



Separating hydrological drought from water scarcity in Mexican catchments

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Separating the effects of climate and human activities on catchment hydrology is critical for understanding how surface water availability will respond to future climate and anthropogenic forcings. This work analyses the temporal distribution of hydrological drought and water scarcity in Mexico since the 1960's. We use an observation-modelling approach (Van Loon & Van Lanen, 2013) in a set of temperate and tropical watersheds located in western and eastern Mexico, respectively. In the first case, the impact of dam construction on the streamflow regime downstream was analyzed. In the second case, a paired-catchment approach was used and the timeline period of this work was divided as an "undisturbed period" (before significant population growth) and "disturbed period" (during population growth). Then, streamflow time series were generated using a conceptual hydrological model and a "naturalized" scenario during the "disturbed period" was defined and combined with a variable threshold method in order to assess the impact of human activities on the hydrological response of each watershed. Results show that in the temperate watersheds, the operation of the dam reduced hydrological drought conditions, however, after the construction of dam, water scarcity periodically occurred every year. In contrast, the tropical watershed experienced more cases of water scarcity during the period of population growth that eventually was aggravated (but not substantially) because of dry spells.