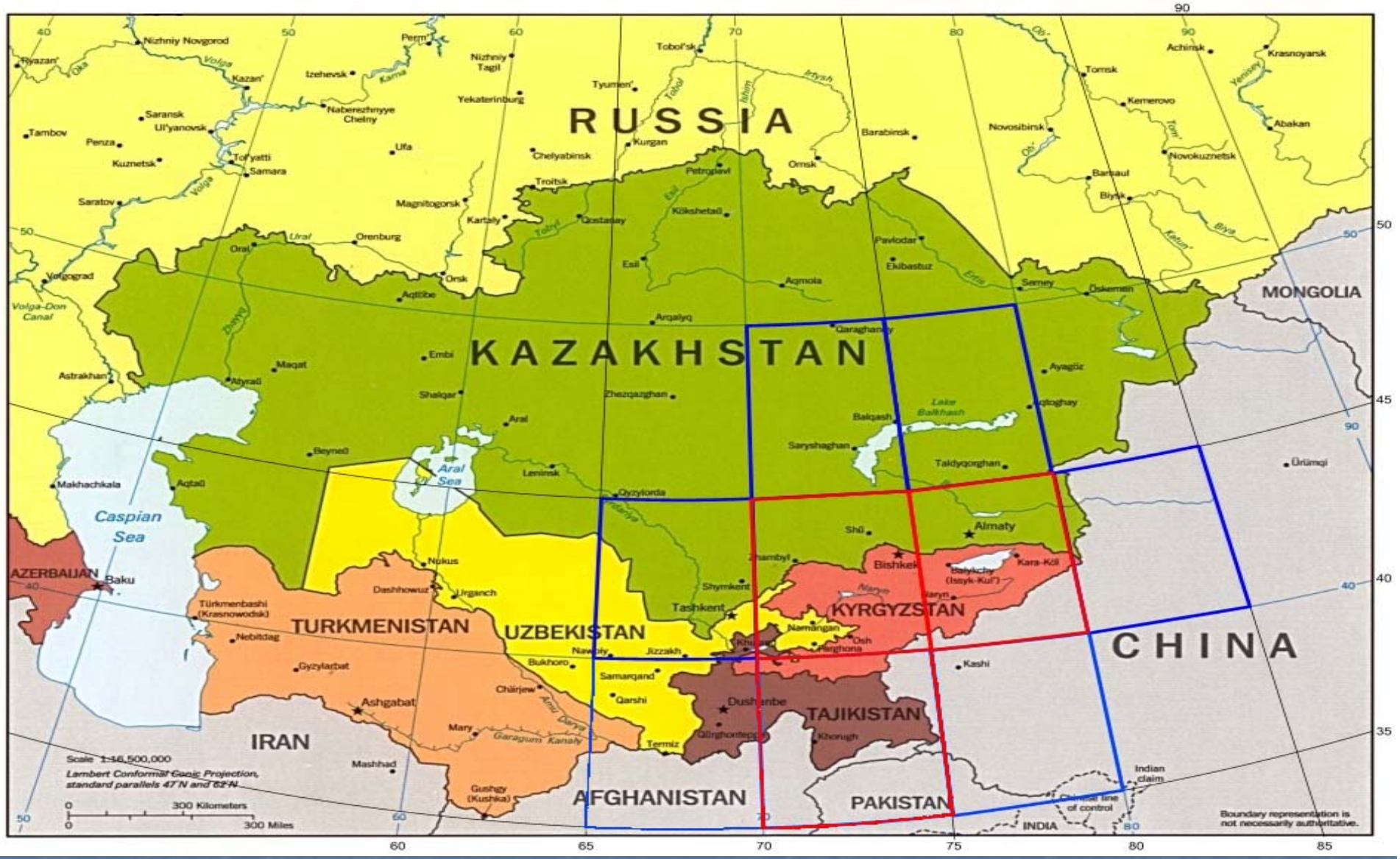
EURASIAN DEVELOPMENT BANK
EXECUTIVE COMMITTEE OF THE
INTERNATIONAL FUND FOR SAVING OF
THE ARAL SEA

IMPACT OF CLIMATE CHANGE ON WATER RESOURCES IN THE CENTRAL ASIA

5-th Global Water Forum

Baymagambetov B.O., Director of Kazakhstan Affiliate of The Regional Hydrology Center

Istanbul, March 16-22, 2002

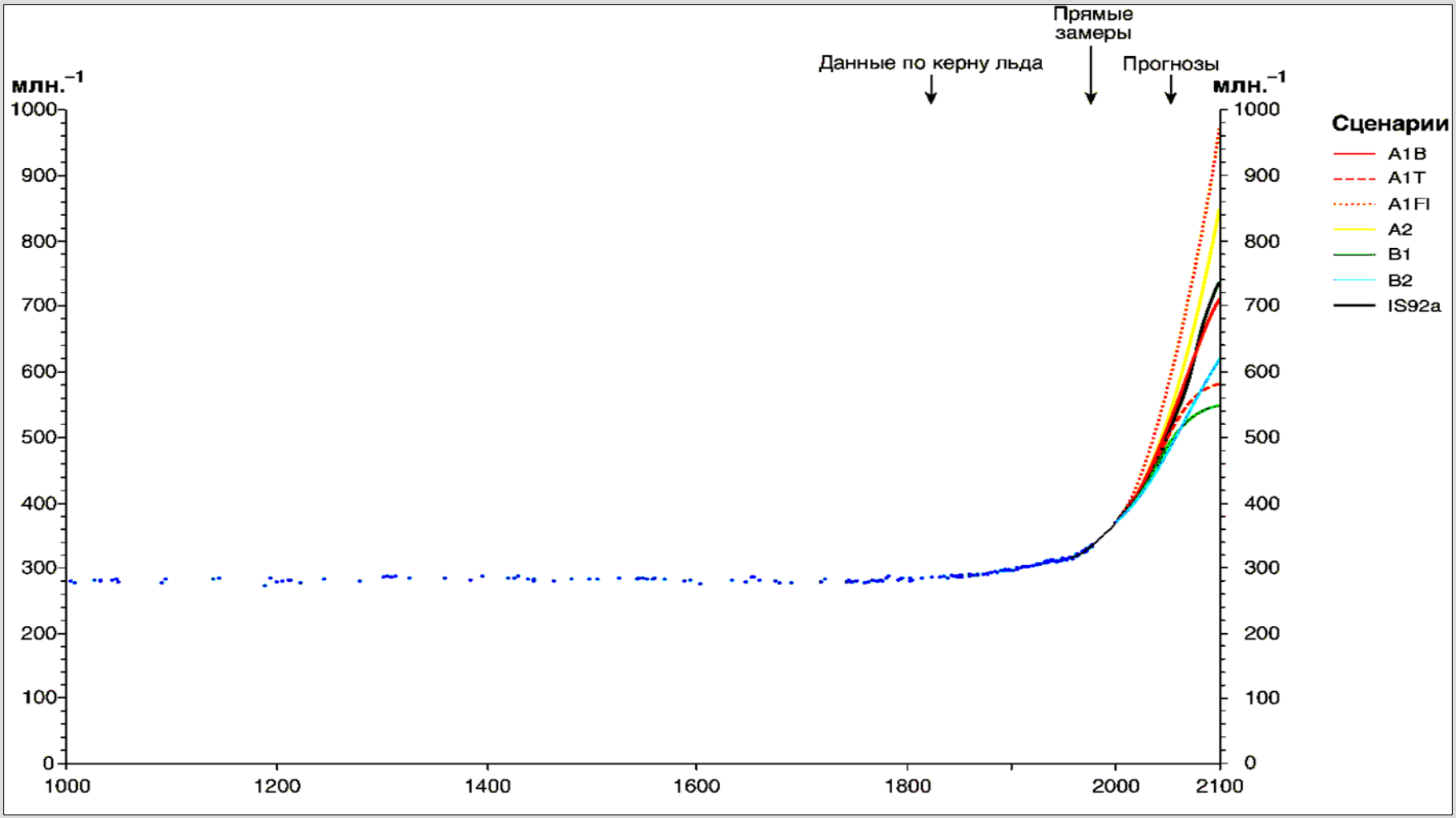


CENTRAL-ASIAN REGION

THE ARAL SEA

Rise of average annual atmospheric temperature in each country for the period of instrumental measurements

- 0,26 °C/10 years in Kazakhstan (1936-2005);
- 0,08 °C/10 years in Kyrgyzstan (1883-2005);
- 0,29 °C/10 years in Uzbekistan (1950-2005);
- 0,10 °C/10 years in Tadjikistan (1940-2005);
- 0,18 °C/10 years in Turkmenistan (1961-1995).

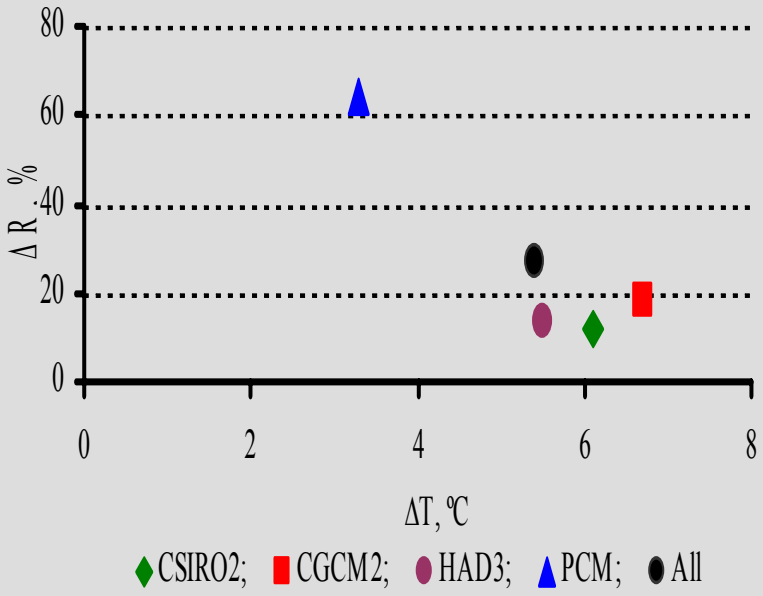


Atmospheric concentration of CO_2 for the period 1000-2000 determined on the basis of ice core data, and direct atmospheric measurements. Forecast of CO_2 concentration for the period 2000-2100. based on six illustrative scenarios of Special Report on Emission Scenarios, and IS92a

VARIATION OF YEARLY AVERAGE ATMOSPHERIC TEMPERATURE AND AMOUNTS OF PRECIPITATIONS

KAZAKHSTAN

A2



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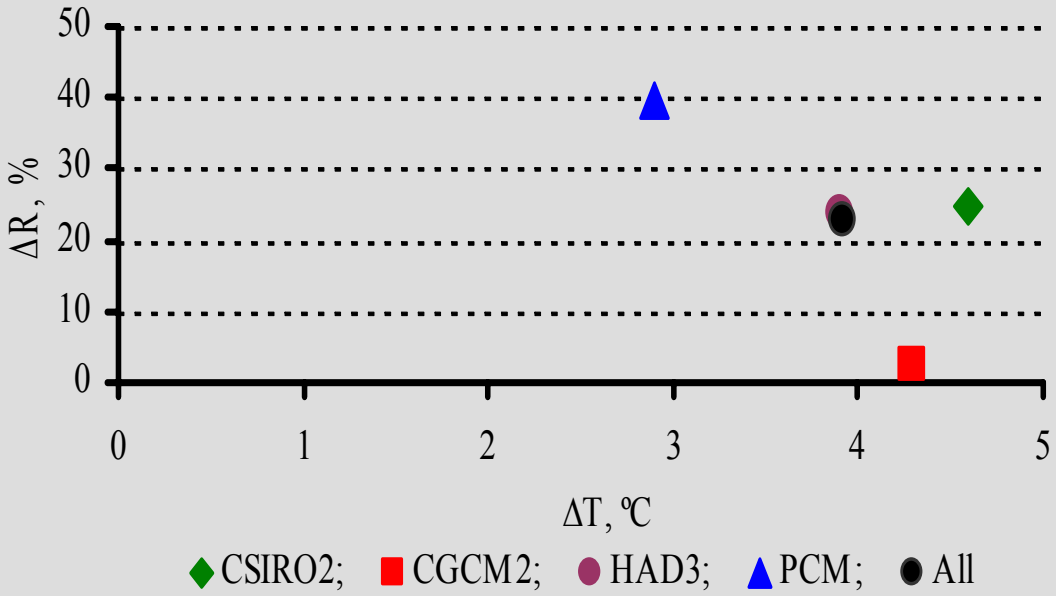
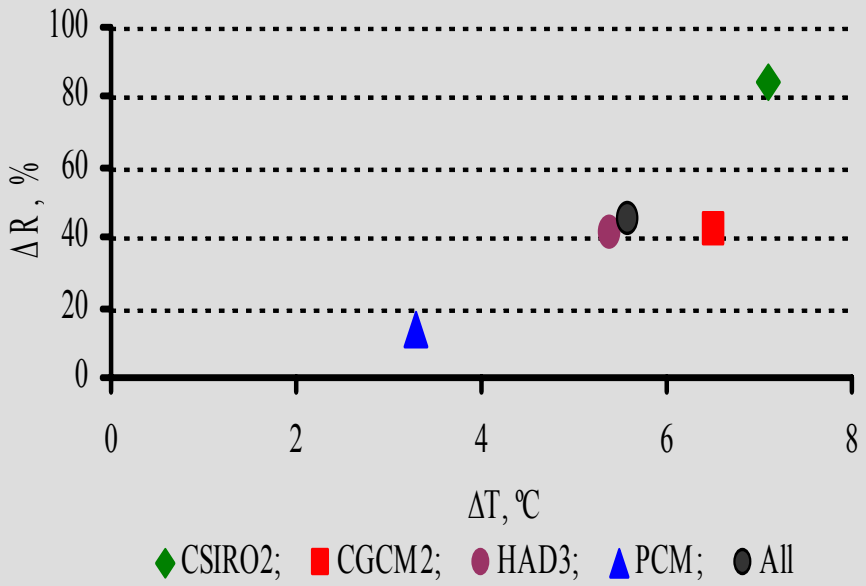


VARIATION OF YEARLY AVERAGE ATMOSPHERIC TEMPERATURE AND AMOUNTS OF PRECIPITATIONS

KYRGYZSTAN

A2



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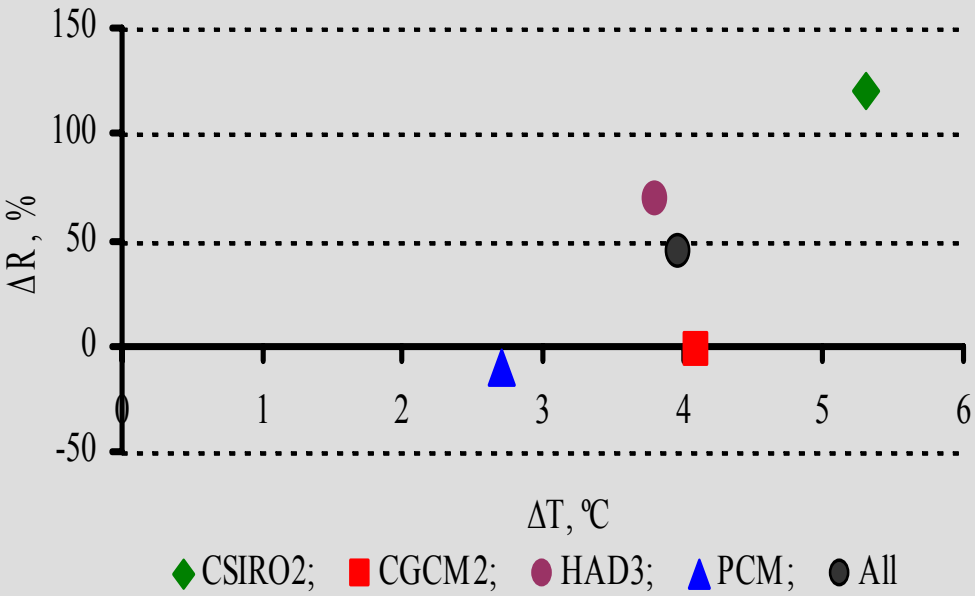
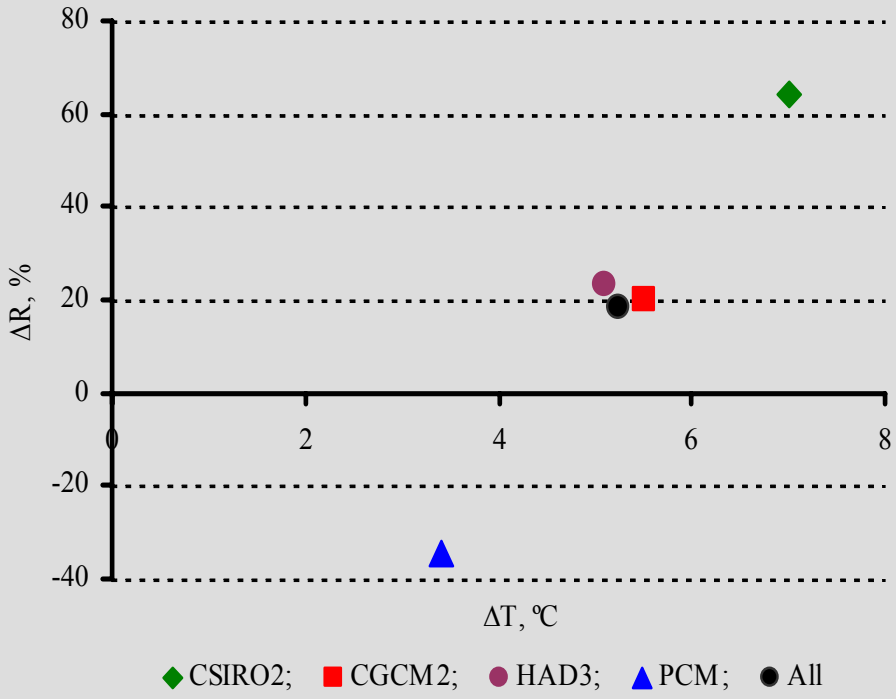


VARIATION OF YEARLY AVERAGE ATMOSPHERIC TEMPERATURE AND AMOUNTS OF PRECIPITATIONS

TADJIKISTAN

A2



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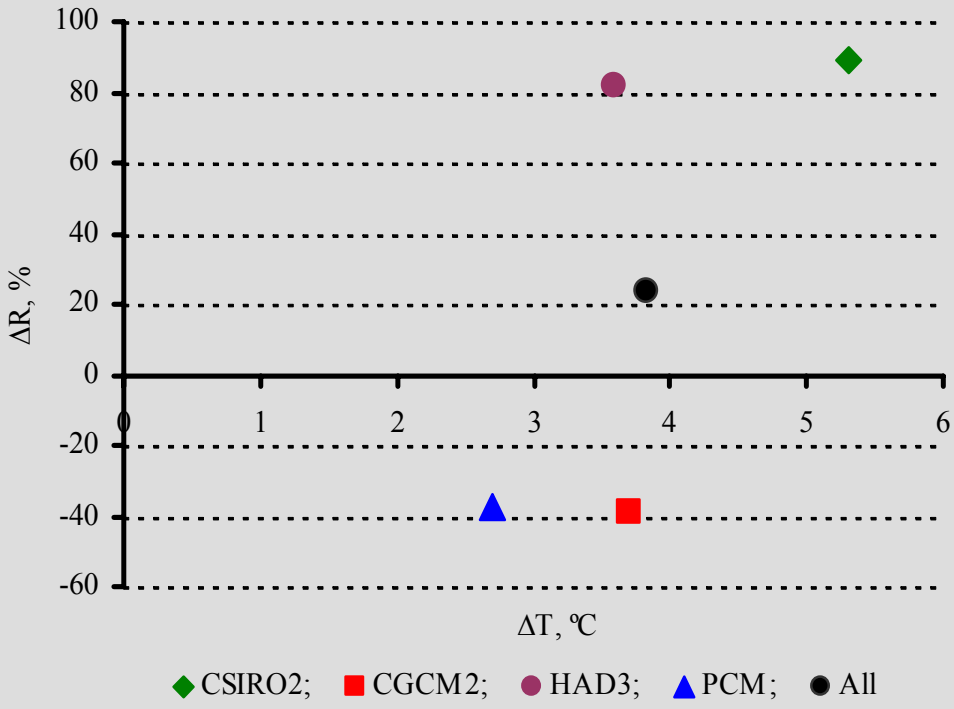

VARIATION OF YEARLY AVERAGE ATMOSPHERIC TEMPERATURE AND AMOUNTS OF PRECIPITATIONS

TURKMENISTAN

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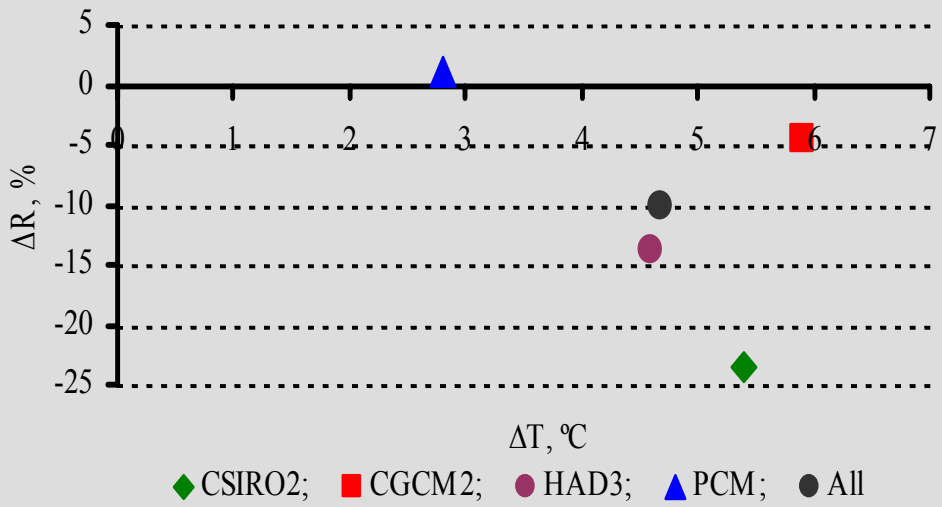

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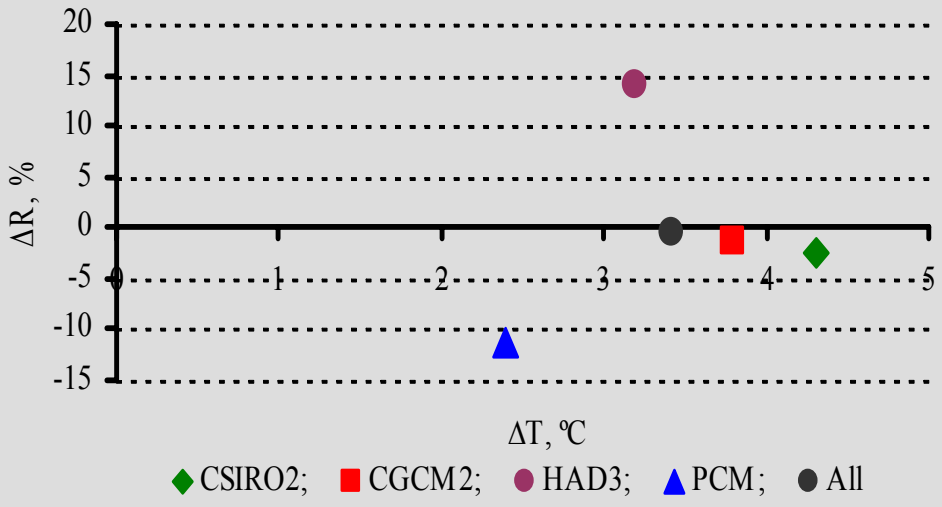
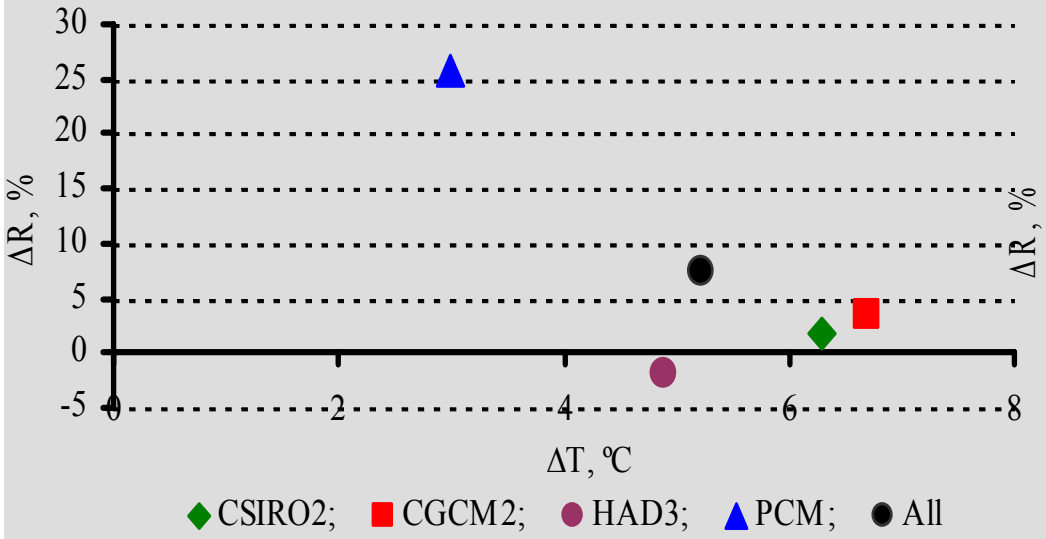


VARIATION OF YEARLY AVERAGE ATMOSPHERIC TEMPERATURE AND AMOUNTS OF PRECIPITATIONS

UZBEKISTAN

A2



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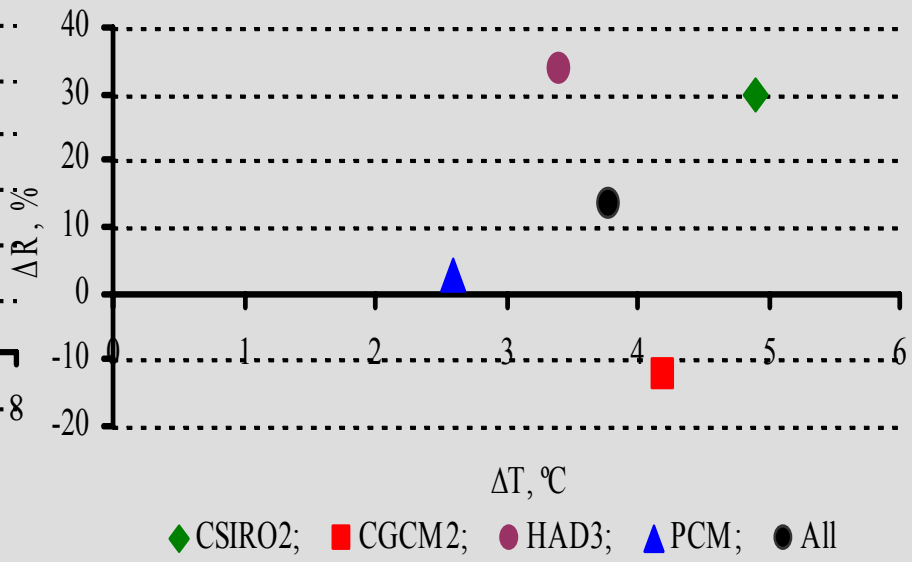
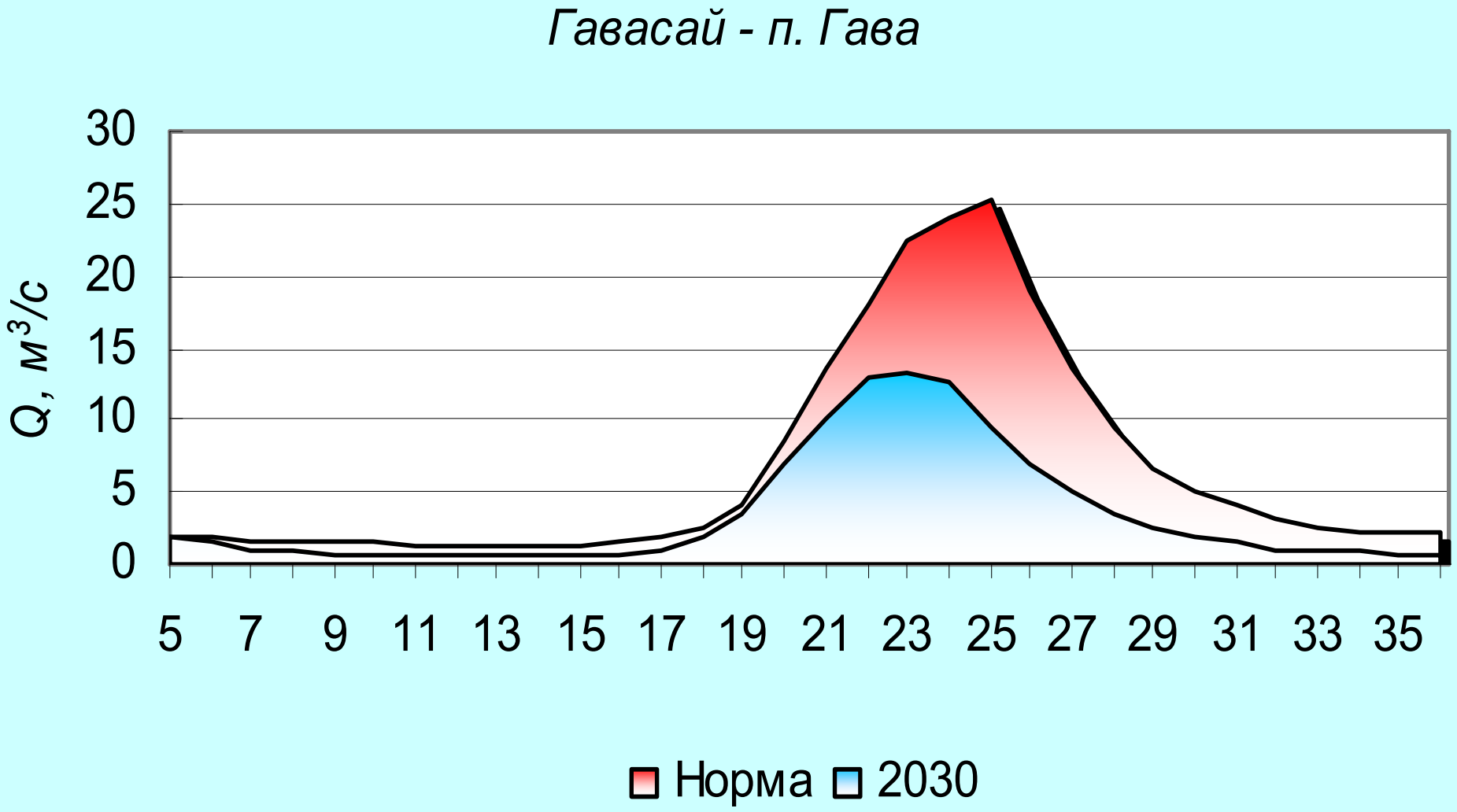
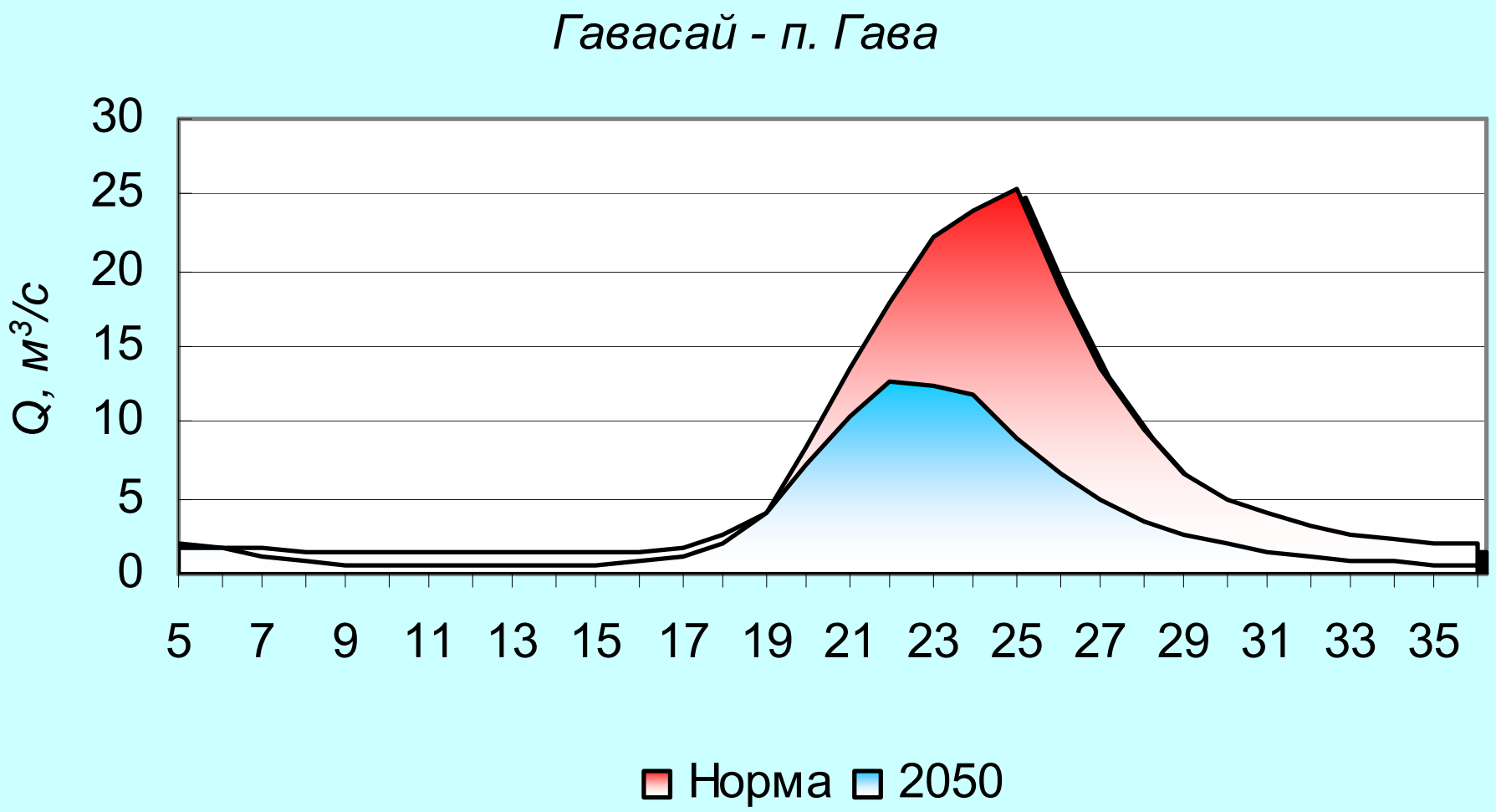


COMPARISON OF DISCHARGE RECORD OF GAVASAY RIVER RUNOFF – GAVASAY SETTLEMENT, CALCULATED ON THE SCENARIO BY 2030



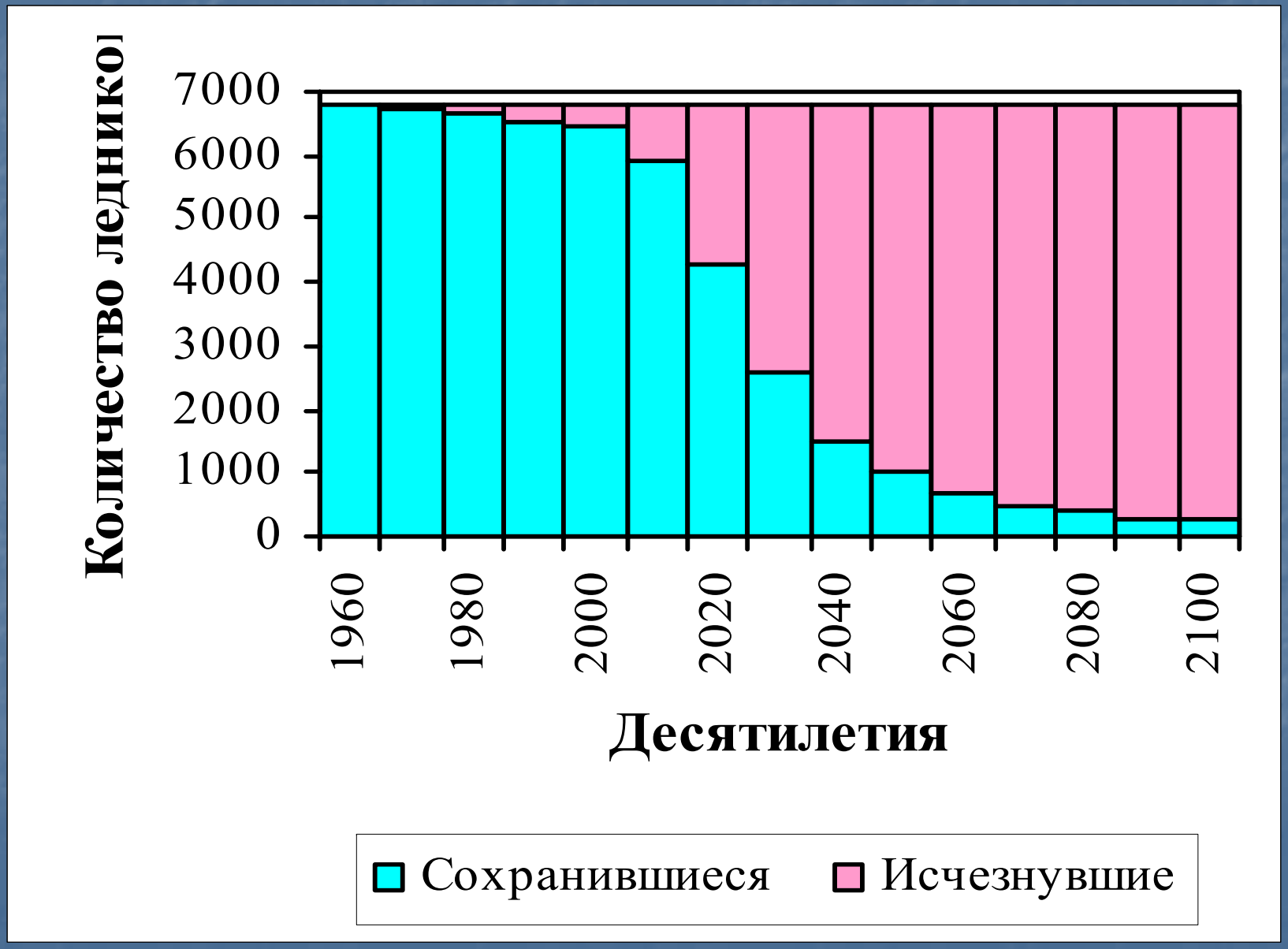
COMPARISON OF DISCHARGE RECORD OF GAVASAY RIVER RUNOFF – GAVASAY SETTLEMENT, CALCULATED ON THE SCENARIO BY 2050



Glaciation condition at the main plexuses of mountains

Источник: ТАДЖИКГИДРОМЕТ

DISTRIBUTION OF QUANTITY CORRELATION OF PRESERVED AND VANISHED GLACIERS BY DECADES



Воздействие изменения климата на сток рек Центральной Азии

Источник: ТАДЖИКГИДРОМЕТ и УЗГЛАВГИДРОМЕТ

- **ADAPTATIVE MEASURES FOR EXPECTED CHANGES OF WATER RESOURCES**

  ON REGIONAL LEVEL:

- **diversion of part of runoff inside and outside the region;**
- **measures, connected with water saving and environmental protection;**
- **development of water resources management simulation system;**

  ON NATIONAL LEVEL:

- **INTRODUCTION OF WATER-EFFICIENT PROCESSES IN AGRICULTURAL INDUSTRY, INDUSTRIAL AND DOMESTIC SECTORS;**

- **IN ORDER TO COMPENSATE INCREASE OF INTERANNUAL RIVERS RUNOFF VARIABILITY AND ITS ANNUAL VARIABILITY, ASSOCIATED WITH DEGRADATION OF MOUNTAIN GLACIATION, IT IS NECESSARY TO DESIGN AND CONSTRUCT WATER RESERVOIRS ON RIVERS, WITH GENERALLY SEASONAL REGULATION, AS WELL AS FLOOD PROTECTION AND ANTI-MUDFLOW HYDRAULIC STRUCTURES**

CONCLUSIONS:

- LONG-TERM WATER RESOURCES APPRAISAL HAS SHOWN THAT NO OF THE CONSIDERED CLIMATIC SCENARIOS THAT REFLECT WARMING, DOES NOT ASSUME INCREASE OF THE EXISTING WATER RESOURCES;

- THE ESTIMATION HAS SHOWN THAT BY 2050 THE VOLUME OF AMU-DARYA RIVER RUNOFF WOULD REDUCE ON 10-15%, AND THE VOLUME OF AMU-DARYA RIVER RUNOFF WOULD REDUCE ON 6-10%. THE EXPECTED GROWTH OF WATER CONSUMPTION FOR SUPPLY OF VITAL REQUIREMENTS OF INCREASING POPULATION, AND BUSINESSES WOULD EXERT INCREASING PRESSURE ON RIVERS RUNOFF, GLOBAL CLIMATE, AND WATER CYCLE, AND THAT THE PROBLEMS OF WATER SUPPLY DEFICIT IN ARID AND SEMIARID REGIONS OF UZBEKISTAN WOULD BECOME MORE CRITICAL;

- IN MID-TERM WE EXPECT OCCURRENCE OF CONFLICTS OF INTERESTS DURING DISTRIBUTION OF WATER AMONG IRRIGATED CROPPING AND OTHER ECONOMY SECTORS;

- ENHANCEMENT OF EFFICIENCY OF WATER USE, WATER SAVING, AND WATER DEMAND MANAGEMENT, BASED ON EQUITABLE DISTRIBUTION, SEARCHING FOR COMPROMISES BETWEEN THE INTERESTS OF THE REPRESENTATIVES OF UPPER AND LOWER REACHES OF RIVERS, DEMANDS OF WATER CONSUMERS AND ECOSYSTEMS IS A VITALLY IMPORTANT PROBLEM FOR THE STATES LOCATED NEAR THE ARAL SEA BASIN;

- THE INTRODUCTION OF PRINCIPLES OF INTEGRATED WATER RESOURCES MANAGEMENT ON THE NATIONAL AND REGIONAL LEVELS WOULD ENHANCE WATER SAVING, STRENGTHENING OF INTERSTATE COOPERATION IN THE SPHERE OF UTILIZATION OF WATER AND ENERGY RESOURCES, BASED ON PRINCIPLES OF WATER RESOURCES UNITY. DEVELOPMENT AND IMPLEMENTATION OF THE MAIN IWRM (Integrated Water Resources Management) INSTRUMENTS WOULD ENSURE RELIABLE AND SUSTAINABLE NATIONAL AND REGIONAL WATER RESOURCES MANAGEMENT UNDER CONDITIONS OF THE PRESENT AND FUTURE CLIMATIC VARIATIONS;

- THE ARRANGEMENT OF CONFLICTS BETWEEN ENVIRONMENTAL REQUIREMENTS AND IRRIGATED CROPPING APPEARS TO BE A VERY IMPORTANT TASK. THIS IS POSSIBLE THROUGH STRENGTHENING OF REQUIREMENTS TO THE REGULATION OF ECOLOGICAL DISCHARGES, REGION ENVIRONMENTAL PROTECTION BY THE NATIONAL AND INTERSTATE LEGISLATION;

- THE CONFLICT OF INTERESTS OF THE COUNTRIES LOCATED AT UPPER AND LOWER COURSES OF TRANS-BORDER RIVERS SHOULD BE RESOLVED ON THE BASIS OF MUTUALLY BENEFICIAL COOPERATION, AND MEASURED APPROACH TO IMPLEMENTATION OF PROJECTS ON CHANGING OF THE EXISTING BALANCE OF WATER CONSUMPTION FROM TRANS-BORDER RIVERS WITH ACCOUNT OF THE INTERNATIONAL RULES AND REGULATIONS;

- THE EVALUATION OF WATER RESOURCES VULNERABILITY AS A RESULT OF EXPECTED CLIMATIC VARIATIONS, OBTAINED FROM THIS CONSOLIDATED REPORT, SERVE AS A BASIC MATERIAL FOR THE NEXT STAGE OF INVESTIGATIONS FOCUSED ON DEVELOPMENT OF STRATEGY AND ADAPTATION MEASURES ON THE NATIONAL LEVEL.

THANK YOU FOR YOUR ATTENTION