

## 2.079 Uncertainty in biogenic emissions from Eucalypts: Implications in urban Southeast Australia.

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Abstract:

Biogenic emissions including isoprene and monoterpenes are strong precursors for ozone and particle formation. In Australian cities, such as Sydney, surrounded by Eucalypt forests, biogenic emissions dominate in summer, leading to deleterious air quality and health implications. Huge distances between Australian cities means that anthropogenic NO<sub>x</sub> sources are isolated, thus chemistry on the biogenic/urban fringes is of major importance.

Isoprene and monoterpene measurements are presented from four field campaigns in Southeast Australia; two from Western Sydney (urban), one from Wollongong (coastal urban), and one from Tumbarumba (Eucalypt forest) (Emmerson et al. 2016). The observed concentrations of isoprene and monoterpenes were of a broadly similar magnitude, indicating that Southeast Australia may hold an unusual position where neither chemical species dominates.

The Model of Emissions of Gases and Aerosols from Nature version 2.1 (MEGANv2.1) was coupled to the CSIRO chemical transport model. The high emission factors within MEGANv2.1 for Southeast Australia over-predicted the observed isoprene (up to a factor of 6) and under-predicted the observed monoterpene concentrations (up to a factor of 4). There was not a consistent factor for either isoprene or monoterpenes that could match observations and modelled results across the four sites/seasons studied.

Re-mapping the Southeast Australian biogenic emission factors is important. A proposed aircraft campaign "Characterising Organics and Aerosol Loading of Australia" (COALA) is aimed for the Austral summer of 2019. COALA will enable study of how these biogenic emissions interact with isolated city plumes. Low NO<sub>x</sub> Australia may represent future conditions in the Northern Hemisphere, where NO<sub>x</sub> levels are decreasing due to strengthened air quality regulations.

Emmerson, K.M., Galbally, I.E., Guenther, A.B., Paton-Walsh, C., Guerette, E.-A., Keywood, M.D., Cope, M.E., Lawson, S.J., Molloy, S.B., Dunne, E., Thatcher, T., Karl, T., Maleknia, S.D. 2016. Current estimates of biogenic emission from Eucalypts uncertain for Southeast Australia.. ACPD. doi:10.5194/acp-2016-92.