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Titolo	Forecast error correction using dynamic data assimilation // by Sivaramakrishnan Lakshmivarahan, John M. Lewis, Rafal Jabrzemski
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Edizione	[1st ed. 2017.]
Descrizione fisica	1 online resource (XVI, 270 p. 125 illus., 104 illus. in color.)
Collana	Springer Atmospheric Sciences, , 2194-5217
Disciplina	004
Soggetti	Data mining Computer simulation Computers Atmospheric sciences Geology—Statistical methods Data Mining and Knowledge Discovery Simulation and Modeling Models and Principles Atmospheric Sciences Quantitative Geology
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references and index.
Nota di contenuto	Part I Theory -- Introduction -- Dynamics of evolution of first- and second-order forward sensitivity: discrete time and continuous time -- Estimation of control errors using forward sensitivities: FSM with single and multiple observations -- Relation to adjoint sensitivity and impact of observation -- Estimation of model errors using Pontryagin's Maximum Principle- its relation to 4-D VAR and hence FSM -- FSM and predictability - Lyapunov index -- Part II Applications -- Mixed-layer model - the Gulf of Mexico problem -- Lagrangian data assimilation -- Conclusions -- Appendix -- Index. .
Sommario/riassunto	This book introduces the reader to a new method of data assimilation with deterministic constraints (exact satisfaction of dynamic constraints)—an optimal assimilation strategy called Forecast Sensitivity

Method (FSM), as an alternative to the well-known four-dimensional variational (4D-Var) data assimilation method. 4D-Var works with a forward in time prediction model and a backward in time tangent linear model (TLM). The equivalence of data assimilation via 4D-Var and FSM is proven and problems using low-order dynamics clarify the process of data assimilation by the two methods. The problem of return flow over the Gulf of Mexico that includes upper-air observations and realistic dynamical constraints gives the reader a good idea of how the FSM can be implemented in a real-world situation. .
