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## Estimation of the annual runoff frequency distribution under a non-stationarity condition within the Budyko framework

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In the past decades, climate change has been leading to non-stationarity in hydrological variables. Therefore, a simple framework within the Budyko framework is proposed to estimate the annual runoff frequency distribution and provide a new method for hydrological design under non-stationarity conditions. In this framework, the mean and standard deviation of annual runoff are derived by the Choudhury-Yang equation. Furthermore, the P-III type frequency curve is selected to calculate the annual runoff on a design return period. Based on this framework, the change in water resources in 207 three-level basins across China during 2020-2050 are estimated according to the Coupled Model Inter-comparison Project Phase 5. The results show that the mean annual runoff will decrease by 2.7% for all basins, and the regional difference will decline, i.e., the mean annual runoff will increase in the north of China and decrease in the south of China. However, the inter-annual variability of annual runoff will increase in more than 70% of basins. Additionally, in the wet year, approximately half of the total basins show decreased runoff change, and in the dry year, decreased change appears in ~65% basins. These findings offer a simple and effective way to re-examine the effects of non-stationarity in hydrological design.