Geophysical Research Abstracts,
Vol. 11, EGU2009-693-6, 2009
EGU General Assembly 2009

One year of carbon monoxide (CO) column measurements with ground-based solar and lunar FTIR absorption spectroscopy in the Mexico Megacity

W. Stremme, I. Ortega, and M. Grutter

Universidad Nacional Autónoma de México, Centro de Ciencias de la Atmósfera - UNAM, Mexico D.F., Mexico (stremme@atmosfera.unam.mx)

The carbon monoxide (CO) total column is monitored by ground-based solar and lunar FTIR spectroscopy with 0.5 cm-1 resolution since October 2007 above the UNAM campus in Mexico City (19,33°N, 99.18°W). The absolute column is obtained using the retrieval code SFIT2 based on optimal estimation theory (Rodgers 1976) and the result is characterized by its averaging kernel. A discussion of the retrieval strategy and the most important error sources will be presented. The vertical CO column in the Mexico megacity shows a pattern on annual, weekly and diurnal scales. The timeseries of the CO vertical columns and the surface CO concentration show different diurnal behaviors and more information about the natural and anthropogenic influence of the air in the urban boundary layer is obtained by simultaneously analyzing of coincident measurements: a) An effective mixing layer height is reconstructed from individual CO columns and surface measurements using some simple assumptions. Its diurnal behavior seems to be rather independent of the week day and also wind conditions, but its nocturnal behavior seems to be more variable. b) The CO emission can be estimated from its column growth rate by taking the horizontal wind measurements in consideration and making some assumptions. It is shown in this work, how monitoring of CO columns in megacities can provide new information of the anthropogenic emissions on a regional scale. Also, continuous monitoring of the CO column in a megacity gives the possibility for the validation of satellite observations over the so called hot-spots as seen for example by the MOPITT instrument.