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局所アンサンブル変換カルマンフィルタを用いた同位体比データ同化に向けた理想化実験
Idealized Experiments for Data Assimilation of Vapor Isotopes with Isotopic AGCM and Ensemble Kalman Filter

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We present idealized tests to develop a data assimilation system of stable water isotopes by combining high frequency vapor isotope satellite observations with the isotope-incorporated general circulation model and a data assimilation technique based on the ensemble Kalman filter. We developed an LETKF-based four dimensional data assimilation system which provides analysis of water isotope and atmospheric state variables, which are physically and dynamically consistent. Not only this purpose, but also we have a purpose of quantifying the observation impact on the dynamical fields (wind, temperature, humidity, pressure). We have done several numerical experiments using various idealized datasets based on the pre-executed model simulation. Comparing with a control experiment with conventional atmospheric fields, addition of isotopic fields as input observation had small positive impact on both isotopic fields and dynamical fields. Surprisingly, if there is less conventional atmospheric observation, the positive impact on the dynamical fields became much larger. The results indicate that there is potential of isotopic data as dynamical constraint of the model, particularly for the past with only isotopic observation data.

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