

LISST-ST/-STX new processed file format.

Date: June 24, 2010

Using the MATLAB processing script, 4 output files are created: _Processed.ASC, _Processed.ASV, _Processed.OUT and _Processed.LOG.

.ASC File format; the .ASC files have the following columns:

Column	Parameter
1	Settling Experiment Number
2:9	Volume Concentration (in $\mu\text{l/l}$) for each of the 8 LISST-ST/-STX size classes. Column 2 is the smallest size; column 9 is the largest size
10	Laser Transmitted Power [mW]
11	Battery Voltage [V]
12	External AUX input [V]. (0 to 5V = 0 to 4096 counts).
13	Laser Reference Sensor [mW]
14	Depth [m]
15	Temperature [C]
16	(Day*100 + Hour) at which data was taken
17	(Minutes*100 + Seconds) at which data was taken
18	Optical transmission [Dimensionless]
19	1 if the last scan was used to process the data, 2 if the supplied zscat-file was used to process the data.
20	Measurement Number (within Experiment)

.ASV File Format

1	Settling Experiment Number
2	Date of start of settling experiment in YYYYMMDD format
3	Time of start of settling experiment in HHMMSS format
4:11	Settling velocities [cm/s] for each of the 8 size classes. Column 2 is the smallest size; column 9 is the largest size
12:19	Reserved for future use
20:27	Reserved for future use
28	Mean diameter [μm] of the particles in the FIRST measurement in an experiment.
29	Volume concentration [$\mu\text{l/l}$] in the FIRST measurement in an experiment.
30	Depth [m] in the FIRST measurement in an experiment
31	Temperature [$^{\circ}\text{C}$] in the FIRST measurement in an experiment

32	Optical transmission [Dimensionless] in the FIRST measurement in an experiment.
33	Beam attenuation [m^{-1}] in the FIRST measurement in an experiment.
34:35	Reserved for future use
36	1 if the last scan was used to process the data, 2 if the supplied zscat-file was used to process the data.
37	<p>QC parameter 1: Check of initial optical transmission</p> <p>Varying linearly from 1 to 0 if the initial transmission is between 0.98 and 1 (e.g. will be 0.5 if the transmission is 0.99).</p> <p>1 if initial transmission is < 0.98</p> <p>0 if initial transmission is > 1</p>
38	<p>QC parameter 2: Is the initial concentration in any of the 8 size classes too low?</p> <p>If the initial VC in a size class is below $0.05 \mu\text{l/l}$, then the settling velocity for that size class will be set to NaN.</p> <p>The quality control value will be between 1 and 0 in steps of $1/8$ – if VC in all size classes $> 0.05 \mu\text{l/l}$ it will be 1, otherwise it will be adjusted according to the number of size classes with a VC $< 0.05 \mu\text{l/l}$. E.G. if 3 size classes < 0.05, this value will be $1-(3/8) = 0.625$.</p>
39	<p>QC parameter 3: is the VC change during an experiment less than 85% in each of the 8 size classes?</p> <p>If the final VC (mean of last 6 scans) in all 8 size classes is larger than 85% of the initial VC (mean of first 10 scans), then all data are considered bad.</p> <p>Otherwise the QC parameter ranges from 0 to 1 in steps of $1/8$ depending on how many size classes have a final VC $> 85\%$ of the initial VC</p>
40	<p>QC parameter 4: Is the average concentration history fit of last 6 scans $> 75\%$ of the initial fit (average of first 10 scans)?</p> <p>Again, as for QC # 3, if all 8 are $> 75\%$ all data are considered bad.</p> <p>Otherwise the QC parameter ranges from 0 to 1 in steps of $1/8$ depending on how many size classes have a final VC history fit $> 75\%$ of the initial VC history fit.</p>
41	<p>QC Parameter 5: Are the settling velocities identical? If so, disregard all data as this is not possible!</p>

	Is the SV std dev < 0.5 of the mean settling velocity? If so, the settling velocities are considered to be equal and all data bad.
42	QC parameter 6: Is the pressure in the first scan less than 0.4m? If the pressure in the first measurement in a settling experiment is less than 0.4 m, then the settling column is not submerged and all data are bad!
43	QC parameter 7: Are the settling velocities in any size bin higher than Gibbs + 50%? If so, those settling velocities and size bins are excluded and the QC parameter ranges from 0 to 1 in steps of 1/8 depending on how many size bins have been excluded.
44	QC parameter 8: Is laser reference less than 1% of zscat laser reference? If so, the laser is blown and all data are bad!
45	QC Parameter 9: Is the optical transmission lower than 0.95 at any point in the last 12 hours of an experiment? If so, the QC parameter is set to 0.5, as most of the data might still be OK
46	QC Parameter 10: Is the optical transmission > 1 in the first 0:15 hours (36 measurements) of an experiment? If so, all data are considered bad!. Otherwise the QC parameter is set to 1
47	QC Parameter 11: Is tau at the end less than at the beginning + 0.005 (0.5%)? If so, virtually no change in concentration has occurred and all data are considered bad. Otherwise all data are considered good.
48	Reserved for future QC parameter # 12
49	Total QC score (range from 0 to 12), summing up elements 37:48.
50	Are data good (1) or bad (0)? If element 49 divided by the number of QC parameters (currently 11) is ≥ 0.75 the data are considered OK.

.OUT file format.

The .OUT file is an ASCII text file (open in WordPad for easiest display) that contains detailed information about the status of the individual QC parameters for each settling experiment along the following lines:

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Settling Experiment # 1 (LAST SCAN used as zscat):
QC # 1: Initial transmission is above 1 (actual value = 1.0394)! Water too clear
QC # 2: Initial concentration too low (<0.05hl/l) in 7 size bins: 1 2 3 4 5 6 7
QC # 4: SV Fits did not decrease in some size classes. These have been set to NaN. The bin(s) are: 1 4 7
QC # 9: Transmission drop to < 95% of max in measurement 48 after 10+ hours of settling; indicates disturbed
settling.
QC # 10: DATA NO GOOD! Transmission > 1 in measurements # 1 2 3 4 5 6 7 8 9 10 11 12 13 14
15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 in the first 0:15 hours (36
measurements). Water too clear or settling disturbed.
QC # 11: DATA NO GOOD! Transmission did not change more than 0.5%!
Settling Experiment # 1 (ZSCAT file used as zscat):
QC # 2: Initial concentration too low (<0.05hl/l) in 7 size bins: 1 2 3 4 5 6 7
QC # 4: SV Fits did not decrease in some size classes. These have been set to NaN. The bin(s) are: 1 2 3 4 5
QC # 9: Transmission drop to < 95% of max in measurement 48 after 10+ hours of settling; indicates disturbed
settling.
QC # 11: DATA NO GOOD! Transmission did not change more than 0.5%!
Settling Experiment # 2 (LAST SCAN used as zscat):
QC # 2: Initial concentration too low (<0.05hl/l) in 3 size bins: 1 2 3
Settling Experiment # 2 (ZSCAT file used as zscat):
QC # 2: Initial concentration too low (<0.05hl/l) in 2 size bins: 1 2
QC # 3: Final concentration (avg of last 5 scans) is larger than 85% of the initial concentration in the first 10
scans, suggesting that settling was not complete, for bins 3
QC # 4: SV Fits did not decrease in some size classes. These have been set to NaN. The bin(s) are: 3 4

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.LOG file format

The .LOG file contains a list of the exact file names and their paths that were used for processing the data. The .DAT file, , zscat file, ringarea file, InstrumentData.txt file and LISST.INI file is listed together with their actual locations during processing.

The number of settling experiments as well as the number of measurements per settling experiments is listed.

The time analysis was begun is listed.

The time analysis ended is listed.

The number of settling experiments (out of the total) that returned data is displayed (e.g. 40 out of 55 experiments).

The overall data return % is displayed (e.g. 58%). For each experiment, a maximum of 8 settling velocities can be obtained. If 10 experiments are conducted during a deployment, a maximum of 80 settling velocities can be recovered. If 45 settling velocities are recovered the data return rate is therefore $45/80 = 56.3\%$.

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Summary data for LISST-STX data processing
.DAT file located in folder: O:\Customer Service\MetOcean Data\ZIPfiles\Set2\1375\May_10\tetsing\
.DAT file name: 2741_1375_1005.DAT
Zscat file located in folder: O:\Customer Service\MetOcean Data\ZIPfiles\Set2\1375\May_10\tetsing\
Zscat file name: 1375_MCW_240302010_test.asc
RingArea file located in folder: O:\Customer Service\MetOcean
Data\ZIPfiles\Set2\1375\May_10\tetsing\
RingArea file name: ringarea_1375.asc
InstrumentData.txt file located in folder: O:\Customer Service\MetOcean
Data\ZIPfiles\Set2\1375\May_10\tetsing\
LISST.INI (Configuration file) located in folder: O:\Customer Service\MetOcean
Data\ZIPfiles\Set2\1375\May_10\tetsing\
.DAT file is organized as 83 measurements per settling experiment.
.DAT file contains 46 settling experiments.
Analysis begun: 24-Jun-2010 12:01:36
Analysis completed: 24-Jun-2010 12:08:58
Of the 46 settling experiments, 44 returned settling velocity data (96%).
Overall data return is 62% with respect to settling velocities.
For details, see the Output file named 2741_1375_1005_Processed.OUT.
Settling velocity data are in the 2741_1375_1005_Processed.ASV file.
Concentration histories data are in the 2741_1375_1005_Processed.ASC file.
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