國立中央大學大氣物理研究所書報討論

Date : 2024/5/24 Location : S1-713

Speaker : Zong-De Xie Advisor : Prof. Ching-Yuang Huang

Testing the JEDI-MPAS Data Assimilation System on Tropical Cyclone Forecasts

Abstract

The skill of 3D hybrid EnVar DA on MPAS-GSI system is examined in the previous study, showing improvement on TC track forecasting and incompleteness on intensity forecasting. The unstructured mesh of MPAS requires format transform to perform GSI assimilation under a coarse resolution (T320, ~42 km), might deteriorate the effect of assimilation.

The JEDI-MPAS system, on the other hand, can assimilate observation onto the unstructured MPAS mesh directly. The robustness of 3D EnVar on JEDI-MPAS system is examined. Additionally, the EnVar-based JEDI-MPAS system is compared to EAKF-based MPAS-DART, which shows equivalent, even better assimilating skill. Based on the researches, experiments regarding TC forecasting skill of JEDI-MPAS is planned.

Further, in the previous study, the dynamical vortex initiaion (DVI) scheme is combined with DA to improve poor TC intensity forecast result. The result shows some improvement on TC intensity, but other research shows that the spuriously enhanced TC structure might compromise DA's impact. Sensitivity tests regarding this are also planned to understand how to utilize the two different tools reasonably.

Keyword

JEDI-MPAS

Reference

- Liu, Z., Snyder, C., Guerrette, J. J., Jung, B.-J., Ban, J., Vahl, S., Wu, Y., Trémolet, Y., Auligné, T., Ménétrier, B., Shlyaeva, A., Herbener, S., Liu, E., Holdaway, D., and Johnson, B. T.: Data assimilation for the Model for Prediction Across Scales – Atmosphere with the Joint Effort for Data assimilation Integration (JEDI-MPAS 1.0.0): EnVar implementation and evaluation, Geosci.Model Dev., 15, 7859–7878, https://doi.org/10.5194/gmd-15-7859-2022, 2022.
- Guerrette, J. J., Liu, Z., Snyder, C., Jung, B.-J., Schwartz, C. S., Ban, J., Vahl, S., Wu, Y., Baños, I. H., Yu, Y. G., Ha, S., Trémolet, Y., Auligné, T., Gas, C., Ménétrier, B., Shlyaeva, A., Miesch, M., Herbener, S., Liu, E., Holdaway, D., and Johnson, B. T.: Data assimilation for the Model for Prediction Across Scales Atmosphere with the Joint Effort for Data assimilation Integration (JEDI-MPAS 2.0.0-beta): ensemble of 3D ensemble-variational (En-3DEnVar) assimilations, Geosci. Model Dev., 16, 7123–7142, https://doi.org/10.5194/gmd-16-7123-2023, 2023.