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クラウドサービスによるデータ同化技術の公開
Cloud Services to Release Techniques of Data Assimilation

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Data assimilation (DA) is a fundamental technique to integrate numerical simulations and observation data in the framework of the Bayesian statistics. The purpose of DA is to provide an assimilation model that enables us to predict the future state and/or to determine parameters in the given simulation model. A sequential Bayesian filter, e.g., Kalman filter and particle filter, alternatively estimates probability density functions of one-step-ahead prediction and filtering, which respectively mean the states conditionally given the past observation data and given both past and present observation data. DA seems to be hard to implement due to complex programing of the procedure and needed numerous computation, which essentially requires High Performance Computing (HPC). Cloud service (CS) can be a solution for this through an implementation of the DA procedure on a parallel computing environment.

We have developed and released several CSs related to DA such as CloCK-TiME (Cloud Computing Kernel for Time-series Modeling Engine) and DA system for seismoacoustic waves. CloCK-TiME enables us to carry out a multivariate time-series analysis using the particle filter through the Internet. Users can, via the user interface, construct observation and system models, and specify optional parameters to control the analysis in detail. DA system for seismoacoustic waves enables us to determine hypocentric parameters through DA based on a numerical simulation related to seismoacoustic wave propagation using the normal model summation and observed infrasound data obtained at Shionomisaki and Sugadaira.

We will discuss the importance and availability of CS for DA researches through introduction of CSs we have developed.

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