

Role of advanced observational and information technologies for addressing hydrometeorological issues

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The need for more effective management of water resources is greater than ever, particularly in arid and semi-arid regions of the world. Water resources managers must utilize more sophisticated hydrologic prediction tools. Depending on the problems, the hydrologic information needed may range from hourly forecasts (in the case of flash floods) to seasonal to interannual (in the case of reservoir operation), and to decadal to century (in the case of planning, design and construction of additional water supply structural).

A further complication arises from the additional uncertainty resulting from global climate change. There is little doubt that climate change and variability will have a great impact on regional water resources and the way they should be managed. Further research and data-collection activities are needed in order to quantify the impact of the intensification of the hydrologic cycle on the magnitude, duration, and frequency of floods, droughts, and other hydrometeorological hazards which impact water resources management. A number of international projects have been initiated for this purpose, including the Global Energy and Water cycle EXperiment (GEWEX) of the World Climate Research Programme (WCRP). These projects have a strong emphasis on the deployment of state-of-the-art remote-sensing satellites and a range of modeling tools which are intended to provide useful information for a variety of purposes related to hydrology and water resources. A review of these projects and their potential benefits to water resources management issues, particularly in the context of arid/semi-arid regions, will be presented. A few examples and challenges facing water resources management in the semi-arid Southwest United States will be discussed.