Geophysical Research Abstracts,
Vol. 11, EGU2009-2607-1, 2009
EGU General Assembly 2009

Organic Compound Characterization and Source Apportionment of Indoor and Outdoor Quasi-ultrafine PM in Retirement Homes of the Los Angeles Basin

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Quasi-ultrafine particulate matter (PM0.25) and its components were measured in indoor and outdoor environments at four retirement communities in the Los Angeles basin, California, as part of the Cardiovascular Health and Air Pollution Study (CHAPS). The present work focuses on the identification and quantification of the sources, characterization of organic constituents and indoor and outdoor relationships of quasi-ultrafine PM. To the contrary to n-alkanes and n-alkanoic acids, the average indoor/outdoor ratio of most of the measured PAHs, hopanes and steranes were close to or slightly lower than 1, and indoor-outdoor correlation coefficients (R) were always positive and for most of these components moderate to strong (median R was 0.60 for PAHs and 0.74 for hopanes and steranes). This suggests that indoor PAHs, hopanes and steranes were mainly from outdoor origin, whereas indoor n-alkanes and n-alkanoic acids were significantly influenced by indoor sources.
The Chemical Mass Balance (CMB) model was applied to both indoor and outdoor speciated chemical measurements of quasi-ultrafine PM. Vehicular sources had the highest contribution to PM0.25 among the apportioned sources for both indoor and outdoor particles at all sites (on average 24-47%). The contribution of mobile sources to indoor levels was similar to their corresponding outdoor estimates, thus indicating the high penetration of these sources indoors.