Atmospheric Chemistry and Physics
An Interactive Open Access Journal of the European Geosciences Union

Atmos. Chem. Phys., 6, 149-161, 2006
www.atmos-chem-phys.net/6/149/2006/

The effect of systematic measurement errors on atmospheric CO_2 inversions: a quantitative assessment

C. Rödenbeck[1], T. J. Conway[2], and R. L. Langenfelds[3]
[1]Max Planck Institute for Biogeochemistry, Jena, Germany
[2]NOAA Climate Monitoring and Diagnostics Laboratory, Boulder CO, USA
[3]CSIRO Marine and Atmospheric Research, Australia

Abstract. Surface-atmosphere exchange fluxes of CO_2, estimated by an interannual atmospheric transport inversion from atmospheric mixing ratio measurements, are affected by several sources of errors, one of which is experimental errors. Quantitative information about such measurement errors can be obtained from regular co-located measurements done by different laboratories or using different experimental techniques. The present quantitative assessment is based on intercomparison information from the CMDL and CSIRO atmospheric measurement programs. We show that the effects of systematic measurement errors on inversion results are very small compared to other errors in the flux estimation (as well as compared to signal variability). As a practical consequence, this assessment justifies the merging of data sets from different laboratories or different experimental techniques (flask and in-situ), if systematic differences (and their changes) are comparable to those considered here. This work also highlights the importance of regular intercomparison programs.

Final Revised Paper (PDF, 571 KB) Discussion Paper (ACPD)

Citation: Rödenbeck, C., Conway, T. J., and Langenfelds, R. L.: The effect of systematic measurement errors on atmospheric CO_2 inversions: a quantitative assessment, Atmos. Chem. Phys., 6, 149-161, 2006. Bibtex EndNote Reference Manager