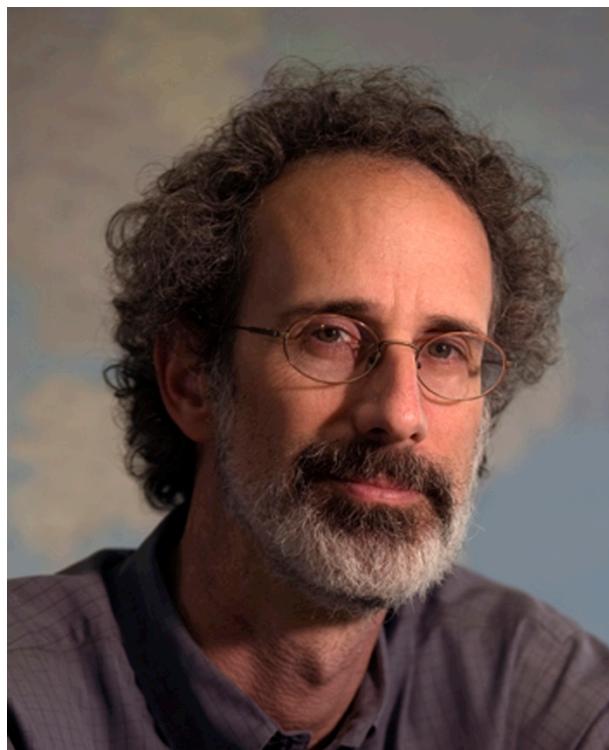


P. Gleick: **Understanding of the Global Hydrologic Cycle and Water Management Challenges in the 21st Century**

Extensive efforts are underway to improve our understanding of the global hydrological cycle and the complex interactions with climate, energy and nutrient flows, and the dynamics of ecosystems and human economic systems. Water, energy, and climate are inextricably linked in space and time. From a purely scientific and academic point of view, understanding the complexity of the hydrological cycle is of paramount interest and central to our understanding of other planetary geological, atmospheric, chemical, and physical processes. But water is more than that: water is key to some of the core economic, social, and political problems of our time such as poverty, health, environmental sustainability, conflict, and economic prosperity.

Perhaps more than any other scientific discipline, hydrology traces its roots to efforts to tackle challenges of social and economic development, including the provision of safe and reliable drinking water, flood prediction and protection, wastewater treatment, irrigation development and food production, and more. The more society seeks to solve these challenges, the more obvious it becomes that we must improve our understanding of the fundamental science of the hydrological cycle and its links with related global processes. Central to solving these challenges is the need to improve our systems for collecting, managing, sharing, and analyzing all kinds of water data, and our ability to model and forecast aspects of both the hydrological cycle and the systems we put in place to manage human demands for water. In short, we need to close the hydrological water balance at all scales. Extensive efforts in some of these areas are ongoing under the auspices of a wide range of organizations.

This assessment identifies key scientific research needs and offers a broader perspective on the role that humans play in altering planetary systems. We also discuss uncertainties in both the science and in our knowledge of future societal factors such as population, economic growth, technology trends, and energy choices, which make modeling efforts and future forecasts inherently imperfect. And we note the important distinctions among the urgent need to improve our basic understanding of the hydrological cycle, the equally urgent need to improve our understanding of how humans are increasingly influencing and changing it, and the ultimate consequences of those changes for societal well-being.



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Dr Peter Gleick's research and writing address the critical connections between water and human health, the hydrologic impacts of climate change, sustainable water use, privatization and globalization, and international conflicts over water resources. Dr Gleick was named a MacArthur Fellow for his work. He was dubbed a "visionary on the environment" by the BBC and elected an Academician of the International Water Academy, in Oslo, Norway, and a member of the U.S. National Academy of Sciences. He serves on the boards of numerous journals and organizations, and is author of many scientific papers and seven books, including the biennial water report, *The World's Water*, and *Bottled and Sold: The Story Behind Our Obsession with Bottled Water*.