热带海洋学报
JOURNAL OF TROPICAL OCEANOGRAPHY

热带海洋学报 » 2011, Vol. 30 » Issue (6) :24-30

集合滤波和三维变分混合数据同化方法研究

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摘要 发展了一种新的混合数据同化方法——基于集合滤波和三维变分的混合数据同化方法。该方法将集合调整卡尔曼滤波(ensembleadjustmentKalmanfilter, EAKF)得到的集合样本扰动通过一个转换矩阵的形式直接作用到背景场上，利用顺序滤波的思想得到分析场的一个扰动；然后在三维变分(threedimensionalvariationalanalysis, 3D-Var)的框架下与观测数据进行拟合，从而给出分析场的最优估计。文中以Lorenz63模型为例，开展了理想数据同化试验，结果表明，相比于集合调整卡尔曼滤波，这种新的混合同化方法可以给出更好的同化结果。

关键词： 混合数据同化方法 集合调整卡尔曼滤波 三维变分

Abstract: A new hybrid data assimilation scheme based on ensemble adjustment Kalman filter (EAKF) and three-dimensional variational (3D-Var) analysis is developed. In this assimilation scheme, the perturbation of ensemble from EAKF is applied to the background field by using a transformation matrix, thus the perturbation of the analysis field can be obtained by taking advantage of a sequential filter, which will then be optimized by being combined with observations under the framework of 3D-Var. The data assimilation experiment in a perfect case is carried out by using Lorenz-63 model. The results demonstrate that the hybrid data assimilation scheme performs better than EAKF.

Keywords: hybrid data assimilation scheme, ensemble adjustment Kalman filter, 3D-Var

收稿日期: 2010-01-31;

基金资助: 国家重点基础研究发展计划项目 (2007CB816001); 国家自然科学 (40776016)

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引用本文:
吴新荣, 韩桂军, 李冬等 . 集合滤波和三维变分混合数据同化方法研究[J] 热带海洋学报, 2011,V30(6): 24-30

Tun-Xin-Rong, Han-Gui-Jun-, Li-Dong- etc . A hybrid ensemble filter and 3D variational analysis scheme [J] Journal of Tropical Oceanography, 2011,V30(6): 24-30

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