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Opinion

Brief review of the monograph assessment of long-term runoff in the southwestern part of the African continent (scenarios of long-term changes in probability characteristics)

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For the physical and geographical conditions of the African continent, it is more acceptable to simplify the runoff formation model by adapting to the relatively poorly studied long-term river flow regime of North Africa. The solution to the problems is based on the methodology of partially infinite modeling, developed in Russia and used in countries of Latin America and Africa with hot climates. This methodology is based on a shaping filter model, which can become more complex (by expanding the phase space) or simplified (by replacing multiplicative noise with additive noise), in order to adapt it to the nature of parametric noise that causes instability, as well as to the form of representation of existing climate scenarios. A methodology for optimizing the regime hydrological network, developed in the former USSR by Professor I.F. Karasev, was also applied.

Main stages:

Formation of a database on hydrological and meteorological quantities;

Optimization of regime hydrological network in South-West Africa;

Statistical assessment of hydrological characteristics;

Development of a stability criterion forecast.

As a result of the study, maps of the distribution of probabilistic characteristics of annual runoff were obtained, which can be used to assess the sensitivity of economic sectors to possible climate changes when designing and operating structures, as well as to optimize the density of the observation network for the state of water bodies. An information and technology base has been created to adapt the methodology for assessing the consequences of climate change to the conditions of South-West Africa and to quantify the optimal density of the observation network for the conditions of the existing climate and its expected changes [1]. A methodology has been developed for assessing the intensity of climate noise, its distribution over South-West Africa, and the degree of dependence on the distribution of the stability criterion of the calculated characteristics. Maps of the distribution of calculated characteristics of long-term annual runoff for the mid-21st century were compiled, for four variants of climate scenarios Commit, SRA1B, SRA2, and SRAB1, implementing the HadCM3 model, for conditions of varying intensity of economic growth in African countries [2].

Together with existing similar maps for North West Africa, they provide a holistic view of the impacts of climate change on the entire African continent.

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