# *README*

*Passive Cavity Aerosol Spectrometer (PCASP)*
*GoAmazon IOP1* - February 22 to March 23, 2014
*GoAmazon IOP2* – September 06 to October 04, 2014

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## 1 Data source

The data were recorded onboard the G1 aircraft, operated by the ARM Aerial Facility during GoAmazon IOP1 and IOP2

### 1.1 Location

The research flights were conducted out of the Eduardo Gomes–Manaus International Airport in Manaus, Brazil.

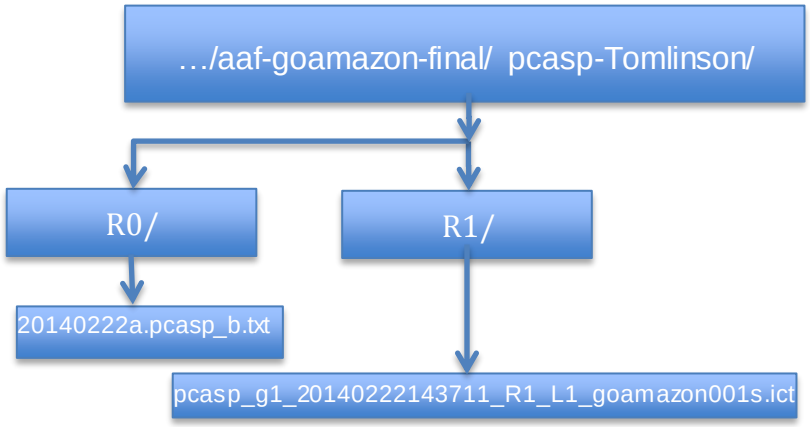
### 1.2 Time period of collection

Flights were conducted from February 22 – March 23, 2014 and September 06 to October 04, 2014.

### 1.3 Instrument description

Laser based instrument that uses the measured intensity of the scatter light from particles passing through the laser beam to measure aerosol concentration and size in the 0.1 to 3.45 µm size range. Instrument was calibrated during the field campaign using PSL (1.58 RI). The PCASP will report a large amount of false counts (at Dp>800nm) in clouds or precipitation and end users should not use these data. A cloud flag has been included in the R1 data.

## 2 Data structure



### 2.1 Level R0

Level R0 data consist of raw data (counts) files and housekeeping files recorded at 1HZ.

### 2.2 Level R1

Level R1 data consist of a file containing integrated number, area, and volume concentrations. The mass flow controller has been corrected to volumetric flow using ambient pressure and temperature. Contains number distributions not normalized by dLogDp. All data is reported at 1HZ and contains a QC flag and cloud flag. File name includes takeoff time for the flight. Metadata has been added to the header of each file and follows the ICARTT standard.
http://www-air.larc.nasa.gov/missions/etc/IcarttDataFormat.htm

# 3 Data log

| Date | Instrument | | | Notes |
|---|---|---|---|---|
| | Instrument Status | Data Process | QC | |
| 20140222a | Ok | R1 | Ok | |
| 20140225a | Ok | R1 | Ok | |
| 20140301a | Ok | R1 | Ok | |
| 20140301b | Ok | R1 | Caution | Instrument started about 17 minutes into flight |
| 20140303a | Ok | R1 | Caution | Instrument started about 25 minutes into flight |
| 20140307a | Ok | R1 | Ok | |
| 20140310a | Ok | R1 | Ok | |
| 20140311a | Ok | R1 | Ok | |
| 20140312a | Ok | R1 | Ok | |
| 20140313a | Ok | R1 | Ok | |
| 20140314a | Ok | R1 | Ok | |
| 20140316a | Ok | R1 | Ok | |
| 20140317a | Ok | R1 | Ok | |
| 20140319a | Ok | R1 | Caution | Data missing briefly around 16:40 UTC |
| 20140321a | Ok | R1 | Caution | Data missing from 18:15 to 18:35 UTC |
| 20140323a | Ok | R1 | Ok | |
| 20140906a | Ok | R1 | Ok | |
| 20140909a | Ok | R1 | Ok | |
| 20140911a | Ok | R1 | Ok | |
| 20140912a | Ok | R1 | Ok | |
| 20140913a | Ok | R1 | Ok | |
| 20140915a | Ok | R1 | Ok | |
| 20140916a | Ok | R1 | Ok | |
| 20140918a | Ok | R1 | Ok | |
| 20140919a | Ok | R1 | Ok | |
| 20140921a | Ok | R1 | Ok | |
| 20140922a | Ok | R1 | Ok | |
| 20140923a | Ok | R1 | Ok | |
| 20140925a | Ok | R1 | Ok | |
| 20140927a | Ok | R1 | Ok | |
| 20140928a | BAD | R1 | BAD | Loose wire in canister caused data to drop out for most of the flight |
| 20140930a | BAD | R1 | BAD | Loose wire in canister caused data to drop out for most of the flight |
| 20141001a | Ok | R1 | Ok | |
| 20141003a | Ok | R1 | Ok | |
| 20141004a | Ok | R1 | Ok | |

# 4 File Format

File naming convention: "pcasp_g1_YYYYMMDDHHMMSS_Rx_Ly_goamazon001s.ict"
Where x is the revision number and y is the flight (launch) number for the day. The file is comma delimited. YYYYMMDD is the date of the flight and HHMMSS represents the takeoff time.

## 4.1 Data description

| Index | Variable Name | Units | Range or Frequency | From Instrument: | Description Definition |
|---|---|---|---|---|---|
| 1 | Start Time | UTC | 1 s | PCASP | Seconds since midnight Synchronized with M300 |
| 2 to 31 | Num_Conc | (#/cm^3) | 1s | PCASP | Number Concentration at specified mean diameters |
| 32 | Num_Conc | (#/cm^3) | 1s | PCASP | Integrated Number Concentration |
| 33 | Area_Conc | (mm^2/cm^3) | 1s | PCASP | Integrated Area Concentration |
| 34 | Vol_Conc | (mm^3/cm^3) | 1s | PCASP | Integrated Volume Concentration |
| 35 | Data_Flag | | 0 to 2 | PCASP | 0: Good 1:Caution 2: Bad |
| 36 | Cloud Flag | | 0 to 2 | IWG1 | 0: Good 1:Clouds may be present 2:Definite clouds |

## 4.2 Definition and diagrams

| *QC* | *Description* |
|---|---|
| Data_Flag | **0: Good** - Laser voltage > 7 and Num_Conc < CPC_Conc<br>**1: Caution** - 6 < Laser voltage < 7 or CPC_Conc < Num_Conc < CPC_Conc*1.25<br>**2: Bad** - Laser voltage < 6 or Num_Conc > CPC_Conc*1.25 |

## 4.3 Bins (μm)

| Bin # | Lower | Upper | Mid | Bin # | Lower | Upper | Mid |
|---|---|---|---|---|---|---|---|
| 1 | 0.090 | 0.100 | 0.095 | 16 | 0.300 | 0.400 | 0.350 |
| 2 | 0.100 | 0.110 | 0.105 | 17 | 0.400 | 0.575 | 0.488 |
| 3 | 0.110 | 0.120 | 0.115 | 18 | 0.575 | 0.690 | 0.633 |
| 4 | 0.120 | 0.130 | 0.125 | 19 | 0.690 | 0.920 | 0.805 |
| 5 | 0.130 | 0.140 | 0.135 | 20 | 0.920 | 1.150 | 1.035 |
| 6 | 0.140 | 0.150 | 0.145 | 21 | 1.150 | 1.380 | 1.265 |
| 7 | 0.150 | 0.160 | 0.155 | 22 | 1.380 | 1.610 | 1.495 |
| 8 | 0.160 | 0.170 | 0.165 | 23 | 1.610 | 1.840 | 1.725 |
| 9 | 0.170 | 0.180 | 0.175 | 24 | 1.840 | 2.070 | 1.955 |
| 10 | 0.180 | 0.200 | 0.190 | 25 | 2.070 | 2.300 | 2.185 |
| 11 | 0.200 | 0.220 | 0.210 | 26 | 2.300 | 2.530 | 2.415 |
| 12 | 0.220 | 0.240 | 0.230 | 27 | 2.530 | 2.760 | 2.645 |
| 13 | 0.240 | 0.260 | 0.250 | 28 | 2.760 | 2.990 | 2.875 |
| 14 | 0.260 | 0.280 | 0.270 | 29 | 2.990 | 3.220 | 3.105 |
| 15 | 0.280 | 0.300 | 0.290 | 30 | 3.220 | 3.450 | 3.335 |

# 5 Calibration

## 5.1 PSL

PSL calibration showed a consistent under sizing of the PSL by the PCASP in the low gain stage ($D_p$ > 0.450 µm). For that reason, the bins were shifted by a factor of 1.15 starting with Bin #17.