Contents

Sasaki's Pathway to Deterministic Data Assimilation 1
John M. Lewis

Data Assimilation for Numerical Weather Prediction: A Review 21
Ionel M. Navon

Theoretical and Practical Issues of Ensemble Data Assimilation in Weather and Climate 67
Milija Zupanski

Information Measures in Ensemble Data Assimilation 85
Dusanka Zupanski

Real Challenge of Data Assimilation for Tornadogenesis 97
Yoshi K. Sasaki

Radar Rainfall Estimates for Hydrologic and Landslide Modeling 127
Kang-Tsung Chang, Jr-Chuan Huang, Shuh-Ji Kao and Shou-Hao Chiang

High-Resolution QPE System for Taiwan 147
Jian Zhang, Kenneth Howard, Pao-Liang Chang, Paul Tai-Kuang Chiu, Chia-Rong Chen, Carrie Langston, Wenwu Xia, Brian Kaney and Pin-Fang Lin

Assimilation of Satellite Data in Improving Numerical Simulation of Tropical Cyclones: Progress, Challenge and Development 163
Zhaoxia Pu

Diagnostics for Evaluating the Impact of Satellite Observations 177
Nancy L. Baker and Rolf H. Langland

Impact of the CHAMP Occultation Data on the Rainfall Forecast 197
Hiromu Seko, Yoshinori Shoji, Masaru Kunii and Yuichi Aoyama

Parameter Estimation Using the Genetic Algorithm in Terms of Quantitative Precipitation Forecast 219
Yong Hee Lee, Seon Ki Park, Dong-Eon Chang, Jong-Chul Ha and Hee-Sang Lee

Applications of Conditional Nonlinear Optimal Perturbations to Ensemble Prediction and Adaptive Observation 231
Zhina Jiang, Hongli Wang, Feifan Zhou and Mu Mu

Study on Adjoint-Based Targeted Observation of Mesoscale Low on Meiyu Front 253
Peiming Dong, Ke Zhong and Sixiong Zhao

Ocean Data Assimilation: A Coastal Application 269
Xiaodong Hong, James A. Cummings, Paul J. Martin and James D. Doyle

Comparison of Ensemble-Based Filters for a Simple Model of Ocean Thermohaline Circulation 293
Sangil Kim

Preconditioning Representer-based Variational Data Assimilation Systems: Application to NAVDAS-AR 307
Boon S. Chua, Liang Xu, Tom Rosmond and Edward D. Zaron

Cycling the Representer Method with Nonlinear Models 321
Hans E. Ngodock, Scott R. Smith and Gregg A. Jacobs

Implementation of the Ensemble Kalman Filter into a Northwest Pacific Ocean Circulation Model 341
Gwang-Ho Seo, Sangil Kim, Byoung-Ju Choi, Yang-Ki Cho and Young-Ho Kim

Particle Filtering in Data Assimilation and Its Application to Estimation of Boundary Condition of Tsunami Simulation Model 353
Kazuyuki Nakamura, Naoki Hirose, Byung Ho Choi and Tomoyuki Higuchi

Data Assimilation in Hydrology: Variational Approach 367
François-Xavier Le Dimet, William Castaings, Pierre Ngnepieba and Baxter Vieux

Recent Advances in Land Data Assimilation at the NASA Global Modeling and Assimilation Office 407
Rolf H. Reichle, Michael G. Bosilovich, Wade T. Crow, Randal D. Koster, Sujay V. Kumar, Sarith P. P. Mahanama and Benjamin F. Zaitchik

Assimilation of Soil Moisture and Temperature Data into Land Surface Models: A Survey 429
Nasim Alavi, Jon S. Warland and Aaron A. Berg

Assimilation of a Satellite-Based Soil Moisture Product into a Two-Layer Water Balance Model for a Global Crop Production Decision Support System 449
John D. Bolten, Wade T. Crow, Xiwu Zhan, Curt A. Reynolds and Thomas J. Jackson

Index 465