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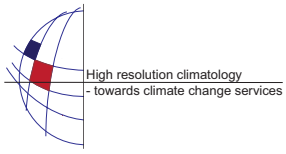

Determination of informative climate characteristics for regional assessment of annual river runoff.

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Various options were analyzed for the general solution of forecasting annual runoff in the basins of High Mountain Asia using a number of climate characteristics. It was established on example of Amudarya river basin (area 309 000 km2, mean long term runoff 65.3 km3/year): a) An effective form of prediction is the equation of multiple linear regression, where the vector of informative predictors include or anomalies of average summer air temperature, or anomalies of annual precipitation, or the difference between these normalized variables. Informative predictors were selected from the initial set of data on 27 meteorological stations in the region of Central Asia in the intervals: height from 24 to 4169 meters above sea level, latitude 37.6o - 43.2o N and longitude 63.6o - 78.2o E. b) The highest combined correlation coefficient r = 0.85 was obtained for the multi-factor linear equation in the form V = f(Ibn), where V – is the annual form of runoff, Ibn – is vector predictor, which consist of n normalized difference of anomalies of average summer temperature and yearly precipitation amount on informative meteorological stations (i.e. Ib – is index of balance of accumulation and melting of precipitation). For the best flow forecast depending only on the anomalies of precipitation r was equal to 0.80, and for the dependence of V on the anomalies of the average summer temperature r = 0.48. These three equations confirm the significance of selected characteristics as potential predictors of runoff using climate scenarios. c) A two-factor linear equation V = f(dP,dT) was obtained for assessment of annual runoff of Amudarya river as function of regional anomalies of precipitation (dP) and average summer air temperature (dT). Combined correlation coefficient is equal to 0.75 and mean square error 5.26 km3/year. Substituting in this equation the expected value of regional anomalies of yearly precipitation and average summer air temperature, defined on the basis of a climate scenario, we obtain the expected value of the annual runoff. Instead, the average summer temperature is possible to use the average yearly air temperature. This work was supported by Russian Fund of Basic Research. Grant 08-05-00661.