

Curriculum Vitae

Name: Melita Keywood
Date of birth: 7 July 1967
Citizenship: Australian/New Zealand/England
Qualifications: B.Sc, University of Auckland, 1989
M.Sc, University of Auckland, 1991
Ph.D, Australian National University, 1996

Employment:

1996-1999 Post Doctoral Fellow, CSIRO Atmospheric Research
1999-2000 Research Scientist CSIRO Atmospheric Research
2000-2002 Senior Research Scientist CSIRO Atmospheric Research
2002-2004 Post Doctoral Fellow, Caltech
2004-2007 Senior Research Scientist CSIRO Marine and Atmospheric Research
2007- present Senior Research Scientist, Centre for Australian Weather and Climate research: A partnership between the Bureau of Meteorology and CSIRO

Positions held: Lead Scientist, Multiphase Atmospheric Chemistry Program, Cape Grim Baseline Monitoring Station
Commission for Atmospheric Chemistry and Global Pollution (ICACGP) committee member
Standards Australia technical committee
NATA technical assessor
Member of the Air Quality Working Group of the Environment Protection and Heritage Council.

Research Interests and Experience

Dr Melita Keywood is a Senior Research Scientist in the Centre for Australian Climate and Weather Research (a partnership between the Australian Bureau of Meteorology and CSIRO Marine and Atmospheric Research) where she has investigated aerosol composition and microphysics since 1996. Early in her career Dr Keywood carried out the first measurements of the size-resolved chemical composition of particulate matter in six Australian cities, producing data that was utilized in the establishment of the National Environment Protection Measure for Air (Air NEPM) and resulting in 6 publications. These data are the only Australian particulate data reported in the USEPA Office of Air Quality and Standards Staff Paper review of air quality and standards. Between 2002 and 2004 Dr Keywood carried out a sabbatical at the California Institute of Technology where she worked with Professor John Seinfeld on the formation of secondary organic aerosol (SOA). This work contributed significantly to our understanding of the effect of the structure of a volatile organic compound on the yield of aerosol produced in SOA formation, our understanding of the composition of SOA products, and the hygroscopic behaviour of these products. This work has resulted in the production of 8 refereed publications.

Since her return to CSIRO, Dr Keywood has established a strong particle research program in the Bayside Air Quality Station located in Aspendale, Melbourne focusing on SOA formation and Dr Keywood has just completed a major project investigating tools for the identification and quantification of SOA in Australian airsheds. This work has provided the first quantitative estimate of SOA loading in Australia. Dr Keywood is currently applying the methodology to other locations, including urban air sheds and remote forest sites where biogenic SOA formation dominates. Dr Keywood is also using information collected at the Bayside Air Quality

Site in Aspendale to understand the effects of bushfire smoke on urban air quality and how this may be affected by changing fire regimes under climate change.

Dr Keywood is the Lead Scientist for the Multiphase Atmospheric Chemistry program at the Cape Grim Baseline Air Monitoring Station, one of the World Meteorological Organization's Global Atmospheric Watch stations; Melita is responsible for monitoring PM10 and PM2.5 mass and chemical composition in baseline air, contributing these data to the international data base for air quality. Dr Keywood co-organised the Precursor to Particle 2006 (P2P2006) Research Intensive at Cape Grim (February 2006), aimed at investigating new particle formation in the marine environment. Dr Keywood is currently completing some work on organic composition of remote marine boundary layer aerosol.

Dr Keywood is regularly requested to provide expertise advice on particle composition and SOA to government groups. Dr Keywood co-instigated and co-organised the "Something in the Air" Workshop in Canberra in August 2008, which brought together Australian researchers interested in the influences of aerosol on climate. The outcome of the meeting was a report setting out a proposal for an Australian Aerosol and Climate Research Program that has been used by the Department of Climate Change in developing the National Framework on Climate Change Research that will be implemented in 2009.

Dr Keywood is an author on over 34 refereed journal publications and 30 reports

Referred Publications

1. Lawson, S. J., Galbally, I. E., Powell, J. C., Keywood, M. D., Molloy, S. B., Cheng M., and Selleck, P. W. (2011). The effect of proximity to major roads on indoor air quality in typical Australian dwellings. *Atmospheric Environment*, in press.
2. Galbally, I. E., Keywood, M. D., Powell, J. C., Lawson, S. J., Cheng M., Dunne, R., Gillett, R. W., Molloy, S. B., Selleck, P. W., Ward, J., and Reisen, F. (2011). An overview of the CSIRO 2008-2009 indoor air quality study. *Clean Air and Environmental Quality*, in press.
3. Radhi, M., Box, M. A., Box, G. P., Mitchell, R. M., Cohen, D. D., Stelcer, E., and Keywood, M. D. (2010a). Optical, physical and chemical characteristics of Australian continental aerosols: results from a field experiment. *Atmospheric Chemistry and Physics*, 10(13), 5925-5942.
4. Gabric, A. J., Cropp, R. A., McTainsh, G. H., Johnston, B. M., Butler, H., Tilbrook, B., and Keywood, M. (2010). Australian dust storms in 2002-2003 and their impact on Southern Ocean biogeochemistry. *Global Biogeochemical Cycles*, 24.
5. Radhi, M., Box, M. A., Box, G. P., Mitchell, R. M., Cohen, D. D., Stelcer, E., and Keywood, M. D. (2010b). Size-resolved mass and chemical properties of dust aerosols from Australia's Lake Eyre Basin. *Atmospheric Environment*, 44(29), 3519-3528.
6. Rotstayn, L. D., Keywood, M. D., Forgan, B. W., Gabric, A. J., Galbally, I. E., Gras, J. L., et al. (2009). Possible impacts of anthropogenic and natural aerosols on Australian climate: a review. *International Journal of Climatology*, 29(4), 461-479.
7. Iinuma, Y., Boge, O., Keywood, M., Gnauk, T., & Herrmann, H. (2009). Diaterbic Acid Acetate and Diaterpenylic Acid Acetate: Atmospheric Tracers for Secondary Organic Aerosol Formation from 1,8-Cineole Oxidation. *Environmental Science & Technology*, 43(2), 280-285.
8. O'Toole, J., Keywood, M., Sinclair, M., & Leder, K. (2009). Risk in the mist? Deriving data to quantify microbial health risks associated with aerosol generation by water-efficient devices during typical domestic water-using activities. *Water Science and Technology*, 60(11), 2913-2920.
9. Cainey, J. M., Keywood, M., Bigg, E. K., Grose, M. R., Gillett, R. W., & Meyer, M. (2007). Flux chamber study of particle formation from *Durivillaea potatorum*. *Environmental Chemistry*, 4(3), 151-154.
10. Cainey, J. M., Keywood, M., Grose, M. R., Krummel, P., Galbally, I. E., Johnston, P., et al. (2007). Precursors to Particles (P2P) at Cape Grim 2006: campaign overview. *Environmental Chemistry*, 4(3), 143-150.

11. Keywood, M. D. (2007). Aerosol composition at Cape Grim : an evaluation of PM10 sampling program and baseline event switches. *Baseline Atmospheric Program Australia 2005-2006. 2005-2006 ed. J. M. Caine, N. Derek, and P. B. Krummel (editors). Melbourne: Australian Bureau of Meteorology and CSIRO Marine and Atmospheric Research. p. 31-36.*
12. Lee, A., Goldstein, A. H., Keywood, M. D., Gao, S., Varutbangkul, V., Bahreini, R., et al. (2006). Gas-phase products and secondary aerosol yields from the ozonolysis of ten different terpenes. *Journal of Geophysical Research-Atmospheres*, 111(D7).
13. Luhar, A. K., Galbally, I. E., & Keywood, M. (2006). Modelling PM10 concentrations and carrying capacity associated with woodheater emissions in Launceston, Tasmania. *Atmospheric Environment*, 40(29), 5543-5557.
14. Varutbangkul, V., Brechtel, F. J., Bahreini, R., Ng, N. L., Keywood, M. D., Kroll, J. H., et al. (2006). Hygroscopicity of secondary organic aerosols formed by oxidation of cycloalkenes, monoterpenes, sesquiterpenes, and related compounds. *Atmospheric Chemistry and Physics*, 6, 2367-2388.
15. Bahreini, R., Keywood, M. D., Ng, N. L., Varutbangkul, V., Gao, S., Flagan, R. C., et al. (2005). Measurements of secondary organic aerosol from oxidation of cycloalkenes, terpenes, and m-xylene using an Aerodyne aerosol mass spectrometer. *Environmental Science & Technology*, 39(15), 5674-5688.
16. Ng, N. L., Kroll, J. H., Keywood, M. D., Bahreini, R., Varutbangkul, V., Flagan, R. C., et al. (2006). Contribution of first- versus second-generation products to secondary organic aerosols formed in the oxidation of biogenic hydrocarbons. *Environmental Science & Technology*, 40(7), 2283-2297.
17. Keywood, M. D., Kroll, J. H., Varutbangkul, V., Bahreini, R., Flagan, R. C., & Seinfeld, J. H. (2004). Secondary organic aerosol formation from cyclohexene ozonolysis: Effect of OH scavenger and the role of radical chemistry. *Environmental Science & Technology*, 38(12), 3343-3350.
18. Keywood, M. D., Varutbangkul, V., Bahreini, R., Flagan, R. C., & Seinfeld, J. H. (2004). Secondary organic aerosol formation from the ozonolysis of cycloalkenes and related compounds. *Environmental Science & Technology*, 38(15), 4157-4164.
19. Schauer, J. J., Mader, B. T., Deminter, J. T., Heidemann, G., Bae, M. S., Seinfeld, J. H., et al. (2003). ACE-Asia intercomparison of a thermal-optical method for the determination of particle-phase organic and elemental carbon. *Environmental Science & Technology*, 37(5), 993-1001.
20. Gao, S., Keywood, M., Ng, N. L., Surratt, J., Varutbangkul, V., Bahreini, R., et al. (2004). Low-molecular-weight and oligomeric components in secondary organic aerosol from the ozonolysis of cycloalkenes and alpha-pinene. *Journal of Physical Chemistry A*, 108(46), 10147-10164.
21. Gao, S., Ng, N. L., Keywood, M., Varutbangkul, V., Bahreini, R., Nenes, A., et al. (2004). Particle phase acidity and oligomer formation in secondary organic aerosol. *Environmental Science & Technology*, 38(24), 6582-6589.
22. Keywood, M. D. (2003). Aerosol chemistry at Cape Grim. *Baseline Atmospheric Program Australia. 1999-2000 ed. N. W. Tindale, N. Derek, and P. J. Fraser (editors). Melbourne: Bureau of Meteorology and CSIRO Atmospheric Research. p. 31-41.*
23. Keywood, M. D., Ayers, G. P., Gras, J. L., Boers, R., & Leong, C. P. (2003). Haze in the Klang Valley of Malaysia. *Atmospheric Chemistry and Physics*, 3, 591-605.
24. Gras, J. L., Keywood, M. D., & Ayers, G. P. (2001). Factors controlling winter-time aerosol light scattering in Launceston, Tasmania. *Atmospheric Environment*, 35(10), 1881-1889.
25. O'Leary, R., Ayers, G. P., Bridgman, H. A., and Keywood, M. D (2002) Indoor/outdoor air pollution relationships at a household level in SE Australia: a pilot study. *Clean Air*, 36 (2), 25-31
26. Keywood, M. D., Ayers, G. P. and Gras, J. L. (2000) Testing a low-cost aerosol sampler, *Clean Air*, 43, 38-42.
27. Keywood, M. D., Ayers, G. P., Gras, J. L., Gillett, R. W., & Cohen, D. (1999). An evaluation of PM10 and PM2.5 size selective inlet performance using ambient aerosol. *Aerosol Science and Technology*, 30(4), 401-407.
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29. Keywood, M. D., Ayers, G. P., Gras, J. L., Gillett, R. W., & Cohen, D. D. (2000). Size distribution and sources of aerosol in Launceston, Australia, during winter 1997. *Journal of the Air & Waste Management Association*, 50(3), 418-427.
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32. Ayers, G. P., Selleck, P. W., Gillett, R. W., & Keywood, M. D. (1998). Determination of nicotine in water by gradient ion chromatography. *Journal of Chromatography A*, 824(2), 241-245.
33. Keywood, M. D., Ayers, G. P., Gras, J. L. and Cohen, D. D. (1998) The Use of a Micro-orifice Uniform Deposit Impactor (MOUDI) to investigate relationships between PM₁₀, PM_{2.5}, PM₁ and Ultrafine Particles in Urban Australia. *Journal of Aerosol Science*, 29 S1, 99-100.
34. Keywood, M. D., Beer, T., Ayers, G. P., Gillett, R. W. and Kreibich, H. (1998) The use of passive gas samplers to monitor personal exposure. *Clean Air*, 32, 32-36. Ayers G.P., Selleck P.W., Gillett R.W. and Keywood M.D., (1998) Determination of nicotine in water by gradient ion chromatography, *Journal of Chromatography A*, 824, 241-245.
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36. Keywood, M. D., Chivas, A. R., Fifield, L. K., Cresswell, R. G., & Ayers, G. P. (1997). The accession of chloride to the western half of the Australian continent. *Australian Journal of Soil Research*, 35(5), 1177-1189.
37. Simmons, S. F., Keywood, M., Scott, B. J., & Keam, R. F. (1993). IRREVERSIBLE CHANGE OF THE ROTOMAHANA-WAIMANGU HYDROTHERMAL SYSTEM (NEW-ZEALAND) AS A CONSEQUENCE OF A VOLCANIC-ERUPTION. *Geology*, 21(7), 643-646.
38. Keywood, M. D., Rodgers, K. A., Nicholson, K. A (1992) Catalogue of Active Thermal Features in the Waimangu Valley, 1990. *New Zealand Volcanological Record* 19, 29-51.