An Integrative Study of Basin-Scale Hydrological-Ecological Processes under a Changing Climate and Ever-Intensifying Human Activities

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Northwest China is characterized by an arid climate and fragile ecosystems. The sustainability of irrigated agriculture and economic development in the region is threatened by severe eco-environmental problems, including desertification, salinization, groundwater depletion, and dust storms, as a consequence of both climate changes and human activities. As the climate change intensifies and rapid economic growth continues, the water scarcity plaguing the region is expected to worsen. To improve the bleak outlook for the health of ecosystems and the environment in northwest China, the Chinese government has invested heavily in watershed management and ecosystem restoration in recent years. However, the effectiveness of such measures and actions depends on scientific understanding of the complex interplays among hydrological, ecological, and socioeconomic factors. This presentation discusses an integrated hydrological-ecological study being conducted in the Heihe River Basin in northwest China whose overall objective is to identify sustainable water resources management strategies through fundamental research based on comprehensive ecohydrological observations and integrated process modeling. The Heihe River Basin is an inland watershed located at the center of the East Asia’s arid zone, stretching from Qilianshan Mountains in the south to the Gobi desert in the north, with a total area of approximately 130,000 km\textsuperscript{2}. The presentation will highlight the scientific issues, and major challenges and opportunities in the integrative study of basin-scale hydrological-ecological processes under a changing climate and ever-intensifying human activities.