

Contents

Preface	v
Contributors	xi
Introductory Paper	
A Focus on Climate During the Past 100 Years	1
S. Brönnimann, T. Ewen, J. Luterbacher, H. F. Diaz, R. S. Stolarski, and U. Neu	
Section A The Observational Climate Record	
From the Bottom to the Stratosphere – Arctic Climate Features as Seen from the First International Polar Year (1882–1883) Until the End of World War II	
C. Lüdecke	
Arctic Sea Ice Data Sets in the Context of Climate Change During the 20th Century	
G. V. Alekseev, S. I. Kuzmina, A. P. Nagurny, and N. E. Ivanov	
The Evolving SST Record from ICOADS	
S. D. Woodruff, H. F. Diaz, E. C. Kent, R. W. Reynolds, and S. J. Worley	
Upper-air Temperature Trends: Current Problems and Some Recent Results	
A. M. Sterin, V. M. Khan, and K. G. Rubinshtein	
Atmospheric Reanalyses and Climate Variations	
S. Uppala, A. Simmons, D. Dee, P. Kållberg, and J.-N. Thépaut	

Constructing Climate Quality Atmospheric Temperatures from Satellite Microwave Measurements	119
C. A. Mears	
Total Ozone Observations During the Past 80 Years	129
S. Brönnimann, C. Vogler, J. Staehelin, R. Stolarski, and G. Hansen	
Section B Climate Trends: Forcings and Processes	
Arctic Sea Ice Variability During the Last Half Century	143
J. Stroeve and W. Maslowski	
Decadal Changes in Surface Radiative Fluxes and Their Role in Global Climate Change.....	155
M. Wild	
Observed Interdecadal Changes in Cloudiness: Real or Spurious?	169
J. R. Norris	
The Role of Land–Atmosphere Interactions for Climate Variability in Europe	179
S. I. Seneviratne and R. Stöckli	
Aerosol Effects on Precipitation Locally and Globally	195
U. Lohmann	
Section C Climate Variability and Extremes	
Human Activity and Climate Change in Africa	209
H. Paeth	
Impacts of Climate Variability, Trends and NAO on 20th Century European Plant Phenology	221
A. Menzel, N. Estrella, and C. Schleip	
Summer Heat Waves in Western Europe, Their Past Change and Future Projections.....	235
P. M. Della-Marta and M. Beniston	
Distribution Changes of Seasonal Mean Temperature in Observations and Climate Change Scenarios.....	251
S. C. Scherrer, M. A. Liniger, and C. Appenzeller	

Section D Chemical Changes and the Variability of the Stratosphere

Long-term Tropospheric Ozone Trends: A Critical Review 271
 J. Staehelin and C. Schnadt Poberaj

**Simulation of Long-term Evolution of Stratospheric Dynamics
 and Chemistry: Role of Natural and Anthropogenic Forcings 283**
 M. Dameris and R. Deckert

**Dynamical Changes in the Arctic and Antarctic Stratosphere
 During Spring 293**
 U. Langematz and M. Kunze

**Creating Knowledge from the Confrontation of Observations
 and Models: The Case of Stratospheric Ozone 303**
 G. P. Brasseur

**Response of the Earth’s Atmosphere to the Solar Irradiance
 Variability 317**
 E. Rozanov, T. Egorova, and W. Schmutz

**Stratospheric Ozone Variations Caused by Solar Proton Events
 Between 1963 and 2005 333**
 C. H. Jackman and E. L. Fleming

**Sunspots, the QBO, and the Stratosphere in the North Polar
 Region: An Update 347**
 K. Labitzke, M. Kunze, and S. Brönnimann

Index 359