



TARA TSG SN: 0269 Conductivity cell condition report after LEG5 @ Josep M^a Erta/EMS

The aim of this report is to evaluate the conductivity cell condition of the TSG with serial number 0269 after 22 days of operation. The operation time corresponds to the LEG5 duration of Mission Microbiomes (Martinique-Macapa).

The TSG was initially installed on August 2021 in the Underway System of TARA research sailing boat in Martinique.

It has been in continuous operation from the 18th of August to the date when this evaluation was done. The evaluation was done the 8th of September 2021.

The conductivity cell was cleaned three times during the navigation. The sensor was rinsed thoroughly with Triton-X, bleach and DI water each time but the end caps were not removed due to the risk of breaking the conductivity cell because of the ship heave.

An additional cleaning was done in the end of the LEG5 once in Macapa. There the sensor was fully cleaned and the end caps were removed to do a proper clean of the TSG chamber.

The graph below shows the dates when each cleaning was done:

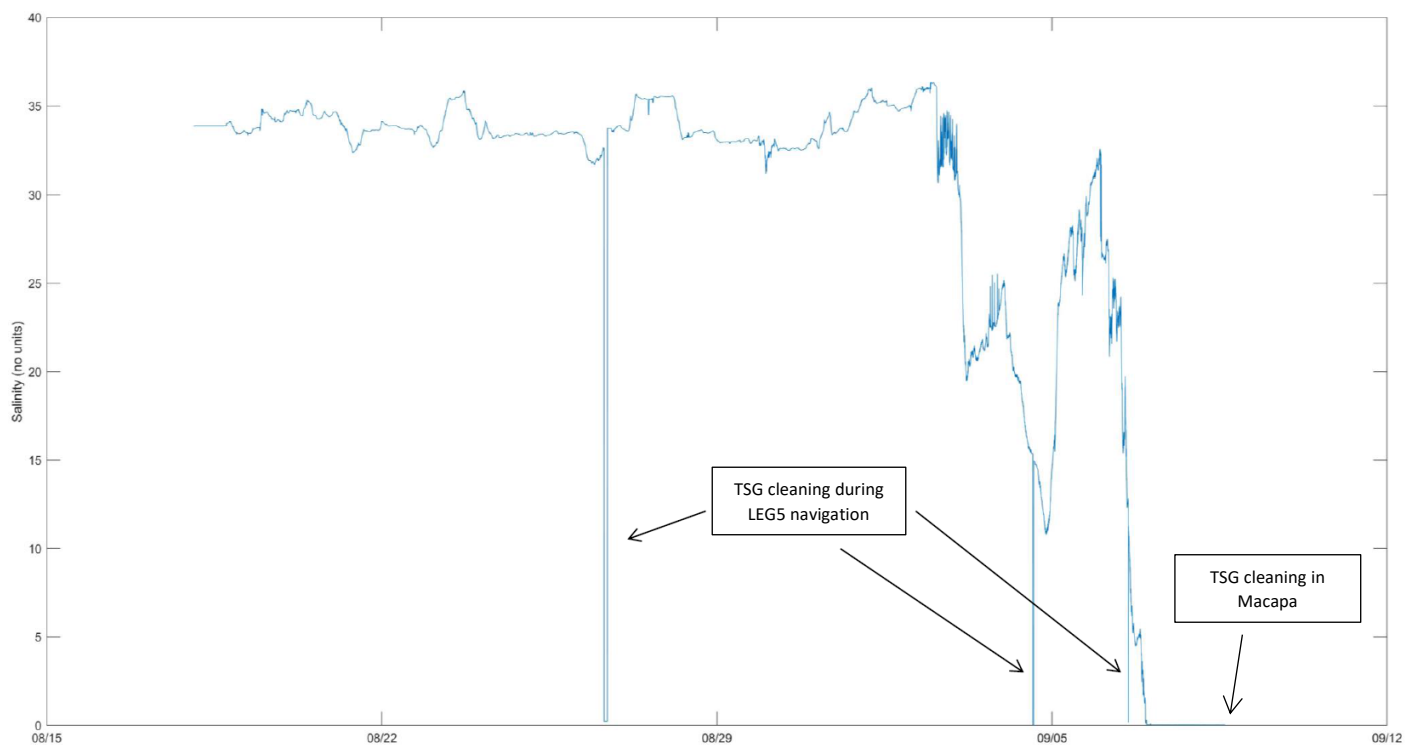


Fig 1. Salinity Time Series graph. Spikes where the salinity becomes 0 correspond to cleaning episodes.



Every conductivity cell has a calibration certificate. The calibration certificate contains information of the frequency output for zero conductivity, obtained from a clean and dry cell. A zero conductivity frequency that has changed by more than a few 10ths of a Hertz may indicate a cell that is damaged or considerably out of calibration. The frequencies obtained after LEG5 from the TSG serial number 0269 with the conductivity cell dry were:

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1 S>ds
2 SBE45 V 1.1b SERIAL NO. 0269
3 logging data
4 sample interval = 10 seconds
5 output conductivity with each sample
6 output salinity with each sample
7 output sound velocity (Chen-Millero) with each sample
8 start sampling when power on
9 do not power off after taking a single sample
10 power off after two minutes of inactivity
11 A/D cycles to average = 4
12 S>
13 TCR
14 2701.578
15 2701.596
16 2701.587
17 2701.605
18 2701.605
19 2701.578
20 2701.592
21 2701.561
22 2701.596
23 2701.592
24 2701.592
25 2701.587
26 2701.592
27 2701.583
28 2701.587
29 2701.600
30 2701.583
31 2701.592
32 2701.587
33 2701.600
34 2701.600
35 2701.592
36 2701.596
37 2701.592
38 2701.587
39 2701.592
40 2701.587
41 S> 30.6907, 0.00010, 0.0137, 1510.736
42 30.6914, 0.00009, 0.0137, 1510.738
43 30.6914, 0.00010, 0.0137, 1510.738
44 30.6916, 0.00009, 0.0137, 1510.738
45 30.6903, 0.00009, 0.0137, 1510.735
46 30.6911, 0.00010, 0.0137, 1510.737
47 30.6906, 0.00009, 0.0137, 1510.736
48 30.6908, 0.00011, 0.0137, 1510.736
49 30.6905, 0.00010, 0.0137, 1510.735
50 30.6906, 0.00010, 0.0137, 1510.736
51 30.6904, 0.00010, 0.0137, 1510.735
52 30.6899, 0.00009, 0.0137, 1510.734
53 30.6896, 0.00011, 0.0137, 1510.733
54 30.6889, 0.00011, 0.0137, 1510.732
55 30.6895, 0.00010, 0.0137, 1510.733
56 30.6895, 0.00010, 0.0137, 1510.733
57 30.6899, 0.00011, 0.0137, 1510.734
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Fig 2. Conductivity raw frequencies obtained from the TSG sn 0269 after LEG5 with the conductivity cell cleaned and dry.



On the other side, the last conductivity calibration certificate of the TSG sn 0269 is the following:



Sea-Bird GmbH
Postfach 1167
87401 Kempten
Germany

+49 831 9 60994
seabird.eu@seabird
www.seabird

SENSOR SERIAL NUMBER: 0269
CALIBRATION DATE: 23-Jun-21

SBE 45 CONDUCTIVITY CALIBRATION DATA
PSS 1978: C(35,15,0) = 4.2914 Siemens/meter

COEFFICIENTS:

g = -9.855405e-001
h = 1.355648e-001
i = -3.109847e-004
j = 4.363627e-005

CPcor = -9.5700e-008
CTcor = 3.2500e-006
WBOTC = 6.7862e-007

BATH TEMP (° C)	BATH SAL (PSU)	BATH COND (S/m)	INSTRUMENT OUTPUT (Hz)	INSTRUMENT COND (S/m)	RESIDUAL (S/m)
22.0000	0.0000	0.00000	2701.45	0.00000	0.00000
1.0000	34.8880	2.98151	5417.64	2.98153	0.00002
4.5000	34.8688	3.28919	5623.07	3.28917	-0.00002
15.0000	34.8271	4.27280	6233.70	4.27278	-0.00002
18.5000	34.8179	4.61856	6434.27	4.61856	-0.00000
23.9999	34.8072	5.17741	6745.46	5.17742	0.00001
28.9999	34.7997	5.69989	7023.54	5.69993	0.00003
32.5001	34.7949	6.07269	7215.13	6.07266	-0.00003

Fig 3. TSG sm 0269 last conductivity calibration certificate.

The calibration sheet shows a zero frequency of 2701.45 Hz whereas the value obtained during the sensor evaluation after LEG5 was in average 2701.59 Hz. We can affirm that the zero frequency output has not change more than few 10ths. Thus, we can conclude the calibration condition of the conductivity cell of the TSG 0269 to date 09/09/21 is acceptable.

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