



Attribution of CO concentration decline in recent decades by atmospheric inversion

Yi Yin (1), Frederic Chevallier (1), Audrey Fortems-Cheiney (2), Isabelle Pison (1), Marielle Saunois (1), and Philippe Ciais (1)

(1) Laboratoire des Sciences du Climat et l'Environnement (LSCE), CEA-CNRS-UVSQ, Gif-sur-Yvette, France
(yi.yin@lsce.ipsl.fr), (2) Institut National de l'Environnement Industriel et des risqueS (INERIS) , Verneuil-en-Halatte, France
(audrey.cheiney@lisa.ups.pec.fr)

A decreasing trend of the carbon monoxide (CO) content of the troposphere in the last decade has been detected globally by satellite retrievals and in some regions through surface measurements. However, the attribution of this decline is still pending, as CO concentrations in the atmosphere are driven by direct surface emissions, by a large chemical source, by a large chemical sink, and by atmospheric transport at once. In this study, we use a variational inversion system to address this question. Our system includes a global 3D transport model (LMDz, Laboratoire de Météorologie Dynamique) coupled with a simplified atmosphere chemistry scheme (SACS). We estimate the space-time variations of the global surface emissions of CO based on the state-of-the-art CO satellite retrievals from MOPITT (Measurements Of Pollution In The Troposphere, version 6) and on surface measurements of methylchloroform (CH_3CCl_3 , to constrain the CO chemistry) from the start of the MOPITT archive (2000) until now.