Geophysical Research Abstracts
Vol. 20, EGU2018-2737, 2018
EGU General Assembly 2018

Top-down CO fluxes based on IASI data and hemispheric constraints on OH levels

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Assessments of carbon monoxide emissions through inverse modeling are dependent on the modeled abundance of the hydroxyl radical (OH) which controls both the primary sink of CO and its photochemical source through methane oxidation. However, most chemistry-transport models (CTMs) fall short of reproducing constraints on hemispherically-averaged OH levels derived from methylchloroform (MCF) observations. Here we construct five different OH fields compatible with MCF-based analyses, and we prescribe those fields in a global CTM to infer CO fluxes based on IASI CO columns. Each OH field leads to a different set of optimized emissions. Comparisons with independent data (surface, ground-based remotely-sensed, aircraft) indicate that the inversion adopting the lowest average OH level in the Northern Hemisphere (7.8×10^5 cm^{-3}, ca. 18% lower than the best estimate based on MCF measurements) provides the best overall agreement with all tested observation datasets.