Abstract. Traditional water systems were built to serve the “analog economy,” where various ownership and management boundaries are loosely interconnected to meet the needs of an oftentimes under-informed public. Advances in low-cost sensing and communications, however, will soon permit information exchange at unprecedented spatiotemporal scales. My talk will focus intelligent water grids, which have the potential to revolutionize the interaction between hydrologic systems and man-made infrastructure. By coupling the flow of water with the flow of information we will soon enable a suite of never before conceived solutions to water resource operations. We will look at the state of California, where the majority of water originates as snow in the Sierra Nevada. Current measurement and modeling techniques are unable to resolve the variability of the snowpack at the basin scale, and snowmelt processes are not well captured by existing hydrologic models. I will describe a system-level solution to facilitate scientific understanding and real-time water management decisions in mountain basin. The talk will discuss work undertaken at the Southern Sierra Critical Zone Observatory to improve and expand hydrologic sensing methods through the deployment of massive-scale wireless sensor networks. Lessons learned from these large-scale deployments will then be cast into a broader vision for the development of modern water systems.