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Regional variations of tropospheric CO2 concentrations using AIRS and SCIAMACHY measurements for 2003 and 2004.

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Carbon dioxide levels have significantly increased over the past 200 years. AIRS (atmospheric InfraRed Sounder) measures CO_2 in the TIR and SCIAMACHY (SCanning Imaging Absorbing spectroMeter for AtmospHeric CHartographY) measures CO_2 in the region NIR of the spectra. AIRS CO_2 data is sensitive in the upper troposphere; approx 10-15 km and SCIAMACHY CO_2 data is sensitive near the Earth's surface. CO_2 data retrieved from AIRS and SCIAMACHY are compared in order to calculate the CO_2 concentration in their relative tropospheric regions.

Analyses of tropospheric data from 2003 and 2004 over specific regions reveal unique seasonal cycles. Vegetation and fossil fuel emissions along with convection and vertical mixing have a significant effect on the concentration of tropospheric CO_2. Comparing monthly mean CO_2, the data showed that there is some phasing difference between the upper and lower troposphere over the regions calculated. Monthly mean CO_2 concentration in the upper troposphere varies less than the CO_2 in the lower troposphere. Fossil fuels and vegetation vary the concentration of CO_2 significantly in the lower troposphere which causes a greater perturbation in the seasonal cycle.

Further investigations are being made to determine the feasibility of merging AIRS

and SCIAMACHY satellite data to enhance the sensitivity to the surface changes of CO_2.