Stephen R. Springston (srs@bnl.gov)

Started: 4/30/2014

Last Update: 12/11/2015

Data Acknowledgement:

See www.arm.gov/publications/procedures

All instruments and the platform were provided with funds from the American Recovery and Reinvestment Act.

Program: GoAmazon IOP which for MAOS was conducted at the T3 site near Manacapuru, Amazonia, Brazil beginning ~2/1/2014 and concluding on 12/1/2015.

Platform: The MAOS-C (Mobile Aerosol Observing System-Chemistry).

These file(s) contain(s) the SO2 data measured in MAOS-C (Mobile Aerosol Observing System-Chemistry). Data are reported at 1- resolution. (Note that the unit internally filters to ~10s.) Because of the noise in the 10-s data a second column of data is provided filtered to 60 s. All zero, calibration and non-operational periods have been removed (empty field or NAN).

Instrument: These files contain the SO2 measurements made with a Thermo Fisher Model 43iTLE Sulfur Dioxide Analyzer.

Air is sampled at 10-m AGL through a fast flow (~10 LPM) ½” o.d. PFA inlet. In MAOS C for GoAmazon, the fast-flow manifold was sleeved in a 2” flexible tube with a counterflow of warmer ambient air to prevent any condensation inside the structure. The inlet to the instrument is a ¼” PFA tube off a tee in the inlet manifold. There is a 47-mm diam. Teflon filter in-line with the sample (Millipore LSWP04700, 5µm LS) downstream of the calibration point.

An automatic zero is done at 00:00 each day. This involves switching the sample stream through a 47-mm quartz filter impregnated with K2CO3 and ‘moistened’ slightly with glycerol as a humectant. An automatic calibration of SO2 is normally done at 03:00 each day. This consists of adding a flow of an SO2 calibration gas to the fast-flow manifold. The calibration is definitely less stable than the instrument response, but provides an excellent confirmation of the instrument response.

File Structure:

As follows convention, data are reported as tab-delimited ASCII files. Files are formatted such that they are self documenting. For each data row:

Row 1: Filename

Row 4 (col 1 only): ARM Climate Research Facility

Row 5: SitePlatform

Row 7: Last revised date

Row 9: Instrument

Row 13: Instrument Mentor/Affiliation

Rows 14-19: Comments (operational conditions, calibrations, etc.)

Rows 21-24: Constants (usually defined in Comments)

Row 35: Column title

Row 36: Column units line 1

Row 37: Column units line 2

Row 40: First row of data

Time - Time is reported in UTC as set by an NTP server. Following convention, the time is the beginning of the period. The parameter reported at this time is the average of all points >= the time and < the next time. Data are reported at 1- s resolution. All non-operational periods have been removed (empty field or NAN).

Accuracy and Precision:

Sulfur Dioxide – Units: ppbv (uncorrected for water vapor), Precision: ±0.6 ppbv (2 sigma @ 10s). Accuracy: greater of 0.5 ppbv or ~5% (Mentor estimate from data)

Note:

2014-03-08 02:34 - 2014-08-08 21:21 DQR D140902.1 The instrument flash lamp failed, at first intermittently and then completely. The data grew increasingly noisy. The ambient signal appeared near background when the instrument was functioning. The flash lamp was replaced but did not solve the problem. A Mentor visit revealed the flash lamp had again failed and also the associated flash pack. Both were replaced and the optical chamber cleaned. The instrument response was reset. No valid data reported after 2014-03-08 01:49 and several shorter period prior to this. The problem wasn't fully solved until the Mentor visit 2014-08-08

When the instrument was repaired and turned back on, internal parameters were adjusted. This required entering Service Mode. The instument was inadvertantly left in Service Mode and so automatic zeros were not carried out. The Average zero value (2.33124) from the operational period was used in lieu of a measured zero for the first part of Septembe until Service Mode was turned off ~2014-09-15.

Noise is greater than expected, but appears ok.

Posting History

4/30/2014 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/GoAmazon/SO2

mao\_ReadMe\_SO2.txt (This file in ASCII)

mao\_ReadMe\_SO2.docx (This file in Word)

Files of 1-Hz data and associated processing log files.

maomaoscs1.so2.01s.00.20140101.000000.m02.tsv

maomaoscs1.so2.01s.00.20140101.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20140101.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20140201.000000.m02.tsv

maomaoscs1.so2.01s.00.20140201.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20140201.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20140301.000000.m02.tsv

maomaoscs1.so2.01s.00.20140301.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20140301.000000.m02.tsv.plots.pdf

10/15/2014 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/GoAmazon/SO2

mao\_ReadMe\_SO2\_20141015.txt (This file in ASCII)

mao\_ReadMe\_SO2\_20141015.docx (This file in Word)

11/13/2014 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20141113.docx (This file in Word)

mao\_ReadMe\_SO2\_20141113.txt (This file in ASCII)

Files of 1-Hz data and associated processing log files.

maomaoscs1.so2.01s.00.20141001.000000.m02.tsv

maomaoscs1.so2.01s.00.20141001.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20141001.000000.m02.tsv.plots.pdf

1/18/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150118.docx (This file in Word)

mao\_ReadMe\_SO2\_20150118.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20141101.000000.m02.tsv

maomaoscs1.so2.01s.00.20141101.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20141101.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20141201.000000.m02.tsv

maomaoscs1.so2.01s.00.20141201.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20141201.000000.m02.tsv.plots.pdf

3/2/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150302.docx (This file in Word)

mao\_ReadMe\_SO2\_20150302.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150101.000000.m02.tsv

maomaoscs1.so2.01s.00.20150101.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150101.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20150201.000000.m02.tsv

maomaoscs1.so2.01s.00.20150201.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150201.000000.m02.tsv.plots.pdf

4/21/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150421.docx (This file in Word)

mao\_ReadMe\_SO2\_20150421.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv.plots.pdf

5/29/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150421.docx (This file in Word)

mao\_ReadMe\_SO2\_20150421.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150401.000000.m02.tsv.plots.pdf

6/15/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150615.docx (This file in Word)

mao\_ReadMe\_SO2\_20150615.txt (This file in ASCII)

Corrected posting date of last month’s posting (it said 4/21/2015 instead of 5/29/2015)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150501.000000.m02.tsv

maomaoscs1.so2.01s.00.20150501.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150501.000000.m02.tsv.plots.pdf

7/31/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150731.docx (This file in Word)

mao\_ReadMe\_SO2\_20150731.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150601.000000.m02.tsv

maomaoscs1.so2.01s.00.20150601.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150601.000000.m02.tsv.plots.pdf

8/20/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20150820.docx (This file in Word)

mao\_ReadMe\_SO2\_20150820.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150701.000000.m02.tsv

maomaoscs1.so2.01s.00.20150701.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150701.000000.m02.tsv.plots.pdf

10/07/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20151007.docx (This file in Word)

mao\_ReadMe\_SO2\_20151007.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20150801.000000.m02.tsv

maomaoscs1.so2.01s.00.20150801.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150801.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20150901.000000.m02.tsv

maomaoscs1.so2.01s.00.20150901.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20150901.000000.m02.tsv.plots.pdf

12/11/2015 Posting to: c1.xdc.arm.gov /incoming/AOS\_QC/mao/SO2

mao\_ReadMe\_SO2\_20151211.docx (This file in Word)

mao\_ReadMe\_SO2\_20151211.txt (This file in ASCII)

Monthly files of 1-Hz data as a tab-delimited text file, text processing log file(s) and associated pdf time series plots.

maomaoscs1.so2.01s.00.20151001.000000.m02.tsv

maomaoscs1.so2.01s.00.20151001.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20151001.000000.m02.tsv.plots.pdf

maomaoscs1.so2.01s.00.20151101.000000.m02.tsv

maomaoscs1.so2.01s.00.20151101.000000.m02.tsv.log.txt

maomaoscs1.so2.01s.00.20151101.000000.m02.tsv.plots.pdf

This concludes data for the GoAmazon IOP at the mao site