Components of an Airborne Measurement Program

Presented By
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Phases of a Measurement Program

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

Start

Objectives

Plan

Operational

Implementation

Platform

Instruments

Data

Interpretation and Evaluation

Stop
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.
- Perform 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.
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
What is going on here?
## PCASP: Calibration Checks

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PCASP: 523 nm Check

08_01_24_11_48_38.counts.pcasp.raw (Time Period: 47040.000 to 47700.000)
PCASP: 222 nm Check

08_01_24_11_48_38.counts.pcasp.raw (Time Period: 44340.000 to 44700.000)

Particle Counts

PCASP Channel Number
PCASP and DMA Comparison

February 6, 2008

![Graph showing particle size distribution](image)

- DMA 12:46:58
- DMA 12:48:32
- DMA 12:49:53
- DMA 12:51:27
- DMA 12:52:48
- PCASP 12:46:00 - 12:54:20
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.
• Performing field calibration checks of all instruments is very important to ensure that the measurements will be useful for analysis and evaluation.
Any Questions?