

Assimilating MOPITT CO Observations in GEOS-CHEM using a Weak Constraint 4D-Var algorithm

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Systematic forward model errors pose a substantial problem for data assimilation systems, as the assimilation methods currently in use assume that the forward model is perfect. Recently, methods allowing the additional estimation of model errors within the context of 4D-Var, normally referred to as "weak constraint 4D-Var", have been developed. This weak constraint 4D-Var method has been implemented in the GEOS-CHEM chemical transport model to assess the feasibility of estimating transport model errors within the context of chemical source estimation as well as to study the impact of model biases on these estimates. A particular problem that has received attention recently is the vertical transport of trace gases associated with parametrized convection, which can potentially have detrimental impacts on the depiction of the distribution of trace gases in the UTLS. I will present results from the assimilation of MOPITT V5 CO observations and will discuss some of the merits as well as problems associated with this new technique, focusing on vertical transport errors associated with parametrized convection in the tropics.