УДК 551.5(470+571)

Climatic factors of energy consumption in Russia: trends, variability, assessment uncertainty. Khl e b ni k o va E. I . , S a l l I . A . , Proceedings of MGO. 2013. V. 569, P.

The results of the analysis of both observed and expected changes in energy consumption for the cold and warm seasons over Russia are given. As a basis of the analysis the observational data (up to 2010) and the data of the ensemble of global climate models CMIP5 are used.

УДК 551.584

Agroclimatic resources and agricultural productivity of Russia with the application of new climate scenarios in the XXI century. P a v l o v a V . N . 2013. V. 569. P.

New estimations of changes in agroclimatic conditions, bioclimatic potential and crops productivity in the XXI century for Russia's territory are presented. New scenarios for future climate, developed on the fifth stage of the work on World climate research program (CMIP5) with two options of anthropogenic impact - RCP4.5 and RCP8.5, were used. It shown that climate-based changes in bioclimatic potential and crops productivity according to ensemble scenario (RCP4.5) are positive for all time periods in the XXI century. RCP8.5 scenario calculations show that by the year 2090 we may expect reduction of productivity by 16−18% compared to modern level.

УДК 551.583

Snow cover and permafrost simulated with CMIP5 models: an assessment of current state and projected changes over the XXI century. P a v l o v a   T.   V., K a t t s o v   V.   M.,   P i k a l e v a   A.   A.,   S p o r y s h e v   P. V.,   G o v o r k o v a   V.   A. Proceedings of MGO. 2013. V. 569. P.

The Northern Hemisphere terrestrial snow cover and permafrost extent simulations over the XX and XXI centuries with an ensemble of CMIP5 climate models are analysed. A comparative assessment is undertaken against the previous generation of models − CMIP3. The seasonal cycle of NH snow cover extent is better reproduced in CMIP5 than in CMIP3 for the current climate, but inter-model scatter is still large for winter and spring seasons. Projected changes of NH snow cover and permafrost extents are shown for the two scenarios of radiative forcing of the climate system: RCP4.5 and RCP8.5. In general the comparative analysis has not revealed the significant changes in model performance in reproducing snow cover and permafrost extents. Some features of the changes in these characteristics in XXI century projected with CMIP5 models are similar to those in CMIP3 projections.

Keywords: snow cover, permafrost, CMIP5 and CMIP3 climate model ensembles.

Tab. 1. Fig. 11. Ref. 28.

УДК 551.345, 551.581.1, 551.583

Permafrost evaluation in the arctic coastal regions using multiscale system of climate models. Nadyozhina E. D., Orlenko L. R., Pikaleva A. A. Proceedings of MGO. 2013. V. 569. P.

The sea area influence on the permafrost in the coastal regions at the distances less than 25 km from the shore was analysed on the example of Laptev Sea. The evaluations of season thawing depths and soil temperatures for the average climatic conditions over the period of 1981−2000, 2041−2060 and 2081−2099 were performed. The output data of ECHAM and CMIP5 models ensemble were used for climate projections.

Key worlds: climate change, season thawing, sea influence.

Fig. 4. Ref. 12.

УДК 551.583

Expected surface air temperature, precipitation and annual runoff changes over the territory of Russia: projections with an ensemble of global climate models (CMIP5). Kattsov V. M., Govorkova V. A. Proceedings of MGO. 2013. V. 569. P.

Results are analyzed of the surface air temperature, precipitation, and annual runoff over the territory of Russia through the XXI century using an ensemble of CMIP5 climate models. The projections are shown for 3 new scenarios of radiative forcing of the climate system: RCP2.6, RCP4.5 and RCP8.5. A comparison is undertaken with CMIP3 projections under SRES scenarios. Changes are estimated of the above climate characteristics by the time of the global mean temperature increase by 2℃ relative to the pre-industrial period.

Keywords: projected climate change, temperature, precipitation, runoff, scenarios of radiative forcing, CMIP3 and CMIP5 climate model ensembles.

Tab. 8. Fig. 7. Ref. 13.

УДК 551.576

North Atlantic Sea Surface Temperature Distribution Impact on Atmospheric Circulation Regime Formation in Eurasia. Pokrovsky O. M., Bushkova V. Ju. Proceedings of MGO. 2013. V. 569. P.

North Atlantic sea surface temperature (SST) distribution impact on atmospheric pressure field is considered as an important factor for seasonal weather forecasting. Statistical relationship between the NAO and the SST triple in North Atlantic was established by means of the EOF. Implementation of the cross-correlation analysis permits us to reveal linkages between the AMO and the EOF SST expansion coefficient time series. This analysis demonstrate that the time series of first EOF SST expansion leads with account for the AMO time series. Similar link was found between the EOF SST and the NAO time series.

Keywords: climate index, NAO, SST, AMO, ocean-atmosphere interaction, seasonal forecasting, lead and delay phases in climate series.

Fig. 10. Ref. 18.

УДК 551.510.04

Statistical analysis of the temperature change in Russian Federation in summer (for 1966—2010). S a l l M . A . Proceeding of MGO. 2013. V. 569. P.

Statistical analysis of the hottest 10- and 30-days periods shows that temperature of these periods grows faster than the average summer temperature in the European part of Russia and the opposite situation takes place in the Western Siberia. Analysis of probability distributions leads to the conclusion that the probability of a recurrence of such heat waves as in the summer of 2010 is growing rapidly.

Keywords: climate change, grow of temperatures, extremely hot weather.

Fig. 8. Ref. 6.

УДК 551.577.38

A role of blocking processes in forming of droughts in Ukraine. S e m e n o v a I . G ., Proceedings of MGO. 2013. V. 569 P.

The conditions of the regional blocking of the atmospheric circulation for periods of strong spring-summer droughts in Ukraine are investigated using the blocking index of Lejenas-Okland. It is showed that the areas of blocking maximum were within the Ukrainian region during all season. Most intensity of blocking was observed in May. In June the feature of process is a forming the second peak of blocking in the Ural area.

Keywords: drought, blocking index, atmospheric circulation.

Fig. 3. Ref. 15.

УДК 551.584

Spatial distribution of snow-cover height of the site of the Winter Olympic Games «Sochi-2014» for mountain cluster. P i g o l t s i n a G . B ., Z i n o v y e v a N . A . Proceedings of MGO. 2013. V. 569. P.

Quantitative estimation of spatial variability of the snow-cover height in the complex terrain of the site of the Winter Olympic Games «Sochi-2014» was fulfilled. Maps of the long-time average annual snow-cover height in February and March for north slope of Aibga were plotted.

Keywords: snow-cover, spatial variability, mountain relief, plotting.

Tab. 2. Fig. 6. Ref. 9.

УДК 551.521.31

The possibility of joint of sums of solar radiations calculated in different ways. Stadnik V. V., Trofimova O. V., Shanina I. N. Proceedings of MGO. 2013. V. 568. P.

Monthly and annual totals of global radiation data observed in standard acti-nometric time frames and by continuous recording were compared. As a result of this comparison updated coefficients were obtained for recalculation of radiation amounts that are evaluated in different ways. An estimation of the error of recal-culation of long-term average amounts of total radiation and amounts for some years is provided. The map of annual amounts of total radiation for the period 1981−2000 years is an example of the possibility of sharing of the amounts of radiation obtained by different ways.

Keywords: solar radiation, observations made in a discreet time, automatic re-corders, the method of trapezoid, correction coefficient.

Tab. 6. Fig 4. Ref. 8.

УДК 551.580

The method of calculating snow loads due to actualization and harmonization The National Standards implementing Eurocode. Peters A. A., Medvinskiy G. A. 2013. V. 569. P.

The different methods of calculating snow loads are considered. It is shown that the most appropriate method is a method which is used in Construction norms and specification 20.1.3330.2011 "Loads and effects". The snow loads was calculat-ed according to observation of 1965-2010 and used to draw up "The National Standards implementing EN1991-1-3 Eurocode 1 Actions on structures - Part 1−3: General actions - Snow loads". The snow load map of the Russian Federation was presented. The characteristic values of ground snow loads given are referred to mean recurrence interval equal to 50 years. In order to specificate the snow load map at the regional level the territory of St. Petersburg was zoned.

Keywords: snow loads, the National Standards implementing EN, ground snow load.

Tab. 1. Fig. 2. Ref. 16.

551.521.31

Evaluation of long-term changes of solar radiation in Asia. Samukova E. A. Proceedings of MGO. 2013. V. 569. P.

There are presented the results of estimating the linear trends of the seasonal and annual values of global radiation in 1964–2010 as well as of diffuse and direct radiation in 1990–2010 that were measured at 72 radiometric stations in Asia. The decrease of global radiation has been detected in 1964-1989 on the average by 1–2% per decade. In 1990–2010 the negative tendency of incident solar radiation has been preserved only in India and Indo-China, in other regions the increase of incident solar radiation to the earth surface on the average by 1–4% per decade is observed.

Key words: global, diffuse and direct solar radiation, approximation by the linear trend.

Tab. 1. Fig. 3. Ref. 19.

УДК 551.501.777.001.5

Duration of precipitation of various gradations intensity on the territory of Russia and their change in time. Bogdanova E. G., Zorina A. A. Proceedings of MGO. 2013. V. 569. p.

The average annual total duration values for weak, moderate, intensive and very intensive rainfall are calculated for 457 climatic Roshydromet's stations for the period 1976–2010. The temporal changes (linear trends) of annual precipitation duration of different intensity are calculated on each station, their spatial distribution is presented and analyzed on territory of Russia.

Keywords: duration of precipitation, gradation of intensity, temporal and spatial changes of duration.

Tab. 2. Fig. 1 .Ref. 5.

УДК 551.006.92 (47+57)

The results of the experimental exploitation of the Weighing automatic precipitation gauge SF-11. Gavrilova S. Yu., Kurakovskaya A. I. Proceedings of MGO. 2013. V.569 P.

The paper discusses the problem of automatic measurement of precipitation. The up-to-date technical and methodological requirements for the new network precipitation gauge accounting for the specifics and variety of weather conditions in Russia have been formulated. The results of experimental exploitation of new weighting precipitation gauge SF-11 at the field MGO test site in Voeikovo are presented. Comparison of the results of measurements by SF-11 was carried out to daily precipitation measurements provided by standard precipitation gauge O-1 as well as to corrected precipitation amounts. Based on the analysis results the assessment of SF-11 exploitation parameters and recommendations for their improvement have been developed. The perspectives of implementation of weighing automatic precipitation gauges across Russian meteorological network, notably in high latitudes are discussed.

Keywords: precipitation, weighing gauge, form of precipitation, intensity, amount, comparative measurements.

Tab. 1. Fig. 5. Ref. 11.

УДК 551.510.04

Methodology of the urban air quality forecasting using a limited network of monitoring stations. Kirillova V. I., Nikolaev V. D., Sonkin L. R., Bekhtereva G. V., Kogocheva L. V., Jalinskaja E. E. Proceeding of MGO. 2013. V. 569, P.

A methodology of air quality forecasting in urban areas using a limited network of monitoring stations is discussed in this paper. It is tested using the data of monitoring of the air pollution in Petrozavodsk. It is shown that the discussed methodology is rather efficient. The use of the new method in Rosgidromet operational activities makes it possible to extend a list of cities where a forecast of pollution is carried out.

Keywords: air quality forecast, air pollution monitoring, unfavorable meteorological conditions, daily maximum concentration of pollutant, statistical model.

Tab. 1. Ref. 12.

УДК 551.510.04

Bacground atmospheric precipitation components. P e r s h i n a   N.   A. P a v l o v a   M. T. Proceedings of MGO. 2013. V. 569. P.

Total mineralization of atmospheric precipitation consists of sea and continental aerosols and gases. Sea, continental and gas components in background concentration have been determined by calculation method under experimental data of precipitation composition on stations that are situated in different climatic and geographical zone of European and Asiatic Russia region.

Key words: chemical atmospheric precipitation, sea, continental and gas components, background concentration, aerosol.

Tab. 1. Fig. 3. Ref. 8.

УДК 551.508.21

The improvement of instrument constants of the Roshydromet standard pyrheliometers. B o g o m o l o v   I. V., K l e v a n t s o v a   V. A., P a v l o v   A. V. Proceedings of MGO. 2013. V. 569. P.

Instrument constants of the standard Engstrцm pyrheliometers are improuved as a result of their comparisons with the radiometer PMO-6CC № 0817.

Keywords: solar radiation, pyrheliometer, radiometer, standard.

Tab. 1. Fig 2. Ref. 6.

УДК. 551.326:551.521(268)

Some results of researches of reflectivity of hummocks slopes in the central Arctic area of Arctic basin. I v a n o v   *B. V.,* P o l i a k o v   C. P. Proceedings of MGO. 2013. V. 569. P.

Experimental results of reflecting properties of hummocks slopes in the central Arctic area, carried out on ice base ″Barneo″ in April 2010, are presented. The spectral measurements of reflective characteristics of the side surfaces of hummokcs under different light conditions were carried out in the first time.

Key words: Arctic, hummocks, albedo*.*

Fig. 2. Tabl. 2. Ref. 15.

УДК 551.594.21

The influence of thunderstorm lightning on the global electric circuit.
Morozov V. N. Proceeding of MGO. 2013. V. 569, P.

The influence of lightnings on the global ionospheric potential and strength of electrical field near the Earth's surface is calculated The calculations bases on the nonstationary theory of the global circuit that includes thunderstorms as the basic generators of the electrical field of atmosphere.

Key words: atmospheric electricity, modeling of influence of lightning on electric field of atmosphere.

Tab. 1. Ref. 9

УДК 551.594

Radio electric emanation from small-scale atmospheric electrical discharges.
Divinsky L. I., Mayboroda L. A. Proceedings of MGO. 2013. V. 569. P.

Small-scale atmospheric electrical discharges, occurring in the clouds at the initial stage of the lightning process, are examined. A model of the discharge process is analyzed and key parameters of aperiodic radio electric waves accompanying the discharge are defined.

Keywords: thunderstorm, radio electric emanation, lightning damage to planes.

Fig. 5. Ref. 22.

УДК 551.521.64

Impact of atmospheric electric field variations, caused by meteorological phenomena, on neutron monitoring. Antonova V. P., Drobzhev V. I., Kryukov S. V., Shlugaev Yu. V. Proceedings of MGO. 2013. V. 569. P.

We study the impact of the atmospheric electric field variations, caused by meteorological phenomena, on results of neutron monitoring at the Tien-Shan high-altitude station. It is established that it occurs at fields more than 20 kV/m, which are observed in the thunderstorm atmosphere. Change of the neutron monitor counting rate reaches 2% and depends on energy of recorded particles. We think that capture by lead nuclei of soft negative muons with further generation of neutrons is the basis of physical mechanism of this phenomenon.

Keywords: electric field, thunderstorm, cosmic rays, neutron component.

Fig. 3. Ref. 8.