of current practice on aquatic ecosystems all illustrate our limited understanding of how water ought to be managed in a dynamic world. The related challenges of resolving the competition for freshwater among competing uses (so called “nexus” issues) and adapting water resources systems to climate change are prominent examples of the of sustainable water management challenges. In this presentation, we argue that for research to improve water management a new focus is required, one that bridges disciplinary barriers between the water resources research focus on infrastructure planning and management, and the role of human actors, and geophysical sciences community focus on physical processes in the absence of dynamical human response. Examples drawn from climate change adaptation for water resource systems and groundwater management policy provide evidence of initial progress towards a science of sustainable water management that links improved physical understanding of the hydrological cycle with the socioeconomic and ecological understanding of water and societal interactions.