

6.056 Fifteen year CO emission estimates constrained with MOPITT CO measurements.

Presenting Author:

Zhe Jiang, Jet Propulsion Laboratory, jiang.zher@gmail.com

Co-Authors:

John Worden, Jet Propulsion Laboratory

Helen Worden, National Center for Atmospheric Research

Merritt Deeter, National Center for Atmospheric Research

Dylan Jones, University of Toronto

Daven Henze, University of Colorado, Boulder

Abstract:

Long-term measurements from satellite and surface stations have demonstrated a decreasing trend of tropospheric CO in Northern Hemisphere in the past decade, and the major reason is still unclear. Using remote sensing CO measurements from Measurement of Pollution in the Troposphere (MOPITT), and in-situ methyl chloroform (MCF) measurements from World Data Centre for Greenhouse Gases (WDCGG), we investigate the major reason for the decreasing tropospheric CO in the period of 2001-2015. Our results demonstrate that the loss rate of MCF is almost invariable in the past 15 years, suggesting unchanging OH abundance (CO sink). Using adjoint of GEOS-Chem model, we constrain the global CO emission variation. Our results demonstrate significant decreasing trend of anthropogenic emissions from United States, Europe and China, and a decreasing trend of biomass burning emissions from boreal North America and boreal Asia. The a posteriori surface CO magnitude and long-term trend are evaluated with independent in-situ CO observations from WDCGG, which show significant improvement relative to the a priori simulation. Our results confirm the decreasing trend of tropospheric CO in Northern Hemisphere, and indicate that decreasing CO emissions from anthropogenic and biomass burning sources are the major reason.