

Contents

1	Scientific Summary of the German CAWSES Priority Program . . .	1
	Franz-Josef Lübken	
2	Models of Solar Total and Spectral Irradiance Variability of Relevance for Climate Studies	19
	Natalie A. Krivova and Sami K. Solanki	
3	Investigation of Solar Irradiance Variations and Their Impact on Middle Atmospheric Ozone	39
	Mark Weber, Joseph Pagaran, Sebastian Dikty, Christian von Savigny, John P. Burrows, Matt DeLand, Linton E. Floyd, Jerry W. Harder, Martin G. Mlynczak, and Hauke Schmidt	
4	Solar Activity, the Heliosphere, Cosmic Rays and Their Impact on the Earth’s Atmosphere	55
	Horst Fichtner, Bernd Heber, Klaudia Herbst, Andreas Kopp, and Klaus Scherer	
5	Do Galactic Cosmic Rays Impact the Cirrus Cloud Cover?	79
	Susanne Rohs, Reinhold Spang, Lars Hoffmann, Franz Rohrer, and Cornelius Schiller	
6	Laboratory Experiments on the Microphysics of Electrified Cloud Droplets	89
	Daniel Rzesanke, Denis Duft, and Thomas Leisner	
7	Investigations of the Solar Influence on Middle Atmospheric Water Vapour and Ozone During the Last Solar Cycle—Analysis of the MPS Data Set	109
	Paul Hartogh, Christopher Jarchow, and Kristoffer Hallgren	

8	Influence of Solar Radiation on the Diurnal and Seasonal Variability of O₃ and H₂O in the Stratosphere and Lower Mesosphere, Based on Continuous Observations in the Tropics and the High Arctic	125
	Mathias Palm, Sven H.W. Golchert, Miriam Sinnhuber, Gerd Hochschild, and Justus Notholt	
9	Data Assimilation and Model Calculations to Study Chemistry Climate Interactions in the Stratosphere	149
	Björn-Martin Sinnhuber, Gregor Kieseewetter, John P. Burrows, and Ulrike Langematz	
10	The Response of Atomic Hydrogen to Solar Radiation Changes . . .	171
	Martin Kaufmann, Manfred Ern, Catrin Lehmann, and Martin Riese	
11	High-Latitude Thermospheric Density and Wind Dependence on Solar and Magnetic Activity	189
	Hermann Lühr and Stefanie Marker	
12	Global Sporadic E Layer Characteristics Obtained from GPS Radio Occultation Measurements	207
	Christina Arras, Jens Wickert, Christoph Jacobi, Georg Beyerle, Stefan Heise, and Torsten Schmidt	
13	Atmospheric Ionization Due to Precipitating Charged Particles . . .	223
	Jan Maik Wissing, Jan Philipp Bornebusch, and May-Britt Kallenrode	
14	EISCAT's Contributions to High Latitude Ionosphere and Atmosphere Science Within CAWSES in Germany	235
	Jürgen Röttger and Norbert Engler	
15	The Influence of Energetic Particles on the Chemistry of the Middle Atmosphere	247
	Thomas Reddmann, Bernd Funke, Paul Konopka, Gabriele Stiller, Stefan Versick, and Bärbel Vogel	
16	The Impact of Energetic Particle Precipitation on the Chemical Composition of the Middle Atmosphere: Measurements and Model Predictions	275
	Miriam Sinnhuber, Nadine Wieters, and Holger Winkler	
17	Simulation of Particle Precipitation Effects on the Atmosphere with the MESSy Model System	301
	Andreas J.G. Baumgaertner, Patrick Jöckel, Alan D. Aylward, and Matthew J. Harris	
18	Solar Variability and Trend Effects in Mesospheric Ice Layers	317
	Franz-Josef Lübken, Uwe Berger, Johannes Kiliani, Gerd Baumgarten, and Jens Fiedler	

19	Charged Aerosol Effects on the Scattering of Radar Waves from the D-Region	339
	Markus Rapp, Irina Strelnikova, Qiang Li, Norbert Engler, and Georg Teiser	
20	Impact of Short-Term Solar Variability on the Polar Summer Mesopause and Noctilucent Clouds	365
	Christian von Savigny, Charles Robert, Nabiz Rahpoe, Holger Winkler, Erich Becker, Heinrich Bovensmann, John P. Burrows, and Matthew T. DeLand	
21	Observations and Ray Tracing of Gravity Waves: Implications for Global Modeling	383
	Manfred Ern, Christina Arras, Antonia Faber, Kristina Fröhlich, Christoph Jacobi, Silvio Kalisch, Marc Krebsbach, Peter Preusse, Torsten Schmidt, and Jens Wickert	
22	Atmospheric Coupling by Gravity Waves: Climatology of Gravity Wave Activity, Mesospheric Turbulence and Their Relations to Solar Activity	409
	Werner Singer, Peter Hoffmann, G. Kishore Kumar, Nicholas J. Mitchell, and Vivien Matthias	
23	Infra-red Radiative Cooling/Heating of the Mesosphere and Lower Thermosphere Due to the Small-Scale Temperature Fluctuations Associated with Gravity Waves	429
	Alexander A. Kutepov, Artem G. Feofilov, Alexander S. Medvedev, Uwe Berger, Martin Kaufmann, and Adalbert W.A. Pauldrach	
24	The Influence of Zonally Asymmetric Stratospheric Ozone on the Coupling of Atmospheric Layers	443
	Axel Gabriel, Ines Höschel, Dieter H.W. Peters, Ingo Kirchner, and Hans-F. Graf	
25	Extending the Parameterization of Gravity Waves into the Thermosphere and Modeling Their Effects	467
	Erdal Yiğit and Alexander S. Medvedev	
26	The Geospace Response to Nonmigrating Tides	481
	Kathrin Häusler, Jens Oberheide, Hermann Lühr, and Ralf Koppmann	
27	Solar Diurnal Tides in the Middle Atmosphere: Interactions with the Zonal-Mean Flow, Planetary Waves and Gravity Waves	507
	Ulrich Achatz, Fabian Senf, and Norbert Grieger	
28	Short Period Dynamics in the Mesosphere: Morphology, Trends, and the General Circulation	517
	Dirk Offermann and Ralf Koppmann	

29 Solar Effects on Chemistry and Climate Including Ocean Interactions 541
Ulrike Langematz, Anne Kubin, Christoph Brühl,
Andreas J.G. Baumgaertner, Ulrich Cubasch, and Thomas Spanghel

30 Interannual Variability and Trends in the Stratosphere 573
Karin Labitzke and Markus Kunze

31 The Atmospheric Response to Solar Variability: Simulations with a General Circulation and Chemistry Model for the Entire Atmosphere 585
Hauke Schmidt, Jens Kieser, Stergios Misios, and Aleksandr N. Gruzdev

32 Long-Term Behaviour of Stratospheric Transport and Mean Age as Observed from Balloon and Satellite Platforms 605
Gabriele Stiller, Andreas Engel, Harald Bönisch, Norbert Glatthor,
Florian Haenel, Andrea Linden, Tanja Möbius, and Thomas von Clarmann

Acronyms and Abbreviations 625

Index 631

Climate and Weather of the Sun-Earth System
(CAWSES)

Highlights from a Priority Program

Lübken, F.-J. (Ed.)

2013, XXI, 634 p., Hardcover

ISBN: 978-94-007-4347-2