

データ同化手法の多面性と応用展開

中野 慎也^{1,2},

1. 情報・システム研究機構 統計数理研究所;
2. 総合研究大学院大学 複合科学研究科

Various aspects of data assimilation techniques and expansion of their applications

Shin'ya Nakano^{1,2},

1. *The Institute of Statistical Mathematics, ROIS, Japan;*
2. *School of Multidisciplinary Science, SOKENDAI, Japan.*

Data assimilation is a procedure for incorporating actual observation into a simulation model. Data assimilation techniques have been developed as a fundamental tool in numerical weather forecasting. In order to accurately predict temporal evolution of an atmospheric system, it is essential to obtain an accurate estimate of the state of the atmosphere by data assimilation. Various techniques have thus been proposed for such purpose. But data assimilation techniques also have various practical aspects. Since data assimilation estimates the state of a system by making use of a simulation model which is based on physical laws, we can deduce the values of unobservable quantities by considering our knowledge about physical laws. Another aspect is to reproduce the behavior of a nonlinear and high-dimensional system. An atmospheric system is regarded as a nonlinear high-dimensional system. There have been proposed many treatments for such a nonlinear high-dimensional system. These aspects are useful for not only for the atmospheric science but also other fields of geosciences. We have extended the applications of data assimilation to other fields of geosciences such as space science. We are also extending the techniques for data assimilation to other purposes such as analyses of high-dimensional time series data. I will review the various aspects and recent progresses of data assimilation techniques, and show our recent studies to demonstrate their effectiveness.