



Biomass burning influence on ambient aerosol concentrations in a subtropical region – local versus long-range transport source contributions

G. Engling (1), J. Lee (2), Y.-T. Chen (1), Y.-C. Wu (1), C. S.-C. Lung (1) and C. C.-K. Chou (1)

(1) Research Center for Environmental Changes, Academia Sinica, Taipei, Taiwan, (2) Department of Environmental Engineering and Safety, National Yunlin University of Science and Technology, Douliu, Taiwan (guenter@rcec.sinica.edu.tw / Fax: +886 2-2783-3584 / Phone: +886 2-2653-9885 Ext. 284)

Smoke emissions from biomass burning have substantial impact on regional air quality and global biogeochemical cycles and climate. In Asia in particular, numerous burning activities, including post-harvest burning of agricultural fields and domestic biofuel combustion, constitute important sources of aerosol particles locally, while also being subject to long-range transport.

Ambient aerosols were collected at three sites on the subtropical island of Taiwan. Spatial and temporal variations of selected polar organic compounds and various inorganic species were determined over a period of two years. Concentration patterns of molecular biomass burning tracers, including the anhydrosugars levoglucosan, mannosan, and galactosan, were assessed in order to distinguish local from regional biomass smoke contributions. While ambient tracer concentrations were enhanced during the post-harvest burning season of rice fields in Taiwan, fairly high levels of the smoke tracers were observed during non-burning seasons as well. These high background concentrations may be partially explained by re-suspension of soil and contributions of smoke from small-scale domestic fires. Long-range transport of smoke aerosols from East and South-East Asia constituted an additional important source of carbonaceous aerosol in Taiwan. Specifically, during a dust storm event (commonly

observed during the winter monsoon season) mineral dust particles mixed with bio-fuel smoke were transported westward from North-Eastern China and also impacted Taiwan during an episode in the Spring of 2007. Observations of elevated concentrations of biomass smoke tracers at a high-altitude site in central Taiwan also provided evidence for long-range transport of smoke aerosols from South-East Asia and thus another example of regional source influence.