README

Condensation Particle Counter (CPC) 3010 and 3025(TSI)
GoAmazon, , 2014

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1 Data source

The data were collected onboard the G1 aircraft, operated by the PNNL ARM Aerial Facility during GoAmazon, 2014 (IOP1 and IOP2).

1.1 Location

The ARM Aerial Facility Gulfstream-1 (G-1) was deployed in Amazon basin to obtain measurements of cloud, trace gas, and aerosol properties**.** Two types of flight patterns out of the Manaus airport will be used. In the first, the plume will be crisscrossed at multiple downwind distances so that evolution of properties along the plume can be determined. The Manaus plume is well-defined because of persistent easterly winds. An upwind transect as well as continuations of transects beyond plume boundaries will yield a direct comparison between pristine and polluted air masses. In the second type of flight pattern, the aircraft will fly along a gradient downwind of Manaus to capture the spatial extent of the plume.

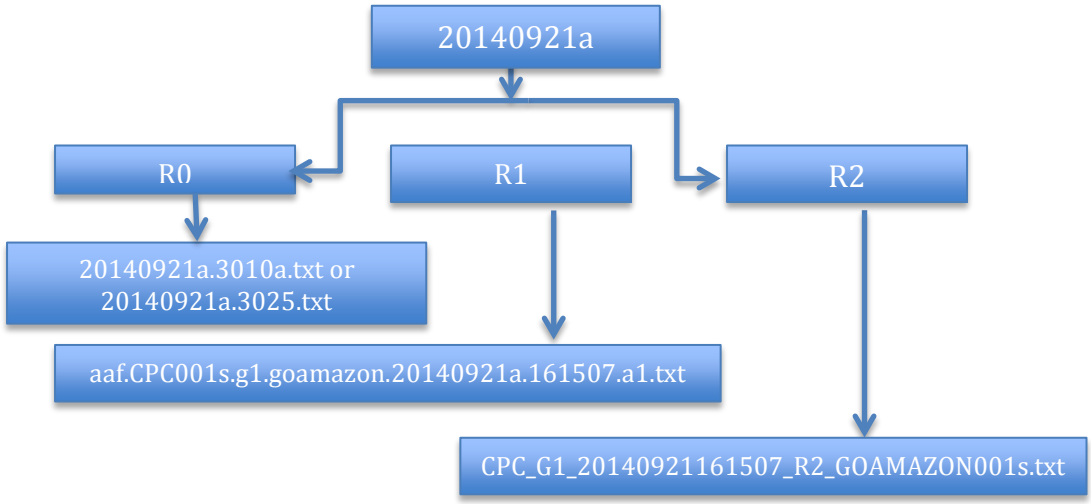
1.2 Time period of collection

Two intensive operational periods—the first from 16 February to 27 March 2014 (IOP1), and the second from 1 September to 10 October 2014 (IOP2)—were conducted to obtain measurements of cloud, trace gas, and aerosol properties.

1.3 Instrument description

The condensation particle counter (CPC 3010, TSI) measures the number concentration of aerosols from 10 nm to 3 mm. The condensation particle counter (CPC 3025, TSI) measures the number concentration of aerosols from 3 nm up to 3 mm. In G1, two CPCs were operated using an external pump. The CPC 3010 flow rate was maintained at 1 LPM using a critical orifice and CPC 3025 is maintained at 1.5 LPM. Two CPCs were installed after iso-kinetic inlet and an aerosol flow diluter, which has a dilution factor varied from 1 to 5 with the relative uncertainty of 20%.

2 Data structure



2.1 Level R0

Level "R0" data consist of number concentration for both CPC 3010 and CPC 3025, but reported in separate files.

2.2 Level R1

Level R1 data consists of CPCs have been corrected for the dilution flow. CPC 3010 and CPC3025 data are merged into a single file. File name includes takeoff time for the flight and uses the ARM data naming conventions.

2.3 Level R2

Level a2 data has applied the coincidence correction and dilution factor. CPC 3010 and CPC3025 data are merged into a single file with data quality flag and isokinetic inlet pressure in mbar and temperature in degree °C. File name includes takeoff time for the flight. Metadata has been added to the header of each file and follows the ICARTT standard.

3 File Format

File naming conventions: "CPC_G1_YYYYMMDDHHMMSS_R#_GOAMAZON001s.txt"

The file is comma delimited. HHMMSS represents the takeoff time.

3.1 Data description

Table 1: Format description example

Index	Variable Name	Units	Range or Frequency	From Instrument:	Description Definition
1	Start_UTC	second	1 s	SEA M300 DAQ	UTC time in second to the start (YYMMDD 00:00:00) of the day. Synchronized daily with GPS signal.
2	CPC_Conc_3010	#/cc	1 s	CPC 3010	CPC concentration after iso-kinetic inlet
3	CPC_Conc_3025	#/cc	1 s	CPC 3025	CPC concentration after iso-kinetic inlet
4	Flag	Integer	1 s	IWG, CPC3010 and CPC3025	Flag=0: good Flag=1: questionable Flag=2: bad
5	IsokP_mbar	mBar	1 s	SEA M300 DAQ, Isokinetic inlet	
6	IsokT_C	°C	1 s	SEA M300 DAQ, Isokinetic inlet	

Note:

1. Flag=2 under the listed conditions:
    a. Aerosol flow fluctuation > 10%
    b. Saturator or Condenser temperature fluctuation >±0.5 °C
2. Flag=1 under the listed condition:
    a. 10% >Aerosol flow fluctuation > 5%
    b. Sampling inside of clouds