

Internal Cycles from Hydrometric Data and Variability Detected Through Hydrological Modelling Results, on the Niger River, over 1901-2020

Authors : Salif Koné

Abstract : We analyze hydrometric data at the Koulikoro station on the Niger River; this basin drains 120600 km² and covers three countries in West Africa, Guinea, Mali, and Ivory Coast. Two subsequent decadal cycles are highlighted (1925-1936 and 1929-1939) instead of the presumed single decadal one from literature. Moreover, the observed hydrometric data shows a multidecadal 40-year period that is confirmed when graphing a spatial coefficient of variation of runoff over decades (starting at 1901-1910). Spatial runoff data are produced on 48 grids (0.5 degree by 0.5 degree) and through semi-distributed versions of both SimulHyd model and GR2M model - variants of a French Hydrologic model - standing for Genie Rural of 2 parameters at monthly time step. Both extremal decades in terms of runoff coefficient of variation are confronted: 1951-1960 has minimal coefficient of variation, and 1981-1990 shows the maximal value of it during the three months of high-water level (August, September, and October). The mapping of the relative variation of these two decadal situations allows hypothesizing as following: the scale of variation between both extremal situations could serve to fix boundary conditions for further simulations using data from climate scenario.

Keywords : internal cycles, hydrometric data, niger river, gr2m and simulhyd framework, runoff coefficient of variation

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