

PAPER • OPEN ACCESS

Climate Change: Causes, Risks, Consequences, Problems of Adaptation and Management (CLIMATE-2019)

To cite this article: I I Mokhov *et al* 2020 *IOP Conf. Ser.: Earth Environ. Sci.* **606** 011001

View the [article online](#) for updates and enhancements.

239th ECS Meeting

with the 18th International Meeting on Chemical Sensors (IMCS)

ABSTRACT DEADLINE: DECEMBER 4, 2020



May 30-June 3, 2021

SUBMIT NOW →

Climate Change: Causes, Risks, Consequences, Problems of Adaptation and Management (CLIMATE-2019)

I I Mokhov, A V Chernockulsky, I A Repina

A.M. Obukhov Institute of Atmospheric Physics, Moscow, Russia

E-mail: mokhov@ifaran.ru

Abstract. The conference “Climate Change: Causes, Risks, Consequences, Problems of Adaptation and Management” was held in Moscow in November 2019. The results of various areas of climate research were presented at the conference, including the diagnosis of modern climate change based on observational data, reanalysis and paleoreconstructions; modeling of current and future climate change; risk assessment of extreme climatic events; determination of the relative role of natural and anthropogenic factors in climate change; studies of the socio-economic consequences of climate change and adaptation to them. The conference was attended by 214 participants from 46 organizations of the Russian Academy of Sciences, Roshydromet, universities and others. 72 oral reports were presented, including 15 invited talks, and 86 poster presentations.

In 2018, the conference was held in Moscow on the program of the Presidium of the Russian Academy of Sciences “Climate Change: Causes, Risks, Consequences, Problems of Adaptation and Management”. As a result of the discussions at that conference, it was decided that it is necessary to organize an all-Russian conference with the same name and with the broadest possible topics. As a result, the All-Russian Conference “Climate Change: Causes, Risks, Consequences, Problems of Adaptation and Management” was held November 26-28, 2019 in the Presidium of the Russian Academy of Sciences in Moscow. Oral, including invited, and poster presentations on key areas of climate research were presented at this conference. The program committee of the conference included leading Russian experts in the field of climate research and related fields.

Results of principal researches were presented in the following topics:

1. Diagnosis of modern climate changes based on observational data, reanalysis, and paleoreconstructions.

The reports in this research area were devoted to identifying significant trends in changes in various characteristics of the Earth's climate system, the spatio-temporal structure of changes, and diagnosing possible mechanisms of the formation of regional anomalies. The growing relevance of such studies is associated with rapid modern climate changes, especially in high latitudes with the manifestation of Arctic amplification, record-breaking regional weather and climate anomalies and an increase in the frequency of extreme events in recent decades.

2. Modeling of modern and future climate change.

Within the framework of this direction, the results of model studies of climate changes using global and regional models of varying degrees of complexity, detailed models of the earth system, including models of the general circulation of the atmosphere, ocean, sea ice, models of biogeochemical cycles, etc. were presented. Fundamental scientific problems were discussed.



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Associated with the need for a more detailed and comprehensive study of the key mechanisms of climate global and regional changes, the creation and development of new methods for studying climate predictability and obtaining climate predictive estimates, including taking into account natural climate variability - from intra-annual and interannual to multi-decadal. The need for inclusion and / or a more detailed presentation of the widest range of natural processes in different layers of the atmosphere (including the ionosphere) and the ocean, biosphere, cryosphere, and active layers of the lithosphere is noted. Adequate consideration in regional and global carbon gas exchange and in assessing its changes in the influence of regional ecosystems, including forests, marshes, and permafrost systems, is of particular importance.

3. The risk of extreme climatic events.

In this area, reports were presented on risk assessments of extreme climatic events for different regions. In recent decades, the frequency of abnormal weather and climate events has increased significantly. Marked trends and a number of the strongest weather and climatic anomalies and extreme events in Russia in recent years, including extreme heat and fires in 2010 in the European part of the country, floods in Krymsk in 2012 and Amur in 2013, Siberian fires in 2019, indicate the growing relevance and importance of relevant studies.

4. The relative role of natural and anthropogenic factors in climate change.

Presentations are delivered with quantitative assessments of the comparative role of natural and anthropogenic factors in the observed climate changes. In particular, quantitative assessments of the role of natural ecosystems in changes in the regional and global carbon balance against the background of anthropogenic greenhouse gas emissions have been made. The importance of this direction is determined, in particular, by the fact that the Russian regions are characterized by the great potential of natural ecosystems that are significant for the regulation of biosphere processes on a scale not only of the country, but of the Earth as a whole. Due to the absorption of carbon dioxide from the atmosphere by forests and the formation of atmospheric oxygen, Russia is a donor to the planet. Swamps can serve as a natural sink of greenhouse gases or a source of their emissions into the atmosphere. An adequate assessment of the potential of natural ecosystems is needed in planning and adopting action programs, including those under the Paris Agreement on Climate Change.

5. Socio-economic consequences of climate change and adaptation to them.

The reports in this area were devoted to quantitative assessments of the social and economic consequences of climate change, as well as measures to adapt to climate change and regulate (mitigate) changes. Presentations made at the conference indicate the importance of the socio-economic consequences of the ongoing climate change for the Russian regions and an increase in this importance in the future. In Russia, as a northern country, climatic changes are significantly stronger than for the Earth as a whole, and climate changes have a significant impact on natural systems, agriculture and forestry, water resources, and the infrastructure of permafrost territories. A number of reports were devoted to assessing climate change on public health. Along with the negative consequences, it is necessary to take into account potential new opportunities related, in particular, to a reduction in the heating season, the availability of resources in the Arctic shelf zone, and navigation on the Northern Sea Route. Assessments of the socio-economic consequences of climate change are necessary, in particular, for the formation and implementation of adaptation programs. Discussion of the reports presented at the conference contributed primarily to the development of methods for studying atmospheric and climatic processes. The presented reports once again confirmed that the forecast of catastrophic atmospheric phenomena and climatic variability, both regional and global, is possible only with the joint use of data from ground-based measurements, satellite sensing and modeling. A wide range of important scientific issues discussed at the conference and the attention of the scientific community showed the importance of the topics addressed both for the development of geophysics and for the economy and society.

Acknowledgments

This conference was supported by the Russian Foundation of Basic Research and Russian Academy of Science.