Geophysical Research Abstracts,
Vol. 10, EGU2008-A-10025, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-10025
EGU General Assembly 2008

Analysis of upper troposphere trace gases and aerosols measurements over West Africa during summer 2006.

E. Orlandi (1), E. Real (2), F. Fierli (1), K. Law (2), S. Borrmann (3), F. Cairo (4), H. Schlager (5), C. M. Volk (6) and A. Minikin (5)

(1) Institute of Atmospheric Science and Climate, CNR, Bologna, Italy, (2) Service d'Aéronomie/IPSL, Université Pierre et Marie Curie/CNRS, Paris, France, (3) Institut für Physik der Atmosphäre, Johannes Gutenberg Universität, Mainz, Germany, (4) Institute of Atmospheric Science and Climate, CNR, Rome, Italy, (5) Institut für Physik der Atmosphäre, DLR-Oberpfaffenhofen, Germany, (6) Institut für Atmosphäre und Umwelt, Universität Frankfurt, Germany

e.orlandi@isac.cnr.it

During the AMMA 2006 campaign, aircraft measurements often revealed the presence of polluted air masses with the chemical characteristics of biomass burning plumes in the free troposphere and in the upper troposphere over the Gulf of Guinea. The analyses carried out within the AMMA project suggest that the main emission region is central Africa during the south hemisphere dry season.

This study shows the importance of convective uplift by large mesoscale convective systems for the transport of southern biomass burning emissions into the upper troposphere over West Africa.

Such a mechanism allows rapid transport of pollutants up to 14 km where they are transported westward by the tropical easterly jet.

The latitudinal distribution of the biomass burning plume and its content in CO, CO2 and O3 is determined with observations onboard three aircrafts (D-F20, BAE-146, M55-Geophysica) for a case study during the Monsoon season in 2006 and increased concentrations are found south of 8˚N below 600 hPa and around of 5˚N at 200 hPa. An analysis of the origin of the air masses sampled during the AMMA campaign and

the transport pathways was carried out using the Lagrangian particle dispersion model FLEXPART and the mesoscale meteorological model BOLAM. The mesoscale model was nudged with cloud top brightness temperatures derived from Meteosat measurements in order to accurately reproduce the position and the life cycle of convective systems over central and western Africa.