Organic Compositions of Baseline Marine Aerosol at Cape Grim, Australia

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With 70% of the earths surface covered by oceans, aerosols in the marine boundary layer play an important role in the climate system, directly by scattering and absorbing radiation, and indirectly by acting as cloud condensation nuclei, thus influencing cloud droplet size distribution, cloud albedo and lifetime. While marine aerosol is dominated by sea-salt aerosol, organic compounds are also present. The species comprising organic aerosol provide information on the sources of the organic compounds, their production mechanisms and their likely interaction with the climate system.

Aerosol samples were collected at the Cape Grim Baseline Monitoring Station and their non-polar organic species composition determined. Several indices for *n*-alkanes were used to identify the contribution of biogenic and anthropogenic sources to the organic aerosol. In general, the baseline samples were dominated by biogenic sources and the contribution of the biological material was greater in summer than winter. Significant amounts of cycloalkanes were detected in all samples, indicating a biomass burning aerosol source in the marine boundary layer under baseline conditions. Back trajectory analysis and chemical transport modeling suggest that at five km the air masses had passed over land masses such as Southern Africa, Madagascar and Western Australia, before arriving at Cape Grim. While there is no indication that the air masses at five km directly interacted with the air masses at the surface at Cape Grim, we suggest that entrainment of aerosols from the free troposphere may provide a mechanism for supplying biomass burning aerosol to Cape Grim under baseline conditions.

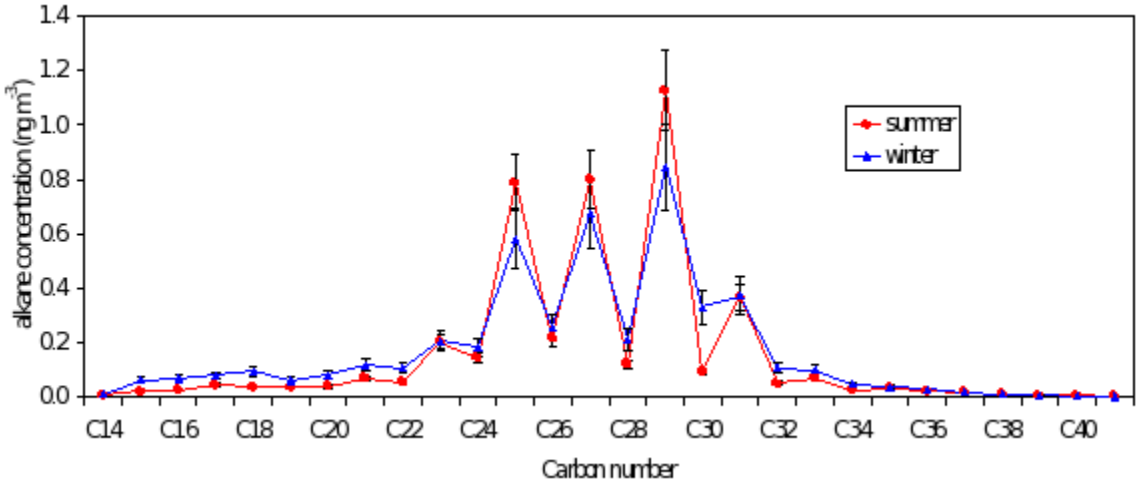

Figure 1. Average summer and winter alkane concentrations measured in aerosol collected under baseline conditions at Cape Grim, Tasmania, Australia. The dominance of alkanes with carbon numbers greater than 22 indicate the importance of biogenic sources to the organic aerosol under clean marine conditions at Cape Grim.