

Preface

The Xth Joint “Atmospheric and Ocean Optics. Atmospheric Physics” International Symposium was hosted by the Institute of Atmospheric Optics SB RAS on June 24–28 of 2003 in Tomsk according to the Regulation of the Presidium of SB RAS and the Plan of Meetings and Conferences of SB RAS for 2003 and supported by the Siberian Branch of the Russian Academy of Sciences (SB RAS), International Society for Optical Engineering (SPIE), the SPIE Russia Chapter, and the Optical Society of America (OSA).

The Symposium incorporated the following four conferences:

- Molecular Spectroscopy and Atmospheric Radiative Processes;
- Optical Radiation Propagation in the Atmosphere and Ocean;
- Optical Investigation of the Atmosphere and Ocean;
- Atmospheric Physics.

The Symposium Program included 287 presentations, among them there were 10 plenary, 77 oral, and 200 poster presentations.

The Symposium co-chairs were Professor **G.G. Matvienko** (Tomsk) and Academician **G.A. Zherebtsov** (Irkutsk). The Organizing Committee was headed by Professor **G.M. Krekov**, and the Scientific Secretary of the Symposium was **N.L. Fateeva**.

Representatives of more than 40 research organizations and institutions from Russia, Poland, Spain, Israel, Ukraine, Belarus, and Kazakhstan took part in the Symposium. Co-authors of the presented papers were also scientists from such countries as the U.S.A., China, Korea, Austria, the Netherlands, Georgia, Tajikistan, and Uzbekistan.

The papers presented new theoretical and practical results. All sections of the Symposium Program were well represented by non-Tomsk participants. The Symposium included two plenary sessions, and its four conferences embraced 14 topical sessions and 4 poster sessions.

The plenary sessions included 9 reports concerning the most urgent problems of atmospheric optics and atmospheric physics representing all the basic topics of the Symposium.

The reports presenting new results in adaptive optics, laser spectroscopy, remote sensing of the atmosphere with a femtosecond lidar, and anthropogenic effect on the climate have attracted the greatest interest.

The Conference on “Molecular Spectroscopy and Atmospheric Radiative Processes” incorporated 6 oral and 53 poster presentations. The investigations in this field are still concentrated at the classical problems of molecular spectroscopy of atmospheric gases and radiative transfer, in particular, in anisotropic and locally inhomogeneous media. The issues of most rational application of the results of classical molecular spectroscopy to climate models and geophysical applications of atmospheric optics were discussed. This Symposium included, for the first time, the Session on “Models and Databases for Problems in Optics and Physics of the Atmosphere.”

At the Conference on “Optical Radiation Propagation in the Atmosphere and Ocean,” 24 oral and 44 poster presentations were presented. The results of investigations of atmospheric aerosol, numerical methods for solution of the radiative transfer equation, in particular, for nonspherical particles were discussed, as well as new methods for retrieval of the aerosol microstructure from the data of optical measurements. Fluctuations of optical fields in the turbulent atmosphere and the related issues of adaptive optics were considered in detail. A particular urgency of studying the relations between the temperature conditions of crystal clouds and polarization and trans-spectral backscattering characteristics in the problem of climate formation was noted.

The Conference on “Optical Investigation of the Atmosphere and Ocean” was traditionally the most numerous. A total of 31 oral and 60 poster presentations were discussed. Analysis of these papers shows that basic research into the development of mathematical models for monitoring and prediction of aerosol transport on both regional and local scales are being continued. Many reports at this conference were devoted to the development of methods and technology of new measurement systems and adaptation of sensing systems to solving particular applied problems. It is worth noting a new field connected with the study of anomalies in optical and electrical properties of the near-surface aerosol as a possible predictor of catastrophic earthquakes. In the papers on acoustic sensing of the atmosphere, the principal attention was paid to the study of the wind and turbulence conditions in the atmospheric boundary layer.

The Conference on “Atmospheric Physics” included 16 oral and 30 poster presentations. This conference incorporated the following sessions: Structure and dynamics of the middle atmosphere, Dynamics of the atmosphere and climate in the Asian region, Physical processes and phenomena in the Earth’s thermosphere and stratosphere. The activity at this conference was somewhat lower

than at the previous one. Nevertheless, the participants discussed new results concerning possible effect of the gravitophoretic forces on the seasonal behavior of aerosol layers in the stratosphere and mesosphere. The issue of transformation of the ozone layer of the Earth's atmosphere and its effect on the global and regional climate was traditionally considered at the conference.

In conclusion, the Symposium noted the following.

1. Within the framework of the Symposium, the participants have exchanged new data, results, and ideas.

2. Most active research teams working in this field have confirmed their high qualification, good base for in-depth co-operation aimed at solving some urgent problems were revealed.

3. Intensification was observed in specific applied geophysical research tasks, which forms a basis for proposals on new programs and joint projects.

4. The Organizing Committee believes that all the sub-fields discussed within the Symposium's sessions showed good promises for further development, but intensification of the coordination activity of the Ministry of Science, the State Ecology Committee of the RF, and the Presidium of RAS is desirable.

5. It was planned to hold the next International Symposium on "Atmospheric and Ocean Optics and Atmospheric Physics" in 2004 with a wider participation of foreign scientists.

The Symposium has accepted the following resolution:

1. To continue arranging regular international symposia and conferences in order to keep and extend contacts among scientists and research teams in Russia and other countries.

2. To accept as successful the experience of holding the Symposium joining investigations in the atmospheric and ocean optics and atmospheric physics. To work for widening the list of participating research teams dealing with the problems in optics of the ocean and sea surface.

3. To pay due attention to the further development of climate and ecological programs covering vast regions of Russia and the world. To favor conducting combined experiments joining the efforts of different research teams.

4. To recommend the presentations at the Symposium for publication in two topical SPIE issues.

5. To note high scientific and organizational level of the Symposium and to express gratitude to the Organizing Committee of the Institute of Atmospheric Optics, SB RAS, for organization of the Symposium.

6. To express gratitude to the Presidium of SB RAS, Optical Society of America, International Society for Optical Engineering (SPIE), as well as personally to Dr. Edmund Akopov and Mrs. Kari Apter, Manager of the OSA Executive Office Programs, for the help in organization of the Symposium including financial support and publication of the Symposium proceedings.

7. To recommend publication of a topical issue of *Atmospheric and Oceanic Optics* based on the materials presented at the Symposium.

This topical issue was prepared following this Resolution.

*Chairman of the Organizing Committee,
Professor **G.M. Krekov***