Estimation of woodsmoke contributions to PM10 loadings in the airshed of Melbourne, Australia

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During the autumn and winter, wood smoke emissions from domestic heating contribute significantly to atmospheric fine particle loadings in the airshed of Melbourne, Australia. Although significant amounts of wood smoke are observed in the region, the chemical properties of the smoke are yet to be well characterised and only a limited number of chemical and physical measurements are available to assess the relationship between direct primary wood smoke emissions and ambient particle concentrations. In order to better assess the contribution of residential wood smoke to the particle loadings of the airshed, an intensive winter-time aerosol characterisation campaign was carried out at the CSIRO Bayside Air Quality Station at Aspendale, Melbourne between the July and August 2004. The station is equipped to measure the concentration of the criteria pollutants defined in the of Australian National Environment Protection Measure for Ambient Air Quality (NEPM), as well detailed measurements of aerosol chemical and microphysical properties, including size-resolved chemical composition, detailed organic speciation, aerosol hygroscopic growth, the concentration of volatile components, aerosol scattering coefficient and aerosol number size distributions.

Samples from a PM10 high volume aerosol sampler were analysed using High Performance Liquid Chromatography coupled to Electrospray Ionisation Time of Flight Mass Spectrometory (HPLC/ESI-TOFMS), and the concentrations of wood smoke tracers such as monosaccharide anhydrides, substituted phenols and resin acids were determined. In addition a thermographic method determined the ratio of organic carbon to elemental carbon (OC/EC). High concentrations of wood smoke tracers and OC were detected on the days associated with high PM10 concentrations (up to 350 ngm^{-3} total detected tracers, 9 μgm^{-3}OC and 4.5 μgm^{-3}EC). The highest daily av-

erage PM10 concentration during the campaign was 41 $\mu\mathrm{gm}^{-3}$ which is below the NEPM PM10 standard of 50 $\mu\mathrm{gm}^{-3}$. By combining the wood smoke tracers with the OC/EC ratio the contributions of wood smoke to the PM10 loadings of the Melbourne airshed are estimated.