Climate science for taking decisions. Kattsov V. M. Proceedings of the GGO. 2022. V. 607. P. 6–39.

Observational, modelling and projecting data on states and changes of the Earth system, as well as on impacting factors serve as a key informational basis for development, practical implementation and subsequent efficiency assessment of the national climate policy — both internal and external — with regard to goals and ways, limitations and mechanisms of climate change adaptation and mitigation. The Federal Science and Technology Programme in the field of environmental improvement and climate change for 2021–2030 (FSTP) is to address those problems. The Innovation Project of State Importance (IPSI) aimed at developing a unified national system for monitoring climatically active substances is synergetic to FSTP. The mission of IPSI-FSTP is development and enhancement of the infrastructure and technologies of monitoring and modelling for obtaining internationally acknowledged data in the field of ecology and climate, including data based products. Since 2022 IPSI-FSTP is being implemented by six consortia joining efforts of about fifty research and educational institutions: (1) Earth System: Modelling and Prediction; (2) Ocean: Monitoring and Adaptation; (3) Land: Monitoring and Adaptation; (4) Carbon in Ecosystems: Monitoring; (5) Climate Economy; (6) Anthropogenic Emissions: Cadastre.

Keywords: national climate policy, climate change, observational, modelling, projecting, unified national system for monitoring, climatically active substances.

Fig. 5. Ref. 16

Monitoring the Earth's modern climate system: data and trends. Kiselev A. A. Proceedings of MGO. 2022. V. 607. P. 40–78.

An overview of observational data on the Earth's climate system, as well as monitoring tools that provide the entire complex of these observations, is presented. The most commonly used reanalyses, built on the basis of measurement data and their processing, are indicated and briefly described. The main trends in changes in the modern global climate are noted, and the cause-and-effect relationships responsible for these changes are characterized.

Keywords: climate observations, reanalyses, greenhouse gases, temperature, precipitation, sea level, sea ice, climate extremes.

Tab. 1. Fig. 13. Ref. 56.

Climatic changes in the main components of the radiation balance of the Earth's surface and clouds on the data of actinometric observations in Russia. Khlebnikova E. I., Zadvornykh V. A., Stadnik V. V. Proceedings of the GGO. 2022. V. 607. P. 79–94.

The results of an analysis of climate changes in the main components of the radiation balance of the earth's surface (direct solar, diffuse and total radiation), as well as the characteristics of cloud cover, are presented, according to ground-based actinometric observations in Russia for 1961–2020.

Keywords: climate change, solar radiation, radiation balance, actinometry, clouds.

Fig.5. Ref. 20.

Preliminary results of direct measurements of long-wave radiation at Roshydromet stations. Makhotkin A. N., Makhotkina E. L. Proceedings of the GGO. 2022. V. 607. P. 94–109.

The results of data analysis of long-wave components of the radiation balance (downward Ed and upward Eu long-wave radiation) based on ground-based actinometric observations at the stations Kargopol, Podmoskovnaya, Samara, Verkhoyansk, Ogurtsovo, Yakutsk, Sadgorod for 2014–2020 are presented. Possible fluctuations in the long-wave components of the radiation balance in the annual and daily variations are determined. The results are preliminary because they are based on short series of observations. As information accumulates, estimates will be refined.

Keywords: radiation balance, long-wave radiation, annual and daily variations, control criteria.

Tab. 3. Fig.5. Ref. 14.

Stationary current circuit model taking into account the aerosol component of the atmosphere and clouds. Morozov V. N**.** Proceedings of MGO. 2022. V. 607. P. 110–135.

A generalization of the stationary current circuit model to the case of taking into account the aerosol component of the atmosphere is considered. Mathematical solutions were obtained for two models: a current circuit model without current sources and a circuit model with current sources. Aerosol particles are located in the surface layer in the spherical Earth model. Analysis of the obtained solutions shows a significant influence of the aerosol component on the electrical characteristics of the atmosphere. The potential and field intensity of the electric field in the earth's atmosphere increases, as well as the global characteristic- potential of the ionosphere.

Keywords: current circuit in the atmosphere, aerosol particles, atmospheric electric field.

Tab. 3. Ref. 14.

Some results of numerical simulation of heavy rainfall formation from a convective cloud. Shapovalov V. A., Zalikhanov M. Ch., Sherieva M. A. Proceedings of MGO. 2022. V. 607. P. 136–146.

The paper describes numerical experiments using a three-dimensional unsteady numerical model of a convective cloud with a detailed account of thermohydrodynamic, microphysical and electrical processes. The development of the convective cloud forming heavy precipitation is considered. Data on the spatial distribution of microphysical and dynamic characteristics of the cloud at different stages of its development are obtained. Data on the amount of precipitation are given.

Keywords: numerical modeling, heavy rainfall, convective clouds, amount of precipitation, convective cloud evolution.

Fig.7. Ref. 15.

The role of the thermal impulse in the evolution of convective clouds. Sozaeva L. T., Zalikhanov M. Ch., Sherieva M. A. Proceedings of MGO. 2022. V. 607. P. 147–1154.

The evolution of hail processes is considered according to a three-dimensional unsteady convective cloud model for three variants of initial overheating at the earth's surface (1, 2 and 3 °C). Characteristics (liquid water content, ice water content, total water content) were obtained at the 20th, 30th and 40th minutes of cloud development. It is shown that an increase in overheating to 3 ^{0}C leads to an increase in the intensity of cloud development at the initial and middle stages of cloud development. At the stage of maximum development (40th minute), the cloud parameters in all three variants become commensurate.

Keywords: mathematical modeling, convective cloud, liquid water content, ice water content, initialization of the model, overheating at the earth's surface.

Fig. 1. Ref. 11.