

VOCALS Aerosol: Surface measurements from Ronald H. Brown

Preliminary Results



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SEP 2003 Aerosol number-size distribution

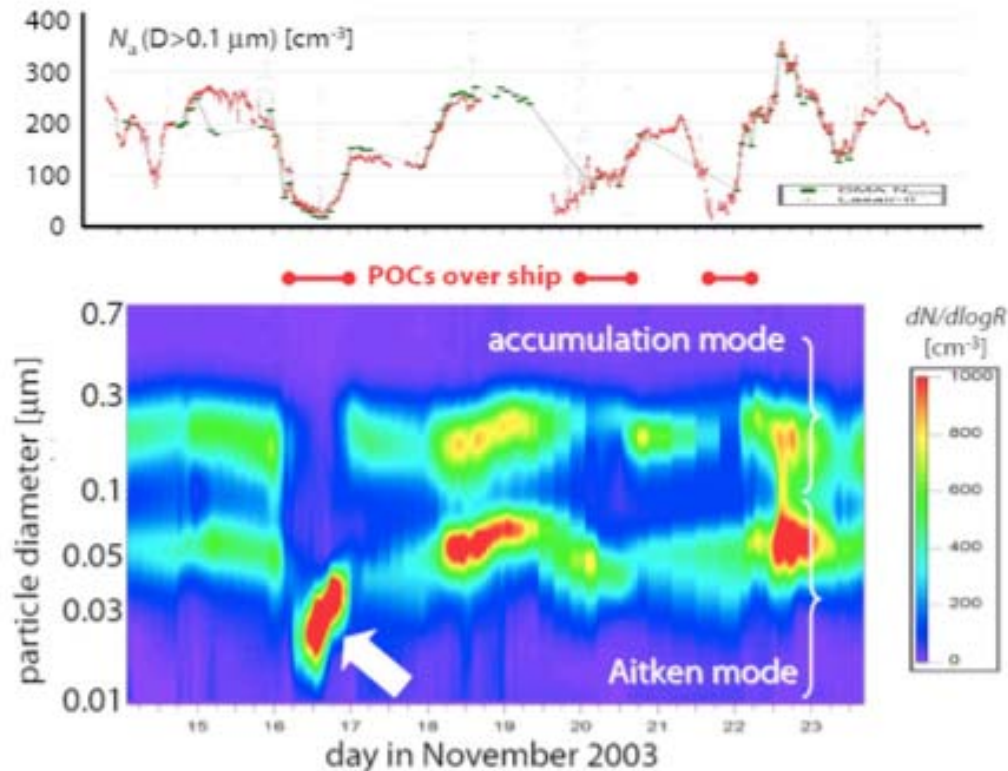
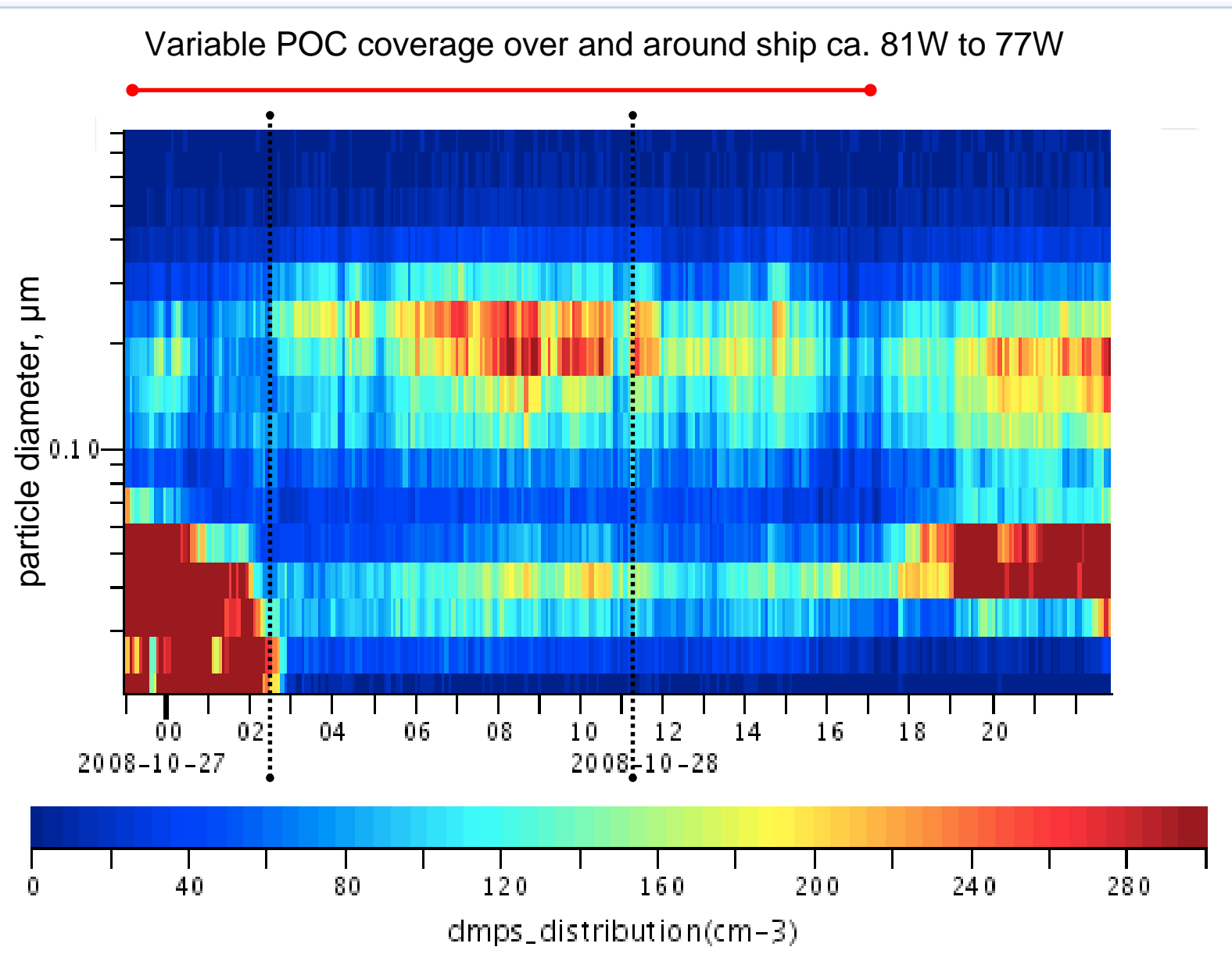


Figure 5: Accumulation mode aerosol concentration (top), and aerosol size distribution (bottom) measured on the R/V Roger Revelle over the SEP during November 2003. The red horizontal bars indicate periods where satellite imagery revealed pockets of open cells (POCs) over the ship. At these times there is strong reduction of the accumulation mode aerosol concentration, and on the 16th (white arrow) there is evidence of new particle formation.

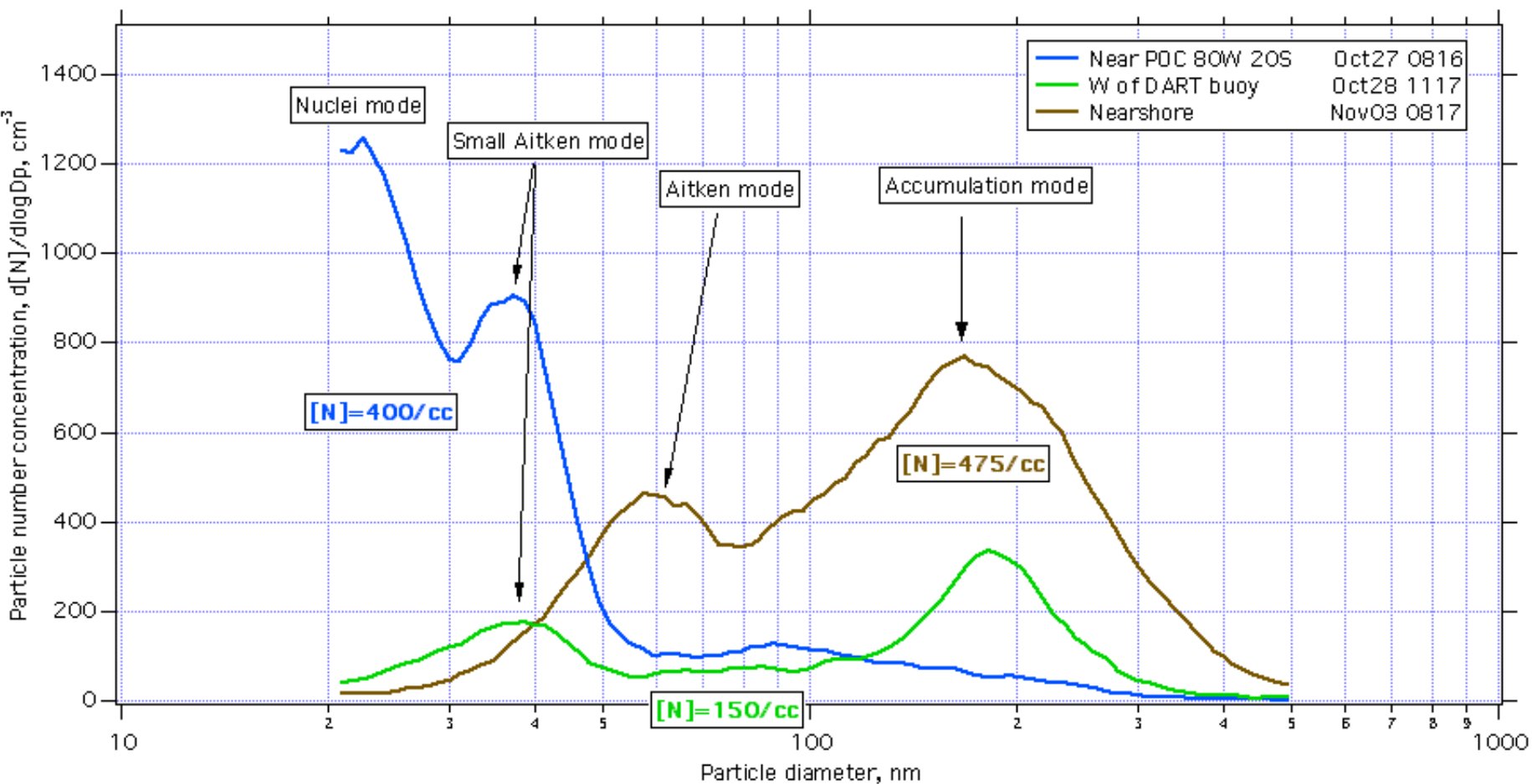
Vocals REx 27, 28 Oct. 2008

Aerosol 3-D number-size distribution $d[N]/d\log D_p \text{ cm}^{-3}$



Vocals REx 27, 28 Oct., 3 Nov. 2008

Aerosol number-size distributions, $d[N]/d\log D_p$ cm^{-3}



VOCALS REx Aerosol Highlights

Physical features:

- | | |
|-----------------------------------|---|
| 1. Nuclei mode <20nm diameter | dominant at times near or within POC |
| 2. Aitken mode 20 to 80nm | always present, often dominant |
| 3. Aitken mode large tail | std. dev. ca. 1.2 in POC. |
| 4. "Hoppel" minimum | always present within range 40 to 100nm |
| 5. Accumulation mode, 80 to 200nm | sometimes dominant, minimal in POC |
| 6. Accumulation mode | std. dev. ca. 1.4 when present > 50/c |
| 7. Seasalt mode, >500nm | always present, dominates [mass], [N] < 1 to 5/cc |

Cloud Condensation Nuclei Concentration, supersaturation range of 0.1 to 0.6%:

1. CCNC spectra equal to integral of ambient number distribution assuming $(\text{NH}_4)_2\text{SO}_4$ for critical diameter
2. CCNC spectra for monodisperse increment at 50nm show solubility similar to $(\text{NH}_4)_2\text{SO}_4$

Radon:

[^{222}Rn] at oceanic levels until east of 75°W, then indicating continental influence

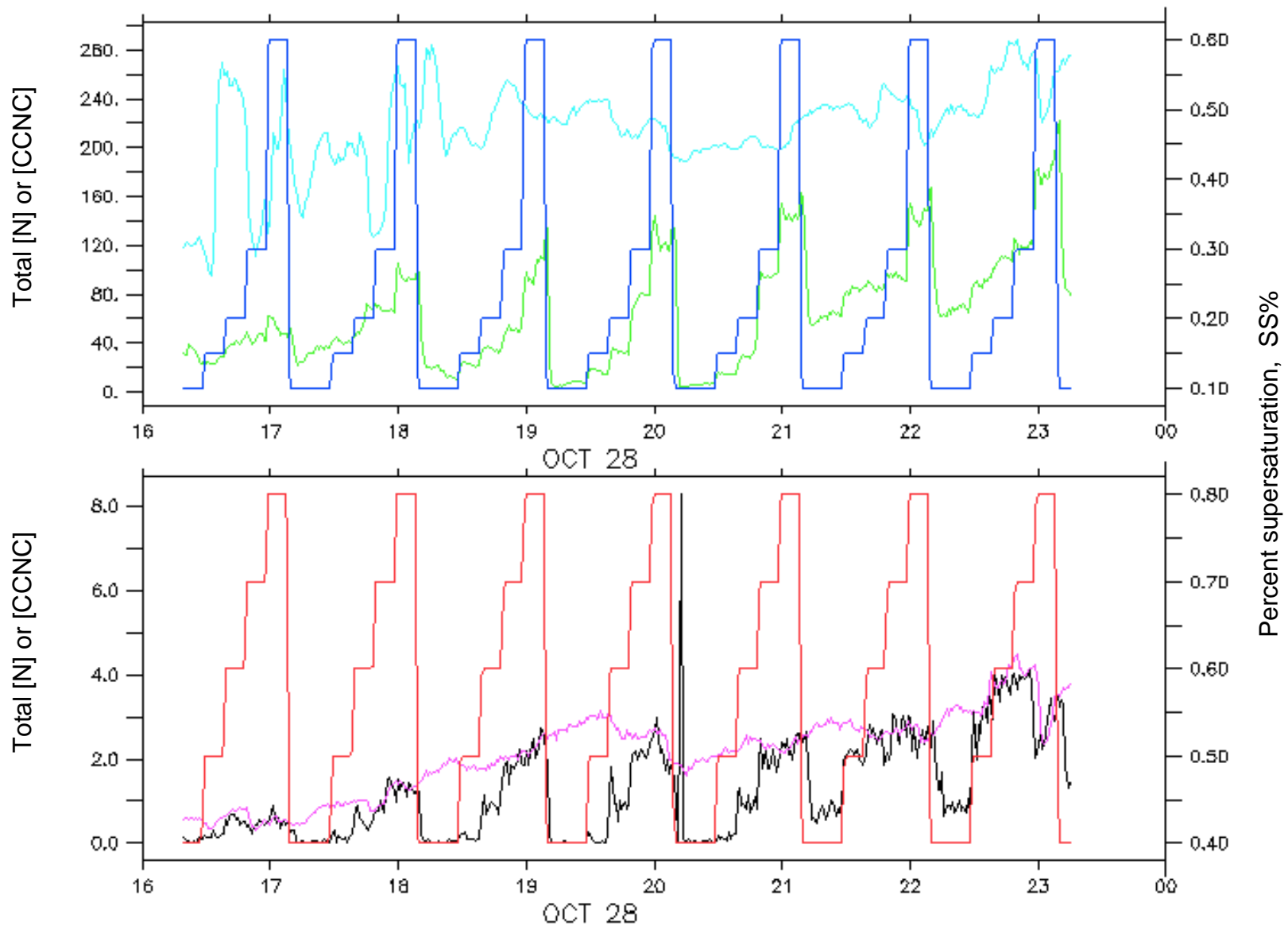
Aerosol optics:

1. Light scattering coefficient dominated by seasalt aerosol.
2. Light absorption coefficient nil west of DART buoy
0.5 to 1 Mm⁻¹ with incursion of continental air at DART buoy, 75°W

Aerosol Chemistry:

Lelia Hawkins of Scripps will present next

Vocals 27, 28 Oct. CCNC spectra, [N](SS%)



Spectra of 60nm increment of ambient size distribution