Development of a technique for regional climate probabilistic projections over the territory of Russia aimed at building scenarios of climate impacts on economy sectors. Part 2: Climate impact projections. Kattsov V. M., Shkolnik I. M., Pavlova V. N., Khlebnikova E. I., Efimov S. V., Konstantinov A. V., Pavlova T. V., Pikaleva A. A., Rudakova Yu. L., Sall I. A., Baidin A. V., Zadvornykh V. A. Proceedings of MGO. 2019. V. 593. P. 6—52.

Development of a technique for regional climate probabilistic projections over the territory of Russia aimed at building scenarios of climate impacts on economy sectors. Part 2: Climate impact projections. As the second stage of a multipurpose research of current and projected climate changes over the territory of Russia and corresponding impacts on conditions of the economic activity and development perspectives of major economy sectors (setting of the task is described in the part 1 of this paper), an analysis is undertaken of the climate change impact quantitative projections detailed in the physical and probability spaces. The impacts are considered on the construction, transport and energy producing infrastructures of the Russian economy, as well as on the agriculture. Perspectives are discussed of the regional climate probabilistic projection technique application as an instrument useful for planning adaptation to future climate changes.

Keywords: regional climate, probabilistic projections, economy, agriculture, impact assessments

Tab. 5. Fig. 17. Ref. 25.

Agroclimatic assessment of irrigation norm of agricultural crops in the South of Kazakhstan in the climate change conditions. Baisholanov S. S., Mukanov E. N. Proceedings of MGO. 2019. V.593. P. 53—69.

On the example of Almaty region agroclimatic assessment of irrigation norms of agricultural crops in the South of Kazakhstan is conducted and their change by 2030 is forecast. For this purpose, a scheme for calculating the irrigation norm of agricultural crops based on the meteorological data is developed. Formula for calculating the irrigation norm used in the absence of data on soil moisture reserves and deep occurrence subsoil water is proposed. Based on the proposed scheme the irrigation norm of agricultural crops in 4 districts of Almaty region is calculated, in the conditions of modern and expected by 2030 climates. The expected climate change will lead to growth in the irrigation norm of agricultural crops by an average of 5%.

Keywords: agriculture, irrigated agriculture, irrigation norm, agricultural crops, vegetation period, total water consumption, climate, climate change.

Tab. 5. Ref. 14.

Climate Changes and Estimates of Perspective Using the Artificial Wash Territories in St. Petersburg City-Planing. Pavlovsly A. A., Menzhulin G. V. Proceedings MGO. 2019. V. 593. P. 70—84.

The modern tendencies of civilization process development which manifesting in megacities progressing growth pose before the city-planners and climate change scientists the important problems concerning to estimates of its perspective development. It is not inconceivable that internally non-coordinated projects besides expected the positive ones can finally will result to negative consequences. Aforesaid statement is quite possible applied to Saint-Petersburg because at present for its benefit the New General City Plan is developed. In this document the important role belongs to city-planning development of Finish gulf cost and its water area. As applied to this Perspective Plan authors of this paper analyze the possible collisions among its some items: (1) extremely strained projects on new inwash areas, (2) changes of open-and-close operating of flood protecting dyke gates for perspective intensification of Finish gulf and Neva river shipping, and also such climatic factor as (3) very possible uncertainties in flooding phenomena recurrences, (4) changes in hydrograph regime of Neva river.

Keywords: climate changes, inwash territories development, perspective projects of St.Petersburg city development

Fig. 1. Ref. 18.

Monitoring of the air pollution as a tool for evaluation of the effectiveness of setting the standards of pollutant emissions and their control during unfavorable meteorological conditions. Genikhovich E. V., Kirillova V. I. Proceedings of MGO. 2019. V. 593. P. 85—98.

In this paper, long-term variations of the 98-th percentiles and annual maxima of concentrations of different atmospheric pollutants are considered as indicators of efficiency of setting the emission standards and additional control measures aimed to the reduction of the maximum values of these concentrations during unfavorable meteorological conditions. Possibilities of such an approach are demonstrated using ten-year-long observations of concentrations of 15 atmospheric pollutants for the city of Krasnoyarsk. It is shown, in particular, that the maximum concentrations of six pollutants (nitrogen mono- and dioxide, CO, HF, H_2S and ethylbenzene) are visibly reduced and corresponding concentrations of five pollutants (benzene, xylene, toluene, SO_2 and HCl) are significantly increased. Possible reasons for these changed are discussed in the paper.

Acidity of the atmospheric precipitation in the Northwest of Russia. Semenets E. S., Pavlova M.T. Proceedings of MGO. 2019. V. 293. P. 99—115.

Daily data quality assessment of precipitation acidity is given. It is shown that irregularityof the selection, storage and the analysis rules often result in extreme values of precipitation acidity. A spatial distribution and temporary dynamics of atmospheric precipitation acidity in the Northwest territory of Russia are also considered. Results of observations show that in the last 10 years there is a decrease in precipitation acidity connected with atmospheric pollution changes.

Experimental studies of the amplitude characteristics of atmospherics.
Snegurov A. V., Snegurov V. S. Proceedings MGO. 2019. V. 593. P. 116—149.

The results of experimental studies of the amplitude characteristics of atmospherics at frequencies of 0,5, 0,9 kHz and in the frequency band 0,3–60 and 3–60 kHz are presented. An estimate is given for the standard deviation of the amplitudes of the electrical and magnetic components of lightning radiation for different observation intervals and at different distances. The distributions of EH field amplitudes are logarithmically normal with a standard deviation of 3,5 to 13,0 dB. The maximum values are observed in the near to 20 km zone for wideband signals and up to 40 km for narrowband signals.

Keywords: lightning discharge, experimental studies, standard deviation.

Tab. 13. Fig. 11, Ref. 32.

Validation the date output of the global model of the atmosphere in days with the development of convection according to data of aerological sensing with time advance on the two-day. Kagermazov A. H. Sozaeva L. T. Proceedings of MGO. 2019. V. 593. P. 150—159.

On the basis of correlation analysis it was assessed the degree of agreement (validation) of predictive values of the atmospheric stratification (24 hours in advance), obtained from the global atmospheric model (T254, NCEP) with the actual data of upper-air sounding of meteorological station in the North Caucasus (Mineralnje Vodi, Divnoje). It shows the high degree of coincidence of planned and actual data.

Keywords: validation, the output of the global model, the upper-air sounding, advance time, correlation.

Tab. 2. Fig. 1. Ref. 12.

Reproducing of atmospheric stratification in order to predict convective phenomena using the WRF-ARW model. Toropova M. L., Rusin I. N. Proceedings MGO. 2019. V. 593. P. 160—176.

The article deals with the task of reproducing atmospheric stratification using the numerical weather prediction model WRF. The task of correct forecasting of stratification is very important, since the obtained stratifications are used to predict convective phenomena. The errors of reproduction of stratification at different vertical levels (both on the ground and in the middle and upper troposphere) and under different weather conditions (thunderstorm and "fair weather" cumulus) are considered. To assess the significance of the factors, analysis of variance (ANOVA) was used. It is shown that there are errors in surface values of temperature and dew point temperature, as well as errors in estimating the humidity of the lower and middle troposphere, which can lead to errors in the prediction of convection.

Key words: numerical weather prediction, WRF, stratification, thunder, ANOVA.

Tab. 5. Fig. 3. Ref. 22.

Features of development of empirical model of convective clouds. Appaeva Zn. Yu. Proceedings of MGO. 2019. V. 293. P. 177—183.

The data of radar observations for 2011–2016 were previously processed and a physical and statistical model of single-cell hail clouds observed in the North Caucasus was constructed. In this paper, to clarify the empirical model and study the features of the development of convective clouds in the region, radar observations for 2017–2018 were additionally processed. The new results in general do not contradict the previously constructed distributions of the main radar characteristics of single-cell hail clouds.

Keywords: Radar, single-cell hail clouds, empirical model, distributions of the main radar parameters, comparative analysis, precipitation.

Fig. 2. Ref. 7.