



How water reservoirs lift the blue water footprint cap for a river basin and reduce blue water scarcity: a case study for the Yellow River Basin

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The maximum sustainable blue water footprint in a river basin is limited by the part of precipitation that becomes runoff and by the need to maintain a minimum flow for sustaining ecosystems and livelihoods. A “blue water footprint cap” to be specified over time has been proposed as a policy instrument to set a maximum to the blue water footprint in a river basin. Reservoirs along the river help smoothing runoff variability and thus may reduce blue water scarcity during the dry season and increase the water footprint cap to be set for that period. Previous water scarcity studies, considering the ratio of actual to maximum sustainable blue water footprints have not included reservoir storages. In a case study for the Yellow River Basin (YRB), the current study estimates how water reservoirs lift the blue water footprint cap during the dry season and reduce blue water scarcity in this season. We schematize the YRB into three reaches (sub-basins), include five reservoirs along the main stream, and consider the period January 2002-August 2006. Results show that blue WF caps in all three reaches in the dry seasons with net water release from the reservoirs can be lifted substantially. In years with a net decrease in water storage over the year as a whole, the blue WF cap over the year can be lifted as well. The caps in the wet seasons with net water storage in the reservoirs get lower, but this is acceptable given the lower water demands in the wetter seasons. It is shown to which extent reservoir storage reduces blue water scarcity in every month and every reach of the YRB.