## Contents

1. **A Survey of Observers for Nonlinear Dynamical Systems** .......................... 1  
   Wei Kang, Arthur J. Krener, Mingqing Xiao, and Liang Xu

2. **Nudging Methods: A Critical Overview** .................................................. 27  
   S. Lakshmivarahan and John M. Lewis

3. **Markov Chain Monte Carlo Methods: Theory and Applications** .......................... 59  
   Derek J. Posselt

4. **Observation Influence Diagnostic of a Data Assimilation System** .......................... 89  
   Carla Cardinali

5. **A Question of Adequacy of Observations in Variational Data Assimilation** .......................... 111  
   John M. Lewis and S. Lakshmivarahan

6. **Quantifying Observation Impact for a Limited Area Atmospheric Forecast Model** .......................... 125  
   Clark Amerault, Keith Sashegyi, Patricia Pauley, and James Doyle

7. **Skewness of the Prior Through Position Errors and Its Impact on Data Assimilation** .......................... 147  
   Daniel Hodyss and Alex Reinecke

8. **Background Error Correlation Modeling with Diffusion Operators** .......................... 177  
   Max Yaremchuk, Matthew Carrier, Scott Smith, and Gregg Jacobs

9. **The Adjoint Sensitivity Guidance to Diagnosis and Tuning of Error Covariance Parameters** .......................... 205  
   Dacian N. Daescu and Rolf H. Langland
10 Treating Nonlinearities in Data-Space Variational Assimilation 233
Brian S. Powell

11 Linearized Physics for Data Assimilation at ECMWF 251
Marta Janisková and Philippe Lopez

12 Recent Applications in Representer-Based Variational Data Assimilation 287
Boon S. Chua, Edward D. Zaron, Liang Xu, Nancy L. Baker, and Tom Rosmond

13 Variational Data Assimilation for the Global Ocean 303
James A. Cummings and Ole Martin Smedstad

14 A 4D-Var Analysis System for the California Current: A Prototype for an Operational Regional Ocean Data Assimilation System 345
Andrew M. Moore, Christopher A. Edwards, Jerome Fiechter, Patrick Drake, Emilie Neveu, Hernan G. Arango, Selime Gürol, and Anthony T. Weaver

15 A Weak Constraint 4D-Var Assimilation System for the Navy Coastal Ocean Model Using the Representer Method 367
Hans Ngodock and Matthew Carrier

16 Ocean Ensemble Forecasting and Adaptive Sampling 391
Xiaodong Hong and Craig Bishop

17 Climate Change and Its Impacts on Streamflow: WRF and SCE-Optimized SWAT Models 411
Shie-Yui Liong, Srivatsan V. Raghavan, and Minh Tue Vu

18 Entropic Balance Theory and Radar Observation for Prospective Tornado Data Assimilation 429
Yoshi K. Sasaki, Matthew R. Kumjian, and Bradley M. Isom

19 All-Sky Satellite Radiance Data Assimilation: Methodology and Challenges 465
Milija Zupanski

20 Development of a Two-way Nested LETKF System for Cloud-resolving Model 489
Hiromu Seko, Tadashi Tsuyuki, Kazuo Saito, and Takemasa Miyoshi

21 Observing-System Research and Ensemble Data Assimilation at JAMSTEC 509
Takeshi Enomoto, Takemasa Miyoshi, Qoosaku Moteki, Jun Inoue, Miki Hattori, Akira Kuwano-Yoshida, Nobumasa Komori, and Shozo Yamane
22 Data Assimilation of Weather Radar and LIDAR for Convection Forecasting and Windshear Alerting in Aviation Applications ....................................................... 527
Wai Kin Wong and Pak Wai Chan

23 Ensemble Adaptive Data Assimilation Techniques Applied to Land-Falling North American Cyclones ............................................................ 555
Brian C. Ancell and Lynn A. McMurdie

24 The Advances in Targeted Observations for Tropical Cyclone Prediction Based on Conditional Nonlinear Optimal Perturbation (CNOP) Method ........................................... 577
Feifan Zhou, Xiaohao Qin, Boyu Chen, and Mu Mu

25 GSI/WRF Regional Data Assimilation System and Its Application in the Weather Forecasts over Southwest Asia ........................... 609
Jianjun Xu and Alfred M. Powell, Jr.

26 Studies on the Impacts of 3D-VAR Assimilation of Satellite Observations on the Simulation of Monsoon Depressions over India ................................................................. 643
A. Chandrasekar and M. Govindan Kutty

27 Parameter Estimation Using an Evolutionary Algorithm for QPF in a Tropical Cyclone .............................................................. 707
Xing Yu, Seon Ki Park, and Yong Hee Lee

Index ................................................................................................. 717
Data Assimilation for Atmospheric, Oceanic and Hydrologic Applications (Vol. II)
Park, S.K.; Xu, L. (Eds.)
2013, XIX, 730 p. 269 illus., 170 illus. in color., Hardcover
ISBN: 978-3-642-35087-0