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Global climate change impact on monthly and seasonal air temperature anomalies in South Caucasus

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Climate change in different territories is caused by summarized impacts of global climate change and internal anthropogenic microclimatic changes. Real assessments of regional climate change make it possible to develop scenarios which can be used in estimations of vulnerability and sensibility of particular impact object. Effective adaptation means development mainly depends on accuracy of such kind of scenarios. Data on global summarized change (anthropogenic and natural) of the Earth air temperature for the period of 1900-2000 have been used for monthly and seasonal air temperature forecast for the territory of South Caucasus. Trend on orthogonal functions was developed, which describes global temperature change quite well. Temperature divergences from the given trend were calculated and their values were checked out. They are casual values and satisfy Johnson's distribution with 0.98 probability. On the basis of Markov's complicated chain changes of these values were predicted. Predicted values were added to the given trend and the Earth temperature change by 2030 was calculated. These values were used as predictors for forecast of annual temperature anomalies in the territory of Armenia and Georgia having used Markov's complicated chain. Monthly values of air temperature from 10 meteorological stations of Armenia and Georgia were used while doing calculations. On the basis of 1930-70 data temperature changes for 1971-80 were calculated, forecast for each year was fulfilled having used factual data of the previous year (one-step forecast). Forecast for the period of 1981-95 was carried out on the basis of 1930-80 data. In the contrast to one-step forecast here forecast for each year was realized using factual data for the period of 1930-80 and predicted values (1981-94) without using values of the previous years (multi-stepped forecast). Maximum divergences hare are 0.80C for 1979 and average is 0.30C. This fact assures to do the next step of forecast for 1976-95 using factual

data of the given year and then data of 1996-2010. In these forecasts validation is within the interval of 75-85%, maximum anomaly is 0.90C for 1989. Analogous calculations were carried out for Georgia as well. Having used the same algorithm and factual values for the territory of Armenia and Georgia by 1995 annual, seasonal and monthly values of air temperature in Yerevan and Tbilisi for the period of 1991-2010 were calculated. Validity of the forecast for Yerevan and Tbilisi cities was estimated, the results were high enough (75-85%). The given model is in the trial process in hydro-meteorological services of Armenia and Georgia.