Components of an Airborne Measurement Program

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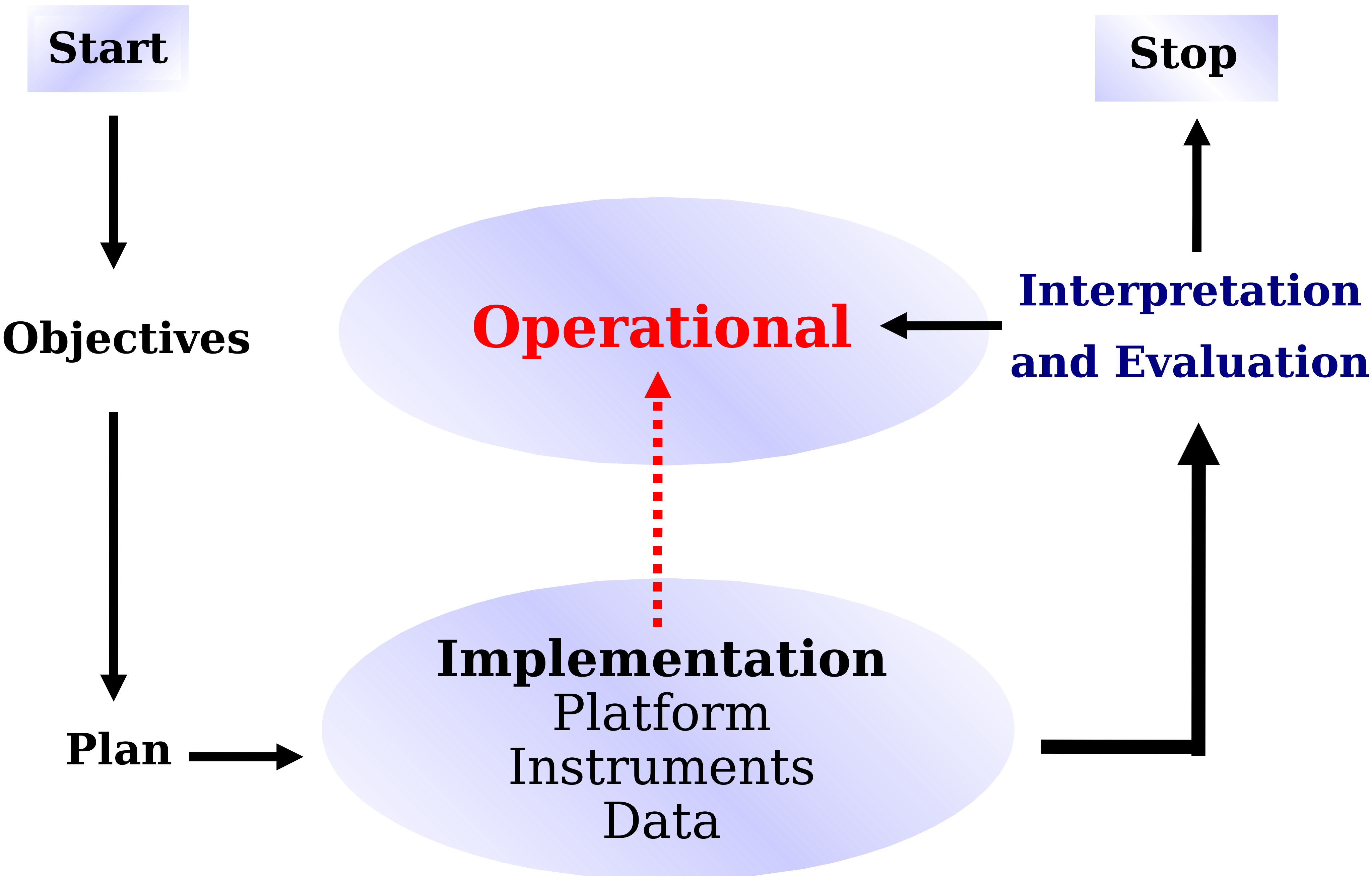
Phases of a Measurement Program

- Objectives
- Plan
- Platform
- Instruments
- Data
- Interpretation and Evaluation

Program Phases



Objectives

- Clear and Quantitative Objectives.
  - Rain Enhancement Objectives
    - Ground Water
    - Reservoirs and Hydro-power
    - Domestic and Industrial Use
  - Research Objectives
    - Potential of Seeding
    - Effectiveness of Seeding
    - Validate Conceptual Model.

Plan Considerations

- Multidisciplinary and High Technology
- Meteorological Phenomena that is Complex and Covers a Range of Scales
- Unexpected Final Results
- Time and Money Consumer
- Appropriate Technology and Human Resources

Human Resources

- Ideally sufficient human resource would be reserve and available at the beginning of the project.
- Development of Local Personnel
  - Lectures
  - Job "Shadowing"
  - University Based Graduate Education
    - Very Advanced and Technical Field
    - Programming, Math, and Physics

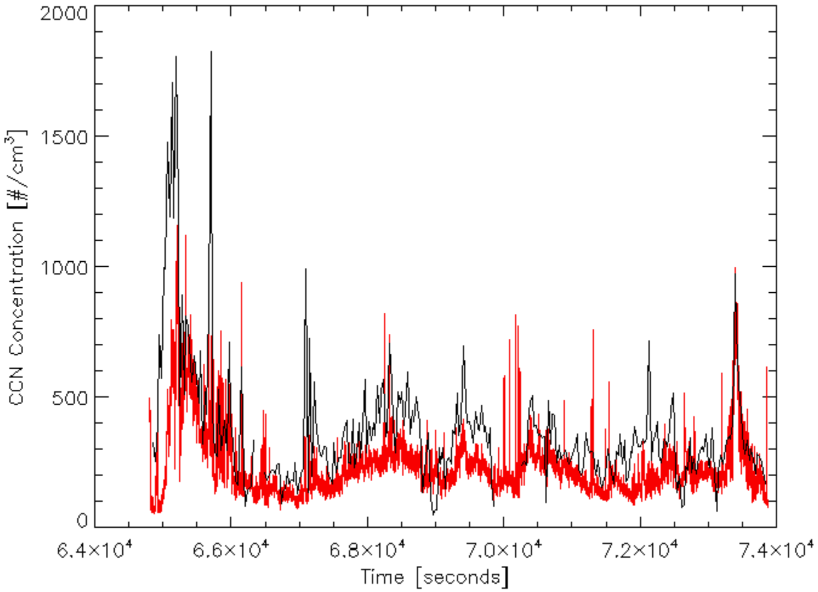
Design of a Plan

- Time Period
- Project Area
- Conceptual Model
- Operational Plan
- Data Collection System
- Evaluation Scheme
  - Physical evaluation the chain of events in the rain process.
  - Statistical evaluation of randomized seeding.

Instruments

- Only deploy instruments for which you are really interested in the measurements.
- Record all "state" parameter for each instrument.
- Calibrate instruments before and after each field project or season.
- Preform calibration "checks" on instruments during the measurement season; however, do not perform calibrations.

Data Processing

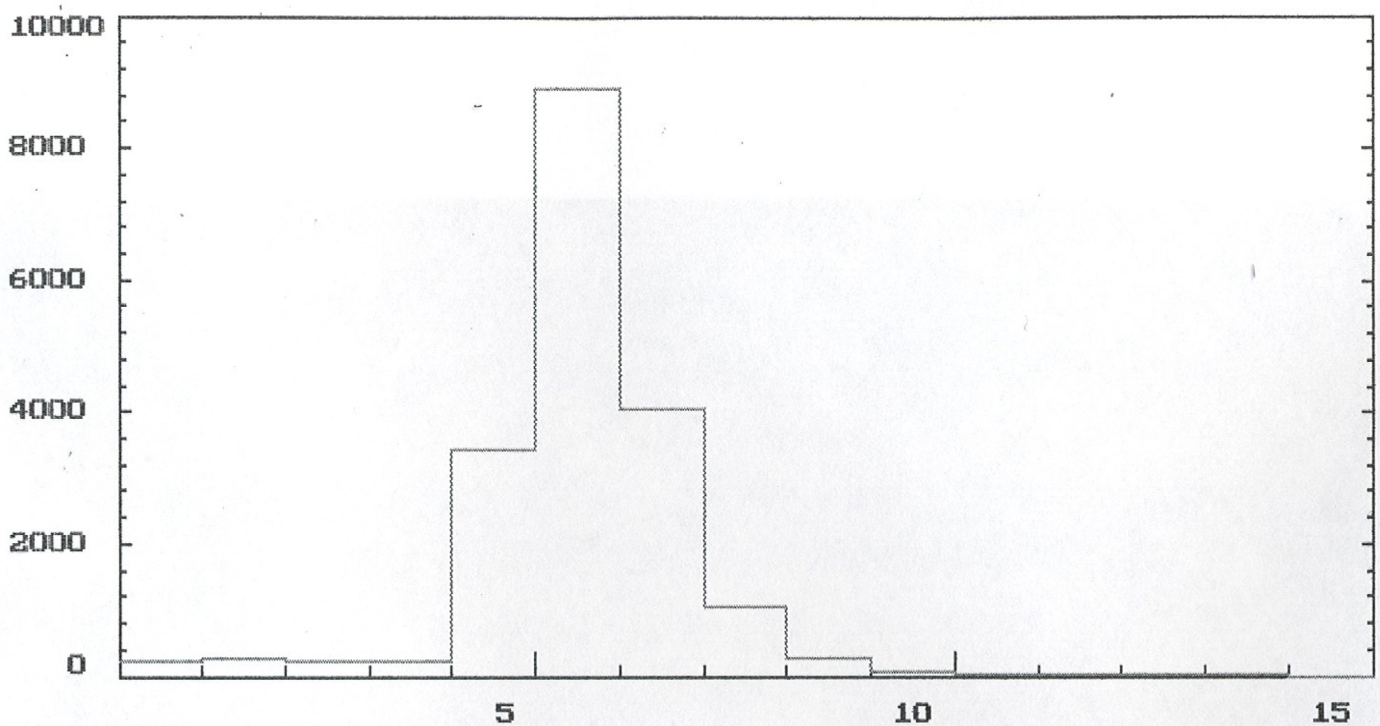


- Data Quality Control
  - Calibration Checks
- Data Missing Values Codes
- Levels of Data Processing
  - Raw recorded data.
  - Convert from engineering to physical units.
  - Create single unit instrument data files.
  - Create combined instrument data file.
- Data Quality Assurance
  - Scientist review the data.
  - Scripts look for unrealistic values.

Data: General Comments

- Quick Visualization of data is very Important.
  - Create a **preliminary** version of the data using automated processing scripts.
  - Create a **final** dataset after the project is over by applying manual edits to the “raw” data files which replace “bad” data with missing value codes.
- Archive the raw data and any editing files.
- Work with ASCII data as much as possible.
  - Compress ASCII files, if necessary.
- Use a standard data format, which includes Meta data in all data files.

PCASP 222nm Calibration



CHNL	Cts
1	218
2	250
3	233
4	223
5	3450
6	8921
7	4047
8	1056
9	275
10	73
11	10
12	1
13	1
14	2
15	0
16	

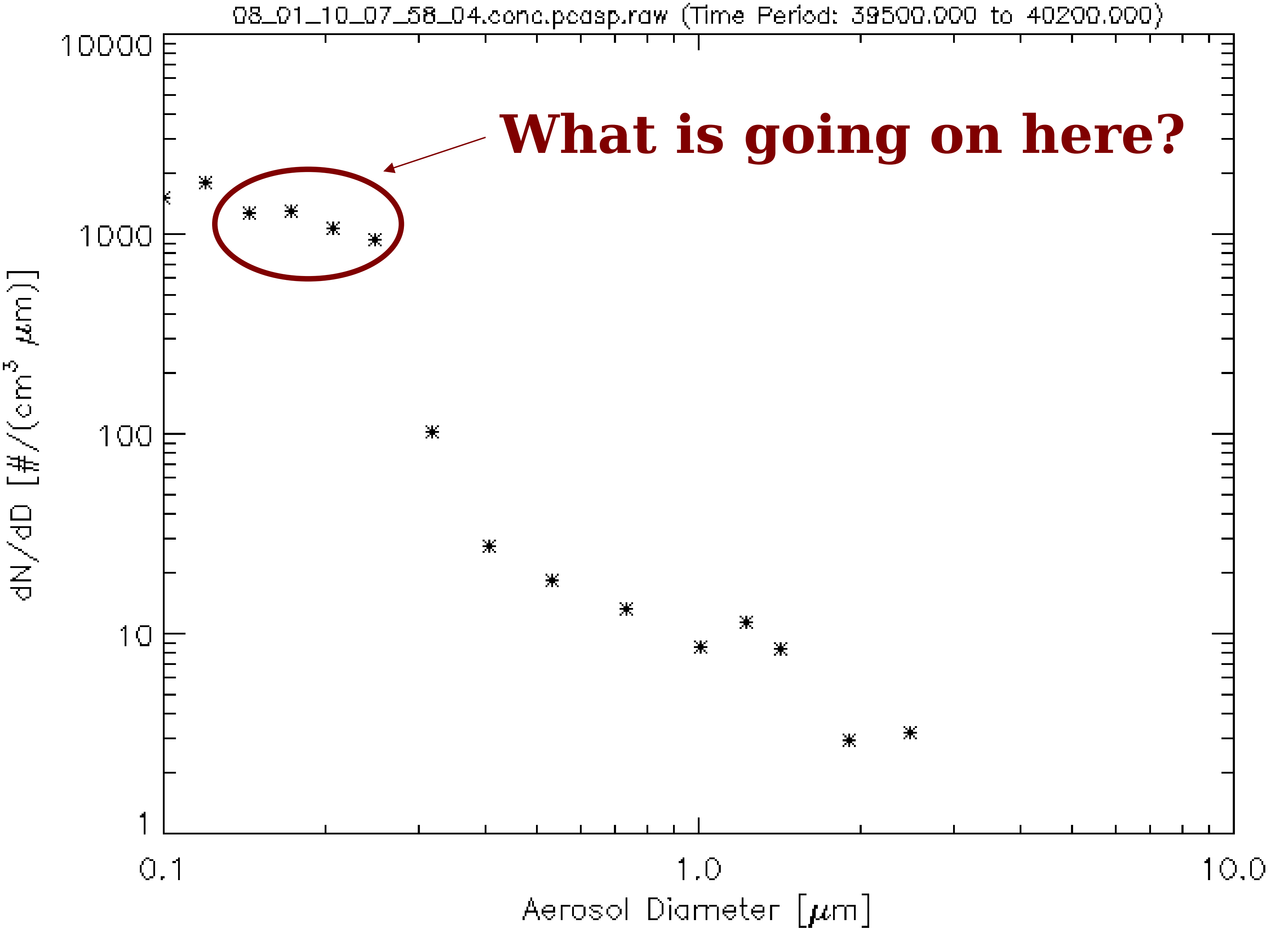
Probe Type: asasp

Probe S/N:
1032-0903-33
Probe Owner:
WMI

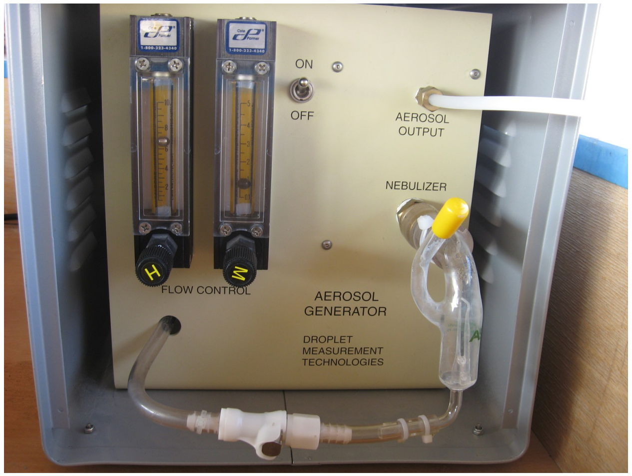
Data Taken:
16:12:19.00 to
16:12:25.00
07/20/06

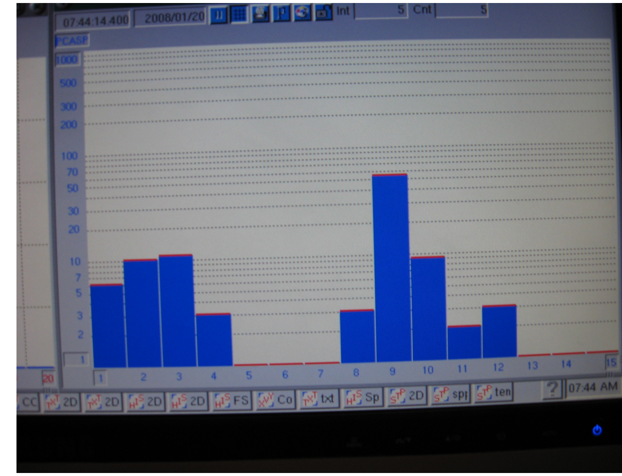
Processed:
07/20/06 16:12:40
Data File:
222nm.cal

January 10, 2008 (10:58:20-11:10:00)



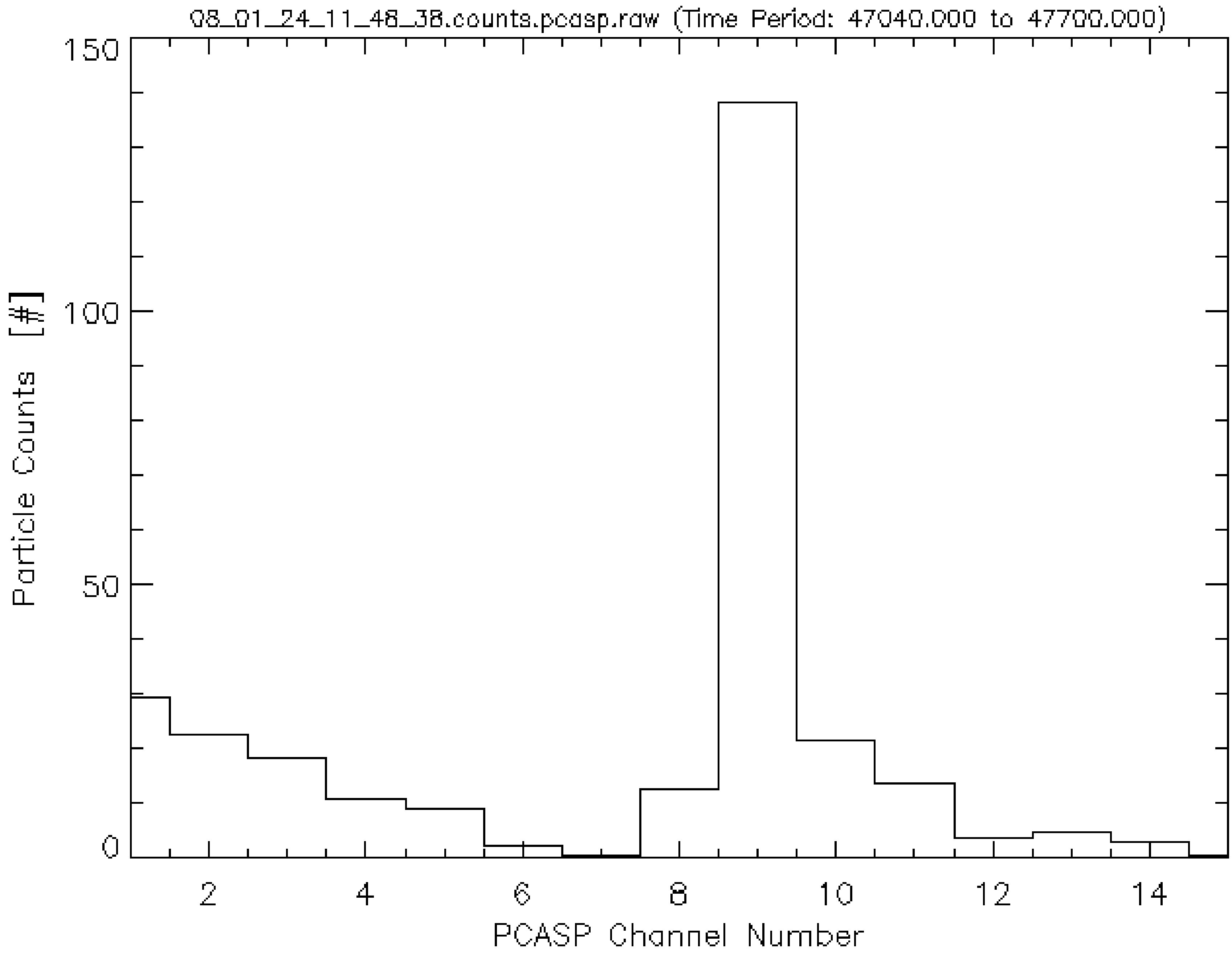
PCASP: Calibration Checks



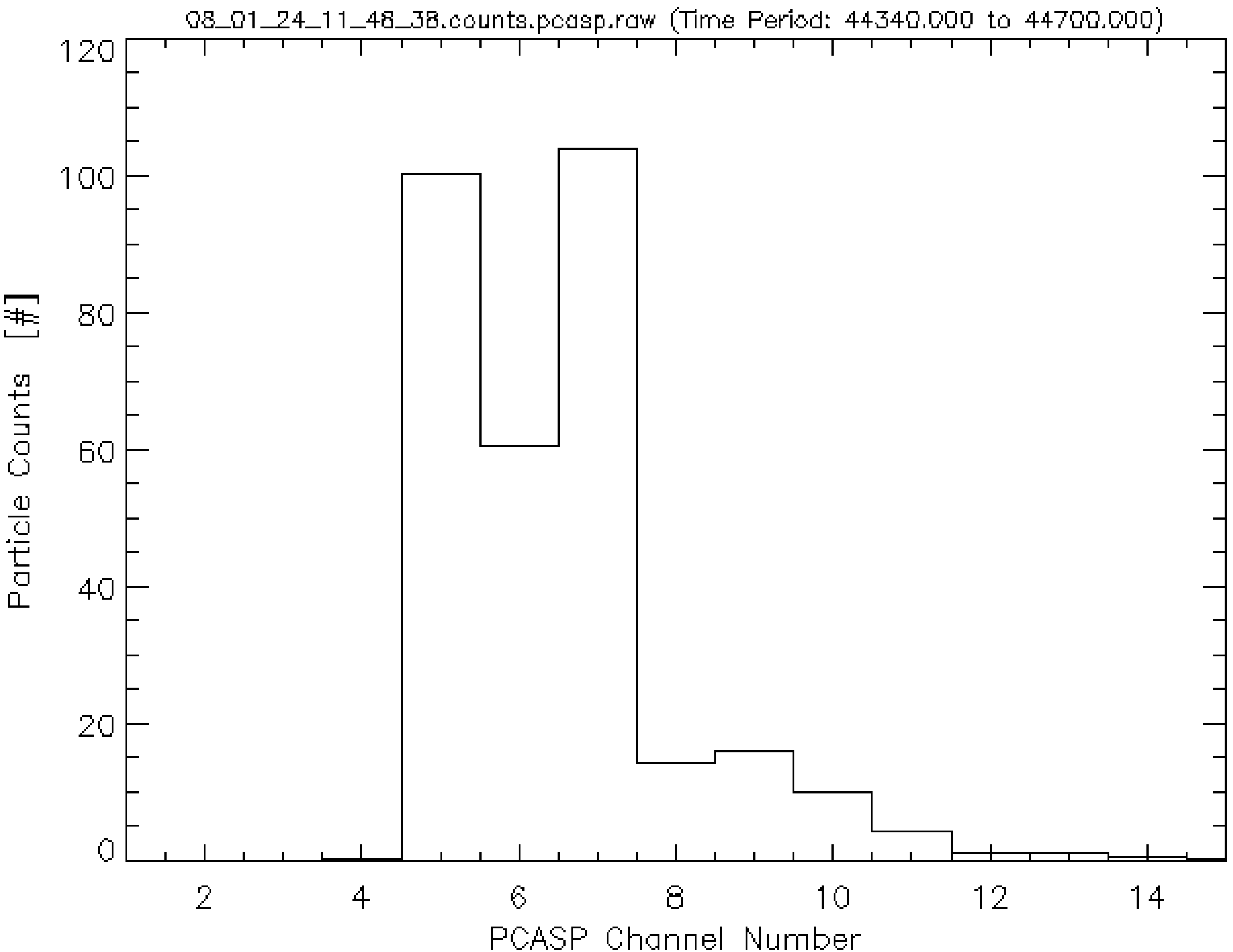


Date	Start [sfm]	End [sfm]	Peak CH	Pre-Peak Counts	Peak Counts	Post-Peak Counts	Size [nm]	Average Channel
07/06/20			6	3450	8921	4047	222	6.03636
07/06/20			7	11	2822	404	300	7.12141
08/01/20	28100	28600	9	0.3370	8.5245	0.8995	523	9.05762
08/01/22	39540	40500	6	2.3052	1.7979	2.3729	222	6.01045
08/01/24	44340	44700	6	100.3500	60.5278	104.0778	222	6.01566
08/01/24	47040	47700	9	12.5364	138.1742	21.4970	523	9.05203
08/01/24	49740	50100	12	3.9611	10.8306	0.4667	993	11.7710

PCASP: 523 nm Check



PCASP: 222 nm Check



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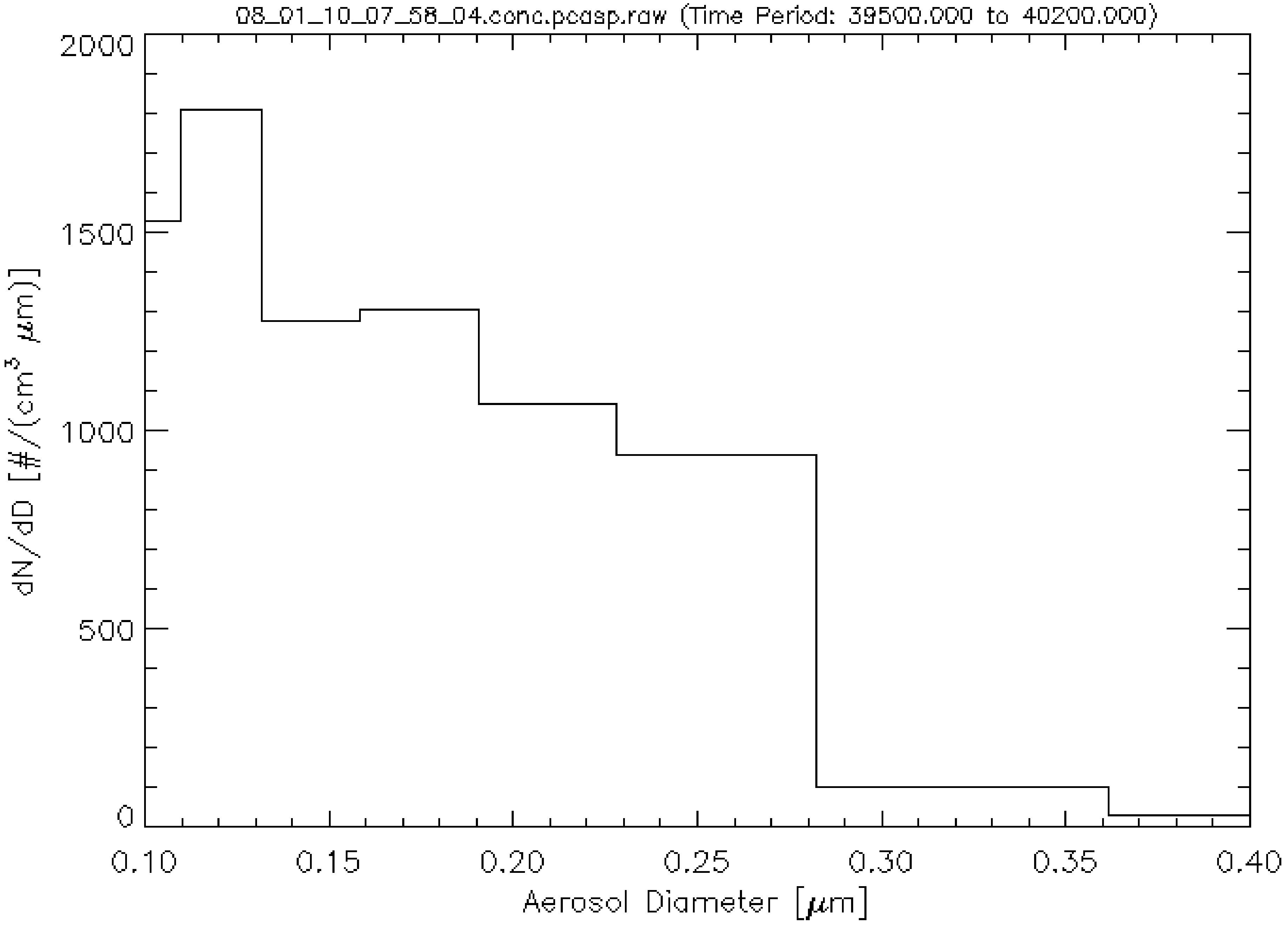
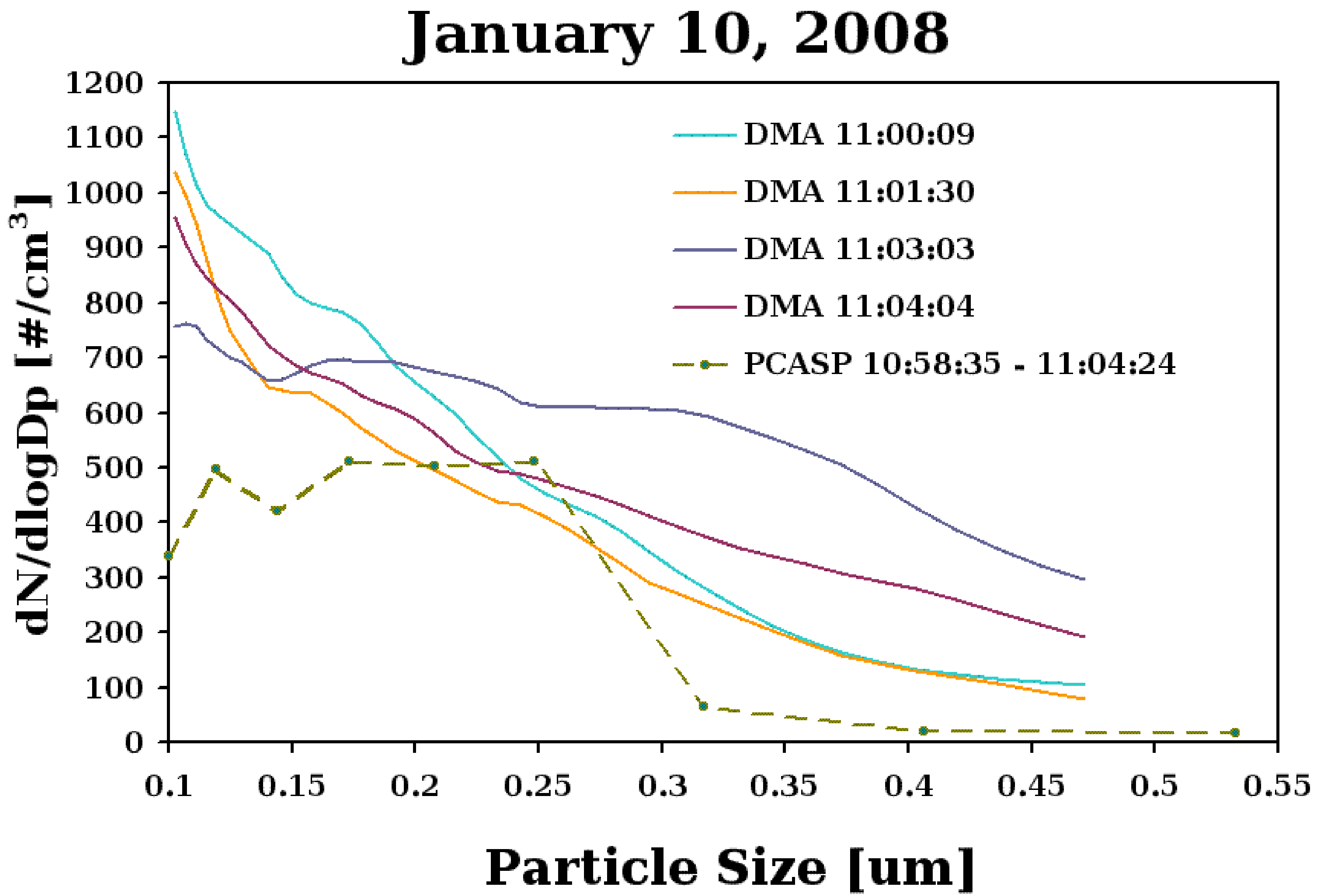
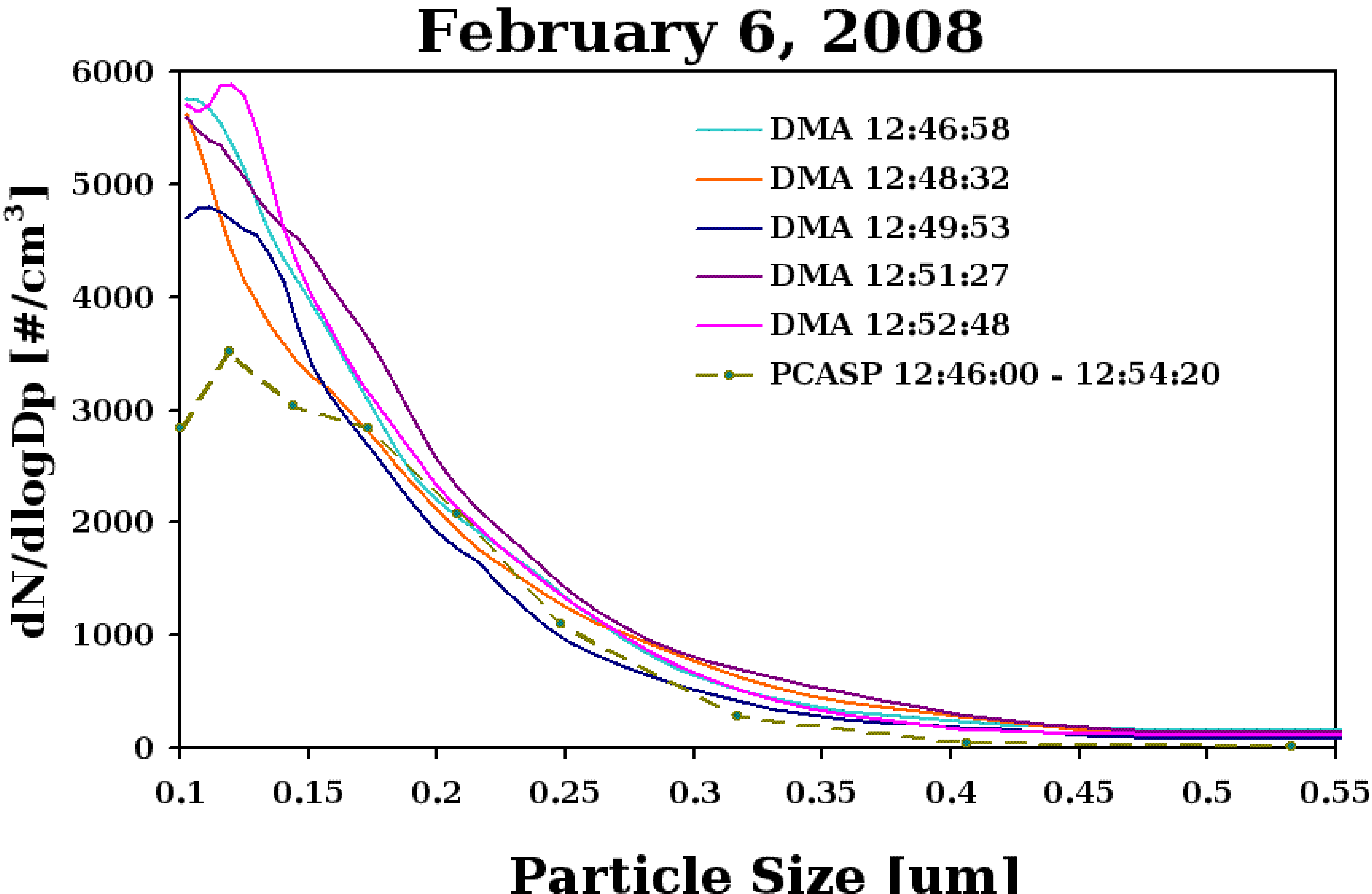


PCASP and DMA Comparison



PCASP and DMA Comparison



Conclusions

- PCASP is currently not giving reasonable field measurements which has been confirmed by 222nm calibration check.
- The second stage PHA seems to be the problem.
- Preforming field calibration checks of all instruments is very important to ensure that the measurements will be useful for analysis and evaluation.


Any Questions?
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