

Preface

The proposed topical issue has been prepared using the materials of the Fifth International Symposium on Monitoring and Rehabilitation of the Environment supported by a grant from RFBR and of the parallel International Conference on Observations, Modeling and Information Systems for Environment ((ENVIROMIS-2006) supported by a grant from EU. The first time when two scientific events have been held in parallel provided for a wider discussion of not only the obtained results, but also of the prospects for further investigations, including joint investigations in the frameworks of international projects.

According to the purposes of the Symposium on Monitoring and Rehabilitation of the Environment, to discuss new results in urgent problems on climate change, preservation of the environment and rational nature management, the following sections of the symposium worked:

- new methods and instrumentation for environmental monitoring;
- techniques for monitoring of the environment and climate;
- techniques for preservation and rehabilitation of the environment;
- monitoring and diminishing of the anthropogenic changes in Siberia (project of the Sixth European framework program ENVIRO-RISKS).

The list of topics discussed at three first sections of the symposium has not changed essentially in comparison with their content during previous, including the first Symposium in 1998. The exception is the problems of the influence of environment on the population health, which earlier were discussed in a separate section, but at this Symposium, they were presented as invited review lectures. The fourth section (upon the project ENVIRO-RISKS) was formed for the first time by suggestion of foreign colleagues at the stage of preparing the Symposium program. Its inclusion is the most concentrated reflection of the worldwide tendencies in recent investigations, which attracted great attention at all Symposia on Monitoring and Rehabilitation of the Environment. This time, the attention was accented on two tendencies.

One of these worldwide tendencies is related to the multi-disciplinary investigations, which, in the frameworks of International Geosphere–Biosphere Program, were announced as priority ones and entitled Integrated Regional Studies (IGBP Newsletters, 2002). Carrying out such investigations in different regions of the planet is conjugated not only with extension of simultaneously taken into account geospheric-biospheric and anthropogenic factors in mathematical modeling, but also with the necessity of developing technical tools and techniques for comprehensive climate and ecological monitoring of modern natural and climate changes. Such investigations of the observed changes of the environment and climate in Siberia are being carried out at the Institute of Monitoring of Climatic and Ecological Systems (IMCES) and have been coordinated in the Siberian Branch of the Russian Academy of Sciences since 1993. The results obtained are discussed yearly (alternatively) either at the Symposium on Monitoring and Rehabilitation of the Environment (since 1998) or at the Siberian Conference on Climate and Ecological Monitoring (since 1995).

Comprehensive climate and ecological investigations are among the main research tasks of IMCES SB RAS, aimed at developing “scientific and technological principles of monitoring, modeling, and forecast of climate and ecosystem changes under the influence of natural and anthropogenic factors” (the statement in quotation marks is formal formulation of the main research of IMCES). The results of integrated regional studies are discussed at this institute during more than 10 years, and the scientific conferences held there play an integrating role for many scientific collectives of Siberia working on separate aspects of natural and climate changes in Siberia. Both direct participation of foreign scientists as presenters at the conferences and extending cooperation in joint investigations under network and topical projects (one of them is the ENVIRO-RISKS Project) are evidence of the growing attention of foreign scientists (not only Europeans) to these integrated regional studies and to scientific conferences where the results of these investigations are discussed.

Another one worldwide tendency in recent investigations of the environment and climate discussed mainly at the ENVIROMIS-2006 Conference is related to the deliberate necessity of developing a new paradigm for describing the observed natural and climate changes (Amsterdam declaration, 2001). The matter is that the interaction of environment and climate complicated by anthropogenic influence, is not yet sufficiently formalized by physical principles of climate theory, which were formulated at the International scientific conference in Stockholm under support of the UN program on the environment (1974) and are initials in the mathematical modeling. The use of these physical principles for mathematical modeling was estimated at that time as “... risky work with uncertain and, perhaps, quite modest chances for success.” In spite of undoubted recent success in the field of detailed mathematical description of weather processes and calculation procedures, calculations of natural and climate changes with the models constructed are still at the level of description of the possible scenarios at one or another influence on a climate system, the calculated results need for verification, and a “small” fact can spoil “big” theory (see the paper by M.V. Kabanov “Regional aspects of modern climatology ...” in this issue on the climate phenomenon of XX century). It seems that the unavoidable step forward on the way to new paradigm in description of natural and climate changes is analysis of the available

instrumental data and revealing the principal empirical regularities for the global and regional processes, which determine the climate and ecological changes. This idea was put into principle while forming the program of the Vth International symposium on Monitoring and Rehabilitation of the Environment.

This topical issue includes the most prepared reports, which meet the title "Climate and ecological changes in Siberia" and discuss the obtained results of investigations on climate and ecosystem changes, as well as the results of development of technical tools for such investigations. Many reports on information technologies and on the problems of modeling, as well as some reports of young scientists are recommended for publication in the topical issues of other journals and/or in a separate collection of papers. The abstracts of all oral and poster presentations were published and given to participants of the symposium (Vth International Symposium on Monitoring and Rehabilitation of the Environment: Materials of the symposium, edited by M.V. Kabanov and A.A. Tikhomirov, Preprint of IMCES SB RAS, Tomsk (2006), 220 pp.).

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