
Preface

The Institute of Atmospheric Physics (Institut für Physik der Atmosphäre, IPA) of the German Aerospace Center (Deutsches Zentrum für Luft- und Raumfahrt, DLR) in Oberpfaffenhofen near Munich, Germany was founded on 1 July 1962. This book appears on the occasion of the 50th anniversary of this institute. The book is part of the DLR-Springer Series, Research Topics in Aerospace, and as such addresses topics of relevance to aviation, Earth observation from Space, and further research and development fields of DLR including mobility and renewable energy. The book covers topics of special expertise in this institute.

The book is structured into three main sections dealing with general aspects of the atmosphere, methods and instruments used for research in this field, and topics and trends of major importance for present and ongoing research. Each section contains several chapters, in total 51. They cover specific topics, written by experts of this institute and partner institutes. Most of the external authors are former staff members of this institute. Several external authors are now members of the meteorological institute (MIM) of the Ludwig-Maximilians-University (LMU) with which IPA has a long tradition of cooperation and now an institutional link. Each chapter briefly describes the general knowledge in the field, and then explains in detail results obtained by the various teams represented by the authors. A few remarks in the chapters illuminate the historical development of the research topics in this field. The basic *keywords* (printed in italic) of importance in this field are defined in chapters identified by a list of keywords at the end of the book. The references cited refer to important publications of relevance for the field of research discussed, but most of the references refer to work performed in this institute.

The authors intended to describe their field in a manner understandable to a wide community of readers with little reference to background literature. We hope we succeeded and that the book is of interest and help to all who are related to aspects of atmospheric physics—scientific, institutional, educational or in cooperation.

The Institute of Atmospheric Physics has a long tradition in research on meteorology and atmospheric physics in relation to aerospace. It was formed from institutional roots going back to the Rhön-Rossitten society in the year 1924. It has kept its dedication and original name without changes over the last 50 years. Further details can be found in the final chapter.



The staff members of the Institute of Atmospheric Physics of DLR in Oberpfaffenhofen in January 2012 (Photo by Karl-Heinz Koos and Hans Volkert)

At present, the institute performs research on the physical and chemical processes of the troposphere and stratosphere. The knowledge of dynamical, cloud physical, and chemical processes constitutes the basis for many applications of aviation, Earth observation, mobility and renewable energy. On regional and global scales the relevant processes and changes of the state of the atmosphere are quantified and systematically investigated using remote sensing, research aircraft, and computational models. Example research topics include the impact of aviation and other modes of transport on climate, and the development of new measurement techniques for future satellite missions. The institute has access to the major research facilities of the DLR, including the research aircraft Falcon and HALO.

The institute is grateful to all the support it received over the decades from DLR management and cooperating institutes and facilities. We acknowledge the fruitful cooperation with many external partners, and thank for the support provided by Bavarian and Federal ministries, European and international funding partners, scientific societies, and for cooperation with industry.

It is my pleasure to take this occasion to thank all authors for their contributions. About 50 internal and several external reviewers helped essentially to improve the various contributions. Dietrich Heimann coordinated the reviews and helped in finding solutions of all kinds. Nadja Reimann and Sonja Mandelartz kept track of all contributions and formatted many of the lists of references. Reinhold Busen completed the list of abbreviations. Winfried Beer managed the data processing tasks. In particular I thank the lector, Susan Giegerich, for her professional work on the manuscripts in short time. Finally we thank the Springer Verlag for final preparation and publishing this book.

The institute gratefully acknowledges the pioneering work of the former directors of predecessors, Walter Georgii and Harald Koschmieder. Moreover we thank the founder of this institute, Hans Gerhard Müller (director from 1962 to 1972) and the former directors of IPA, Heinz Fortak (1973–1976) and Manfred

Reinhardt (1974–1992), for their pioneering work. I myself had responsibility for this institute since 1982, first jointly with Manfred Reinhardt, and alone since 1992. The institute is presently structured into five departments. The departments and their leaders are as follows: Atmospheric Dynamics (Robert Sausen), Atmospheric Trace Species (Hans Schlager), Atmospheric Remote Sensing (Ralf Meerkötter and Bernhard Mayer, LMU), Cloud Physics and Traffic Meteorology (Thomas Gerz in cooperation with George Craig, LMU) and Lidar (Gerhard Ehret). In spring 2012, the institute had about 125 staff members, most of them can be seen on the photo. I am grateful to all who supported this institute over the years. Finally I wish the readers of this book enjoyable and enlightening reading.

Oberpfaffenhofen, Germany, 1 April 2012

Ulrich Schumann

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