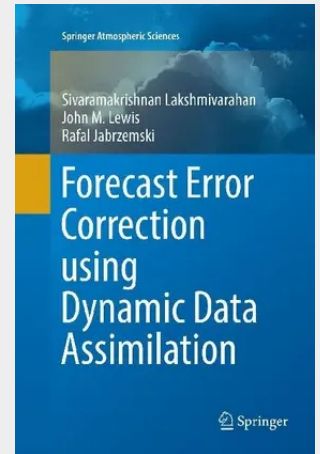


## Forecast Error Correction using Dynamic Data Assimilation

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.

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