Information

On October 18–22, 2004 the International Conference on Optical Technologies for Atmospheric, Ocean, and Environmental Studies (ICOT) was held in Beijing, China.

The ICOT-2004 was organized by the Institute of Atmospheric Physics of the Chinese Academy of Sciences with participation of two institutes from the Russian Academy of Sciences: Institute of Atmospheric Physics (Moscow) and Institute of Atmospheric Optics (Tomsk).

The ICOT-2004 was held under the auspices of SPIE Russia Chapter (Russia), Anhui Institute of Optics and Fine Mechanics, Chinese Academy of Sciences (AIOFM CAS) (China), Institute of Applied Physics and Computational Mathematics (IAPCM) (China), China National Environmental Monitoring Center (CNEMC) (China), Laboratory of Dynamics of Oceanic Processes and Satellite Oceanography of the State Oceanographic Administration of China, Russian Foundation for Basic Research, National Natural Science Foundation of China (NSFC) (China), and Chinese Academy of Sciences.

Conference Chairs were Professor **Daren Lu** (Institute of Atmospheric Physics CAS) and Professor **G.G. Matvienko** (Institute of Atmospheric Optics SB RAS).

The main topics of ICOT were the following:

1) Optical methods and software for the atmosphere, ocean and environment studies.

2) In situ and remote measurements in ecology and monitoring of the atmospheric trace species.

3) Applied atmospheric spectroscopy and laser radiation propagation in the turbulent atmosphere.

4) Laser and multispectral optical instruments and applications to ecological studies of the atmosphere.

5) Novel instrumentation and technologies for monitoring of the atmosphere, ocean, land, and environment.

The ICOT-2004 lasted four working days, during one of which only the invited presentations have been given. During the closing day, the work was arranged in the form of discussions and workshops among the participants. The ICOT-2004 participants were invited to attend the technical tour to the station of the Institute of Atmospheric Physics and the excursion to the Great Wall of China.

The invited papers were presented by scientists from China, Russia, Japan, South Korea, France, and Taiwan.

The ICOT-2004 was opened with the presentation by Prof. G.G. Matvienko (Institute of Atmospheric Optics SB RAS, Tomsk, Russia), which concerned the problems of interaction of femtosecond optical pulses with droplets, aerosol particles, and gaseous constituents of the atmosphere and estimated the promises of applying such pulses to atmospheric sensing.

Delu Pan (Key Laboratory of the Ocean Dynamics Processes and Satellite Oceanography, Hangzhou, China) in his report discussed the methods of cross-calibration in satellite measurements of ocean color with the CMODIS (Chinese Moderate Imaging Spectra Radiation) spectroradiometer, having 34 channels, 20 channels of which are 20 nm wide fall within the spectral region of 0.403–1.043 μm, and 4 channels fall within the IR region: 2.15–2.25, 8.4–8.5, 10.3–11.3, and 11.5–12.5 μm.

The presentation by A. Barbe was devoted to the spectroscopy of atmospheric ozone and compilation of new high-accuracy data bank, including more than 500 000 ro-vibrational transitions in the IR region. This many-year program of the Champagne-Ardennes University (Reims, France) and the Institute of Atmospheric Optics SB RAS (Tomsk, Russia) has led to creation of the Internet-accessible (http://ozone.iao.ru; http://ozone.univ-reims.fr) information system for specialists, dealing with the molecular and atmospheric spectroscopy, atmospheric chemistry, and gas analysis.

The measurement results on the atmospheric dust and aerosol transport in the Asian region at the network of atmospheric lidars, operating in China, South Korea, and Japan, were reported by N. Sugimoto (National Institute for Environmental Studies, Tsukuba, Japan) and Choo Hie Lee (Lidar Center Institute for Laser Engineering, Kyung Hee University Yongin-Si, Gyeonggi-Do, Korea). This network employs aerosol lidars based on Nd:YAG lasers, conducting regular measurements. Thus, the lidar station in Suwon (South Korea) yielded more than 30 000 vertical

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aerosol profiles for the period since 2000 until 2004, which were processed and collected in the appropriate database.

Dr. Jun Zhou presented data obtained at the Anhui Institute of Optics and Fine Mechanics, CAS, Hefei, China; Institute of Atmospheric Physics, CAS, Beijing, China; University of Tokyo, Tokyo, Japan; and Chiba University, Chiba, Japan on the seven-year series of lidar measurements of dust aerosol transport in Southeastern Asia. Two types of the vertical profiles of the Asian dust extinction coefficients have been found.

M.A. Kalistratova (Institute of Atmospheric Physics RAS, Moscow) has analyzed the experimental data, demonstrating the role of mesoscale quasi-regular inhomogeneities ("coherent structures") in the mass and heat exchange and the propagation of electromagnetic waves.

The presentation by Yu.N. Ponomarev with co-authors (Institute of Atmospheric Optics SB RAS) was devoted to the use of a methanometer based on a tunable semiconductor laser (1.65 μm) for investigation of the background methane concentration over Lake Baikal and detection of localized methane seeps from water into the atmosphere in the regions of bottom occurrences of gas-hydrates.

New algorithms of cloud screening for compilation of the AERONET database were discussed in the report by Jinhuan Qiu (Institute of Atmospheric Physics, CAS, Beijing, China), along with the principles and criteria of processing the AERONET data.

The optical and microphysical characteristics of cirrus clouds, measured since 1994 with a two-wave (1064 and 532 nm) Rayleigh lidar in the region of the tropopause were analyzed and presented by J.B. Nee with co-authors (Department of Physics, National Central University, Taiwan). The lidar data were compared with the data of satellite measurements.

A.Y.S. Cheng with co-authors (City University, Hong Kong, China) reported the data on the all-the-year-round measurements of the visibility range, temperature, and relative humidity in the International airport of Hong Kong. These data were combined with the measurements of the aerosol concentration near the airport to obtain the data on the annual and seasonal characteristics of aerosol. The results obtained were used to improve the methods for restoration of the aerosol extinction coefficient from lidar measurements.

Ruizhong Rao (Anhui Institute of Optics and Fine Mechanics, CAS, Hefei, China) in his report discussed the experimental and theoretical results on the influence of optical characteristics of the turbulent atmosphere on the propagation of optical radiation in the traditional approach.

The report by E.N. Kadygrov with co-authors (Central Aerological Observatory, Russian Federation) was devoted to the urgent problem of a heat island over a megalopolis. The quantitative data on the effect of the urban heat island on the thermal state of the atmospheric boundary layer were obtained for Moscow with the aid of the MTP-5 meter of temperature profile, developed by the authors for the 600 m thick layer. The meters of temperature profile were set at the center of Moscow and at the distances of 20 and 50 km from the center. This report analyzed the data of measurements since 2002 until 2004.

In addition, ICOT-2004 involved 48 15-minute oral presentations and 50 poster presentations. A series of papers from the Institute of Optics and Fine Mechanics (Hefei, China) concerned the problem of simulation of laser beam propagation and image transfer through the turbulent atmosphere. The experimental data on displacements of a laser spot from a focused laser beam were obtained with a coordinate-sensitive photomultiplier. At the end of a 1000 m long atmospheric path, fluctuations of laser beam intensity and centroid have been measured simultaneously (Ruizhong Rao with co-authors).

A mobile differential absorption lidar, designed at the Institute of Optics and Fine Mechanics CAS, operated at the radiation wavelengths of 289.04, 288.38, and 299.05 nm was applied to the quasi-simultaneous measurements of the SO_2 and O_3 content in the atmosphere (Lin Xiaogin with co-authors). The conceptual design of a Raman lidar for determination of the SO_2 and NO_x concentrations in plumes emitted by metallurgical plants was considered in the paper by G.G. Matvienko with co-authors (Institute of Atmospheric Optics SB RAS). The creation and application of an eye-safe pulsed microlidar for investigation of the characteristics of atmospheric boundary layer in Hong Kong were considered by A.Y.S. Cheng (City University, Hong Kong, China).

The series of papers by V.V. Zuev with co-authors (Institute of Atmospheric Optics SB RAS, Tomsk, Russia) demonstrated the results of lidar sensing of the gas and aerosol composition and stratospheric temperature at the Siberian Lidar Station. These results were complemented with the UV spectrometer measurements of the total content of NO_2 and O_3 and vertical profiles of NO_2.

The combined investigations of aerosol in the atmospheric boundary layer along the Moscow–Khabarovsk–Moscow–Murmansk route (Project "Troika"), which allowed the zoning of the territory along the route in accordance with the atmospheric pollution level, were reported by

I.G. Granberg (Institute of Atmospheric Physics RAS, Moscow, Russia). This program involved specialists from the Federal Scientific Center "Karpov Institute of Physical Chemistry" (Moscow, Russia). The results of the joint investigation of submicron aerosol in the Beijing atmosphere by the nephelometric method were discussed by A.S. Emilenko, M.A. Sviredenkov, and Gengcheng Wang (Institute of Atmospheric Physics RAS, Moscow, Russia; Institute of Atmospheric Physics, CAS, Beijing, China). Many papers presented at ICOT-2004 demonstrated the results of routine measurements of the total content of gaseous atmospheric constituents such as O_3, NO_2, H_2O, CO_2, CO, and CH_4 by ground-based spectrophotometric and radiometric devices (V.N. Aref'ev with co-authors, Scientific and Production Association "Taifun," Obninsk, Russia; N.F. Elanskii and A.N. Gruzdev with co-authors, Institute of Atmospheric Physics RAS, Moscow, Russia; Jingmei Yang, Institute of Atmospheric Physics, CAS, Beijing, China; M. Makarova with co-authors, Institute of Physics at the St. Petersburg State University, St. Petersburg, Russia; A.Y.S. Cheng, City University, Hong Kong, China).

The application of methods of Fourier transform spectroscopy to monitoring of atmospheric trace gases was discussed in the papers by F.V. Kashin and Yu.I. Baranov (Institute of Experimental Meteorology at the Scientific and Production Association "Taifun," Obninsk, Russia) and Yonghua Fang (Anhui Institute of Optics and Fine Mechanics, CAS, Hefei, China). These methods provide for the measurement of background concentrations of some gases, for example, the total content of CH_4, with the error of $\pm$ 0.01 ppm. Along with the spectroscopic devices having relatively low spectral resolution, the technique of diode laser spectroscopy, characterized by the spectral resolution higher than 10^{-3} cm^{-1}, is finding an increasing utility in the measurements of concentrations of urban pollutants and trace gases (H_2O, CO_2, CH_4).

The papers presented by two Chinese institutions: Key Lab of Ocean Dynamic Processes and Satellite Oceanography and Shanghai Institute of Technology and Physics, analyzed the application of domestic multispectral radiometers SZ-3/CMODIS (Chinese Moderate Imaging Spectra Radiometer) and HY-1A/COCTS (Chinese Ocean Color and Temperature Scanner), which were launched to space in 2002 to study the productivity and the ecological state of coastal seas. Wide promises of orbiting scanners for mapping temperature distributions, chlorophyll and pollution (surface and in depth) fields have been demonstrated.

In addition, ICOT-2004 involved some poster presentations on the application of diode laser gas analyzers (including the cavity enhanced absorption spectroscopy technology) for monitoring of car exhausts (Xinhua Tu and co-authors, Shi Xin Pei and co-authors, Anhui Institute of Optics and Fine Mechanics, CAS, Hefei, China).

Among the reports devoted to the development of the technique and technology of passive optical methods, to be noted is the presentation by Yanmeng Bi (Department of Atmospheric Sciences, School of Physics, Peking University, Beijing, China), which considered the new potential capabilities of the GPS (Global Positioning System) technology for the measurement of water vapor concentration in the atmosphere. The results obtained at the network of 10 GPS for southeastern regions of China were compared with radiosonde measurements.

The limited paper does not allow us to even briefly review all the papers, presented at ICOT-2004. We only would like to note good combination, high level, urgency, and practical orientation of the presentations made. The ICOT-2004 participants had an opportunity to discuss new joint projects, exchange the results, and perform their comparative analysis.

G.G. Matvienko, Yu.N. Ponomarev