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# Interannual variability of CO and its relation to long-range transport and biomass burning as seen by SCIAMACHY

Catharinus Dijkstra (1), Annemieke Gloudemans (1), Jos de Laat (1,2), Hans Schrijver (1), Guido van der Werf (3), Maarten Krol (1,4), Ilse Aben (1), and Remco Scheepmaker (1)

(1) SRON Netherlands Institute for Space Research, Utrecht, Netherlands., (2) Royal Netherlands Meteorological Institute (KNMI), de Bilt, Netherlands., (3) Free University (VU), Amsterdam, Netherlands., (4) Wageningen University (WUR), Wageningen, Netherlands.

The SCIAMACHY short-wave infrared instrument on board ENVISAT currently provides over 6 years (2003-2008) of global carbon monoxide (CO) data. The sensitivity of SCIAMACHY to surface CO allows to study sources and sinks. In addition, the availability of SCIAMACHY CO measurements over both land and clouded ocean scenes allows the investigation of long-term variability and global changes in long-range transport.

SCIAMACHY CO shows significant interannual variability in the southern hemisphere between 2003 and 2008, which is driven by the year-to-year variability in biomass burning. This is confirmed by the TM4 chemistry transport model which includes the independent GFEDv2 biomass-burning emissions data base. Over Amazonia, a decrease in CO from biomass burning is observed in 2006 compared to earlier years. It was suggested that this was a result of political incentives to reduce fires and deforestation. Unfortunately, SCIAMACHY observes high CO emissions again in 2007 which points more towards climatological conditions that drive the variations in emissions from year to year. In 2008 again a decrease in CO emissions is seen. A similar variability is present in MOPITT CO observations and ground-based FTIR measurements. SCIAMACHY CO from biomass burning in Indonesia also shows significant interannual variability with the largest peak in 2006. This is in agreement with MOPITT observations. Comparison with the ESPI ENSO Index strongly suggests that peaks in CO over Indonesia in the period 2003-2008 coincide with the warm phases of El Nino which led to an extended dry season and an increase in the biomass burning over Indonesia.

Using an offline tracer model, the impact of the year-to-year variations in CO from biomass burning in the southern hemisphere has been quantified. Results show that CO over regions influenced by long-range transport display an interannual variability which can be traced back to their CO sources. The CO columns over biomass-burning regions as calculated by the model are however somewhat lower than observed by SCIAMACHY. This suggests that the SCIAMACHY observations can be used to further improve CO emissions inventories.