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カラム CO2、CH4、N2O 濃度の緯度・時間変化
Latitude-time variations of atmospheric column-average dry air mole fractions of CO2, CH4 and N2O

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We present a comparison of an atmospheric general circulation model (AGCM)-based chemistry-transport model (ACTM) simulation with total column measurements of CO2, CH4 and N2O from the Total Carbon Column Observing Network (TCCON). The model is able to capture observed trends, seasonal cycles and interhemispheric gradients at most sampled locations for all three species. The model-observation agreements are best for CO2, 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 CO2 and N2O total columns (˜81% variance, R>0.9 between ACTM and TCCON for 19 out of 22 cases). These results suggest that the transport processes in troposphere and stratosphere are well represented in ACTM. Thus the poor correlation between simulated and observed CH4 total 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 total column measurements of CO2 contains surface flux signals at various spatial and temporal scales, the N2O measurements are strongly affected by the concentration variations in the upper troposphere and stratosphere.

キーワード: CO2, CH4, N2O, 大気輸送モデル, TCCON
Keywords: CO2, CH4, N2O, Atmospheric Transport Model, TCCON