Geophysical Research Abstracts
Vol. 14, EGU2012-6774, 2012
EGU General Assembly 2012


# Comparison of TCCON and ACTM atmospheric $CO_2$, $CH_4$ and $N_2O$ column averages

R. Saito and the ACTM group and TCCON group Team
Research Institute for Global Change, JAMSTEC, Yokohama, 236-0001, Japan (rsaito@jamstec.go.jp)

We present a comparison of the CCSR/NIES/FRCGC atmospheric general circulation model (AGCM)-based chemistry-transport model (ACTM) simulation with total column measurements of $CO_2$, $CH_4$ and $N_2O$ from the Total Carbon Column Observing Network (TCCON). The model captures observed trends, seasonal cycles and interhemispheric gradients at most sampled locations for all three species. The model-observation agreements are best for $CO_2$, because the simulation uses fossil fuel inventories and an inverse model estimate of non-fossil fuel fluxes. The ACTM captures much of the observed seasonal variability in $CO_2$ and $N_2O$ total columns. These results suggest that the transport processes in troposphere and stratosphere are well represented in ACTM. Some of the poor correlation between simulated and observed $CH_4$ columns, particularly at tropical and extratropical sites, have been attributed to the uncertainties in surface emissions and loss by hydroxyl radicals. While the upward-looking column measurements of $CO_2$ contains surface flux signals at various spatial and temporal scales, the $N_2O$ measurements are strongly affected by the concentration variations in the upper troposphere and stratosphere.