A case study of the 2018 Camp Fire event using HYSPLIT-based emission inverse modeling system with GOES Advanced Baseline Imager (ABI) observations and other measurements for wildfire smoke forecasts

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An emission inverse modeling system to estimate wildfire smoke source strength, vertical distribution, and temporal variations by assimilating satellite observations with the HYSPLIT dispersion model for smoke forecasting has been built. In this so-called HEIMS-fire system, a cost function is defined to quantify the differences between the satellite smoke products and their model counterparts, weighted by the model and observation uncertainties. Smoke sources that minimize this cost function provide the optimal smoke emission estimates. It has been successfully applied to hindcast smoke distribution during a Southeast US wildfire event in 2016 using GOES GASP products. A new Advanced Baseline Imager (ABI) sensor onboard GOES-16 has become fully operational since December 2017. The ABI smoke products have better spatial and temporal resolutions than those from its predecessors. In this study, the ABI observations during the 2018 Camp Fire event in California USA are tested in the HEIMS-fire system. Hindcasts using the emission estimates by the HEIMS-fire system will be performed. Comparison between this new emission estimation system and other emission estimates will be conducted. In addition, the impact of additional observations including the tailored ones will be investigated.