

APPLIED OPTICS OF THE ATMOSPHERE (Review of the monograph by V.A. Smerkalov)

Visual perception has long been of a considerable importance for getting a knowledge about the environment, and some atmospheric-optical phenomena were used for predicting weather and climate changes. In this respect the twentieth century has become most productive. It happened in this century, that rigorous theories of atmospheric-optical phenomena and technical means for their recording have been created. In this connection it is worth just mentioning here some methods and instruments for spaceborne optical investigations as well as the methods and means for laser sensing of the atmosphere that is a wide range of optical instruments operating in the ultraviolet, visible, and infrared spectral regions.

The necessity of serious efforts to be applied to studying the atmospheric optics, especially in recent ten years, was caused by the growing public concern in the future of the planet and, therefore, by the demands for the study of not only accelerating processes of climate change in different regions and on the planet as a whole, but also of the growing anthropogenic effects on the environment.

Methods and technology of atmospheric optics studies have become the subject number one not only at scientific laboratories but at the engineering and production institutions as well.

Therefore at present many authors in Russia and abroad try to generalize the results of investigations on atmospheric optics in monographs. One of the most notable generalizations of scientific materials is the library of monographs consisting of nine volumes entitled "Modern problems in atmospheric optics" edited by Academician V.E. Zuev (eight volumes were published by Gidrometeoizdat in St. Petersburg, the ninth volume was published by the publishing house "Spektr" of the Institute of Atmospheric Optics S" RAS in Tomsk). The translated monograph "Atmospheric Optics" by McCartney (Mir, Moscow 1979, 421 pp.) has gained wide recognition among scientists and engineers in our country. In the past few decades several tens of monographs and textbooks on the problems of atmospheric optics have been published.

Among a great deal of the monographs and textbooks the monograph "Applied Optics of the Atmosphere" by V.A. Smerkalov has a series of new and useful distinctive features. First of all, this monograph is intended for the scientists and engineers and contains a large amount of data on power-spectrum characteristics of the atmosphere. This is especially

true in the case with statistical experimental data and the results of calculations for different atmospheric models. This material will undoubtedly attract much attention of scientists. In the monograph by V.A. Smerkalov the primary attention is focused on the critical analysis of the experimental data and techniques. This approach, being rare in occurrence in the monographs of recent years, is very useful and valuable both for beginners and for experts as well. I would like to support this approach, although the author in some cases worked out details of the critical analysis excessively. In my opinion, too much attention is paid to the description and analysis of the measurement errors of spectroradiometers (in particular, 15I) in the rocket investigations in section 3.2. In this case the systematic and random measurement errors only indirectly deal with the realities in rocket studies of optical characteristics of the middle atmosphere while being a direct evidence of the difficulties faced in measurements at the rocket sounding of the atmosphere.

It is a valuable advantage of the monograph the multiparametric approximation formulae derived by the author for some atmospheric-optical regularities that may certainly be useful for computer simulations of the atmospheric optical phenomena. In my opinion in atmospheric optics with a very wide variability in space and time of the defining parameters the description of main regularities and phenomena using simplified formulae holds a greatest promise. The monograph contains the first and correct steps in this direction. As to a limited number of problems, which can be solved using the derived approximation formulae, the author does not indicate that these formulae are promising for a wider range of problems. The chapters of the monograph devoted to standartization and terminology in atmospheric optics are worth noting. For this monograph the discussion of the above-mentioned problems is quite an appropriate. It would be possible to debate with the author on the style of material description in these chapters but the fact of that material presented in these chapters is now available is more important.

So I believe that the monograph "Applied Optics of the Atmosphere" by V.A. Smerkalov is an important connecting link in a series of publications in atmospheric optics. The author has presented the material in a logistically correct and professional manner.

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