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# Land-use change impacts on the hydrology of Ethiopian highlands: Is uncertainty in river discharge data hiding any signals?

Solomon Gebreyohannis Gebrehiwot (1,2), Giuliano Di Baldassarre (1), Kevin Bishop (1,3), and Sven Halldin (1)

(1) Uppsala University, Earth Sciences, Uppsala, Sweden (giuliano.dibaldassarre@geo.uu.se), (2) Ethiopian Institute of Water Resources, Addis Ababa University, P.O.Box 150641, Addis Ababa, Ethiopia, (3) Department of Aquatic Sciences and Assessment, Swedish University of Agricultural Sciences, P.O.Box 7050, 750 07 Uppsala, Sweden

Here we test how errors in river flow data can mask the impact of land-use changes (e.g. deforestation) on hydrological regimes. To this end, we exploit data of two river basins in the highlands of Ethiopia, whereby significant land-use changes have been taking place over the past decades. Based on outcomes of previous studies (i.e. literature review) and the results of hydrological models, a number of different hypotheses about the potential impacts on hydrological regimes are made. The simulated discharge values are then altered introducing "artificial" errors affecting river flow data. These errors are generated using the outcomes of recent studies on the uncertainty of river discharge observations. Different hypotheses about the magnitude and the type of the observational errors are also formulated (e.g. normally distributed with diverse variances, presence of systematic bias, rating curve issues with high and low flows). Finally, we analyze the statistics of the time series to check if the land-use signal is detectable. A matrix of different levels of land-use change impact versus different magnitude and types of observational errors is built. Thus, the matrix shows how large the impact of land-use change must be not to be hidden by different levels of observational errors or, in other words, how accurate hydrological observations should be to allow detection of land-use change impacts. These results can add decisive knowledge to the uncertainty studies in hydrological sciences, as well as useful insights for water resources planning and management.