AGU FALL MEETING
San Francisco | 12–16 December 2016

A31I-0176: Progress Towards Improved MOPITT-based Biomass Burning Emission Inventories for the Amazon Basin

Wednesday, 14 December 2016
08:00 - 12:20
 Moscone South - Poster Hall

The 17-year long record of carbon monoxide (CO) concentrations from the MOPITT satellite instrument is uniquely suited for studying the interannual variability of biomass burning emissions. Data assimilation methods based on Ensemble Kalman Filtering are currently being developed to infer CO emissions within the Amazon Basin from MOPITT measurements along with additional datasets. The validity of these inversions will depend on the characteristics of the MOPITT CO retrievals (e.g., retrieval biases and vertical resolution) as well as the representation of chemistry and dynamics in the chemical transport model (CAM-Chem) used in the data assimilation runs. For example, the assumed vertical distribution ("injection height") of the biomass burning emissions plays a particularly important role.

We will review recent progress made on a project to improve biomass burning emission inventories for the Amazon Basin. MOPITT CO retrievals over the Amazon Basin are first characterized, focusing on the MOPITT Version 6 "multispectral" retrieval product (exploiting both thermal-infrared and near-infrared channels). Validation results based on in-situ vertical profiles measured between 2010 and 2013 are presented for four sites in the Amazon Basin. Results indicate a significant negative bias in MOPITT retrieved lower-tropospheric CO concentrations. The seasonal and geographical variability of smoke injection height over the Amazon Basin is then analyzed using a MISR plume height climatology. This work has led to the development of a new fire emission injection height parameterization that was implemented in CAM-Chem and GEOS-Chem.. Finally, we present initial data assimilation results for the Amazon Basin and evaluate the results using available field campaign measurements.

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