

**Method of economical substantiation of adaptation measures related with changes and variability of climate.** Kobyisheva N. V. Proceedings of MGO 2014. V.574. P. 5-38.

In the article there is represented a system of methods, which enable to evaluate in quantitative terms climatological risks, that are caused by dangerous meteorological phenomena, and to substantiate a choice of measures and purposefulness of adaptation to changes and variability of climate.

*Keywords:* climatological risks, dangerous meteorological phenomena, purposefulness of adaptation, changes of climate.

Tabl. 8. Fig. 7. Ref. 17.

**Causes of observed climate change.** Sporyshev P. V., Kattsov V. M., Meleshko V. P., Alekseev G. V., Karol I. L., Mirvis V. M. Proceedings of MGO. 2014. V.574. P. 39-124.

This article provides an overview of research related to the causes of observed climate change. The paper consists of four sections. The first section discusses the evolution of scientific ideas about the possible causes of climate change from the first studies on the impact of the greenhouse effect of carbon dioxide on the climate, made in the XIX century, until relatively modern works prior to the Fourth Assessment Report of the IPCC. The second section discusses the changes in the components of the climate system which are central to identifying human influence on global climate. The overview relies heavily on the Fifth Assessment Report of the IPCC taking into account the papers published after its publication, as well as Russian-language articles which are not reflected in the report. The third section analyzes regional aspects of establishing the causes of climate change, and assesses the impact of variety of external forcing on climate of Russia. It discusses the problems of seasonal correspondence of model simulation and observational data over different regions of Russia, as well as issues of detection of impact of external forcing on climate of Russia when considering anomalous climate phenomena. The fourth and final section examines the impact of non-anthropogenic factors on the current climate. In particular, it discusses internal variability of the atmosphere due to ocean forcing, impact of solar irradiance variation on climate, as well as the impact of radiative forcing associated with eruptions of the largest volcanoes.

*Keywords:* causes of climate change, greenhouse effect, anthropogenic impact on climate, the impact of external factors on the climate of Russia, the effect of non-anthropogenic factors on climate.

Tabl. 3. Fig. 16. Ref. 139.

**Climate change impacts on construction, land transportation, and energy industry.** Khlebnikova E.I., Datsyuk T. A., Sall I.A. Proceedings of MGO. 2014. V.574, P. 125-178.

The current concepts of climate change impact on energy, construction and land transportation in Russia are discussed. The quantitative estimates concerning the influence of climate change on the economic activities, which are obtained in recent years, are given. The assessment of future climate impacts is based on the results of calculations using global climate models CMIP5, as well as the regional climate model of high spatial resolution.

On the background of the analysis of the observed and expected changes in climate impact on the sectors in consideration the recommendations for their adaptation to climate change are discussed. Special attention is paid to the need for further investigations to extend and to improve the information content of the climate scenarios – especially with respect to extreme events.

*Key words:* climate change, climate impacts, climate models, climatic extremes, duration of heating period, heating degree-days, cooling degree-days, thermal performance of buildings, durability of constructions, atmospheric loads, precipitation intensity, freezing and thawing cycles, transport infrastructure, energy infrastructure

Tabl. 3. Fig. 15. Ref.77.

**Renewable Energy Sources.** Stadnik V. V., Elistratov V. V. Proceedings of MGO. 2014. V.574, P. 179-223.

The results of the use of resources of the main types of renewable energy sources (wind, solar, geothermal and bioenergy) in Russia and the sensitivity of renewable energy to climate change are presented.

*Keywords:* solar energy, wind energy, geothermal energy, bioenergy, energy potential, climate change.

Tabl.3, Fig.8, Ref.61.