



New Particle Formation

ARM/ASR PI meeting

August 7, 2023

2:00 – 2:05 Introduction

2:05 – 3:15 Lightning Talks (12 talks, ~6 min each)

1. Markus Petters
2. Don Collins
3. Jim Smith
4. Jerome Fast
5. Gannet Hallar
6. Nicholas Meskhidze
7. Tamanna Subba
8. Chongai Kuang
9. Manish Shrivastava
10. Jeff Pierce (R)
11. Ellie Brown (R)
12. Shanhu Lee (R)

3:15 – 4:00 Discussion

Discussion questions

1. What aspects of new particle formation science are you most excited about?
2. Have you used ARM data for NPF research?
 - A. If so, what have you done?
 - B. If not, why not and how can ARM better instrument their sites for NPF research?
3. How can this community work together to progress NPF research? (e.g., field campaign? Chamber campaign?)
4. Do you have any questions for any of the speakers?

1. EPCAPE (San Diego, ends Feb 2024)
2. CAPE-K (Cape Grim, Apr 2024 – Sep 2025)
3. CoURAGE
(Baltimore MD;
~Fall 2024)
4. Bankhead
National Forest
(~Fall 2023 for
~5 yrs)

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Overview

J. M. Cainey et al., *Environ. Chem.* **2007**, *4*, 143–150. doi:10.1071/EN07041

Precursors to Particles (P2P) at Cape Grim 2006: campaign overview

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Ian E. Galbally,^B Paul Johnston,^D Rob W. Gillett,^B Mick Meyer,^B Paul Fraser,^B
Paul Steele,^B Mike Harvey,^E Karin Kreher,^D Torsten Stein,^F Ossama Ibrahim,^F
Zoran D. Ristovski,^G Graham Johnson,^G Cathie A. Fletcher,^G E. Keith Bigg^{H1}
and John L. Gras^B

Abstract. Iodine emissions from coastal macroalgae have been found to be important initiators for nucleation events at Mace Head, Ireland. The source of this iodine is the large beds of the brown kelp *Laminaria digitata*, which are significantly exposed at low tide.

On the coast around Cape Grim, Tasmania, there are beds of the brown kelp *Durvillaea potatorum*. The Precursors to Particles 2006 (P2P 2006) campaign at the Cape Grim Baseline Air Pollution Station in late summer (February) 2006 focused on the role of this local kelp in providing precursor gases to particle formation.

Durvillaea potatorum does not produce iodated precursor gases at the levels observed at Mace Head. IO was measured at 0.5 ± 0.3 ppt, while OIO was below detection limits (9 ppt). The dominant atmospheric iodated species was methyl iodide and the average concentration measured at the Cape Grim Station was 1.5 ± 0.3 pptv in baseline conditions, but showed significant variation in discrete samples collected immediately above the ocean surface.

Nucleation events were not detected at the Cape Grim Station, except for one period where the plume of a local bushfire interacted with air of marine origin. The passage of four fronts did not result in nucleation bursts and measurements on the beach 94 m below the Cape Grim Station suggested that *Durvillaea potatorum* was only a weak source of new particles.

