Quality Issue #002: CDOM drift

Issue number: 2			
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Version	**Date**	**Comments**	**Authors**
1	2023-07-07	Creation of document	Chiara Monforte and Callum Rollo
2	2023-07-28	Added info on new missions: SEA069_M15; SEA077_M24 and SEA078_M14	Chiara Monforte
3	2023-08-21	Correction of a typo of flag value in the legend table	Chiara Monforte
4	2023-09-21	Added info on new mission: SEA056_M64; SEA079_M14 and SEA076_M19	Chiara Monforte
5	2023-10-06	Added info on new mission: SEA077_M25 and SEA078_M15	Chiara Monforte
6	2023-11-13	Added info on new mission: SEA079_M16	Chiara Monforte
7	2023-11-20	Added info on new mission: SEA066_M52 and SEA076_M21	Chiara Monforte
8	2023-12-07	Added info on new mission: SEA077_M28 and SEA078_M19	Chiara Monforte
9	2024-01-08	Added info on new mission: SEA076_M22 and SEA079_M18	Chiara Monforte
10	2024-01-10	Added info on new mission: SEA077_M29 and . Corrected info on mission SEA066_M52	Chiara Monforte

1 Introduction

An ongoing issue affects CDOM in glider with the FLBBCD sensor deployed from 2022-09-01. In the affected datasets, CDOM values show a temporal decrease. From 2022-12-01, the protective copper plate covering the sensor was removed on all the gliders deployed in Bornholm and Gotland. This resolved the temporal decrease, but some sensors displayed a temporal increase. Investigation is ongoing and data quality remains uncertain. All affected datasets have been flagged. Check the variable `cdom_qc`. The table below (Table 1) shows an updated list of all the mission deployed with a FLBBCD sensor, color-coded by severity. Flag column corresponds to data quality: suspect (3), fail (4), and good (1).

Table 1: Info summary for all the missions deployed with a FLBBCD sensor.The different basins mentioned in the 'Location' column, follow the division made by HELCOM which is shown in A.1

Glider	Mission	Location	Mission Start date	Sensor Serial	Issue description	Flag
SEA044	25	Skagerrak	2020-08-20	5948	A	1
SEA055	16	Bornholm Basin	2020-10-31	5925	A	1

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Table 1: Info summary for all the missions deployed with a FLBBCD sensor.The different basins mentioned in the 'Location' column, follow the division made by HELCOM which is shown in A.1 (Continued)

SEA066	52	Western Gotland Basin	2023-11-18	7564	D	3
SEA068	27	Eastern Gotland Basin	2022-07-27	7564	B	4
SEA069	15	Bornholm Basin	2023-07-26	7564	D	3
SEA076	8	Bornholm Basin	2022-10-05	7485	B	4
	9	Bornholm Basin	2022-10-20	7485	B	4
	13	Northern Baltic Proper, Eastern Gotland Basin	2023-01-13	7485	D	3
	16	Eastern Gotland Basin, Northern Baltic Proper	2023-04-11	7485	D	3
	17	Western Gotland Basin	2023-06-20	7485	D	3
	19	Western Gotland Basin	2023-09-06	7485	D	3
	21	Åland Sea	2023-11-17	8201	D	3
	22	Western Gotland Basin	2024-01-07	8201	D	3
SEA077	11	Bornholm Basin	2022-09-06	7522	B	4
	12	Bornholm Basin	2022-10-03	7522	B	4
	13	Bornholm Basin	2022-10-12	7522	B	4
	15	Bornholm Basin	2022-11-13	7522	B	4
	17	Bornholm Basin	2022-12-08	7522	C	4
	18	Bornholm Basin	2023-01-10	7522	C	4
	21	Eastern Gotland Basin	2023-03-16	7522	D	3
	22	Eastern Gotland Basin, Northern Baltic Proper	2023-05-16	7522	D	3
	24	Eastern Gotland Basin, Northern Baltic Proper	2023-07-28	7522	D	3
	25	Eastern Gotland Basin, Northern Baltic Proper	2023-10-06	7522	D	3
	28	Eastern Gotland Basin, Northern Baltic Proper	2023-12-06	7522	D	3
	29	Åland Sea	2023-12-06	7522	D	3
SEA078	11	Northern Baltic Proper, Eastern Gotland Basin	2023-03-16	7563	D	3
	12	Eastern Gotland Basin	2023-05-16	7563	D	3
	14	Western Gotland Basin	2023-07-28	7563	D	3
	15	Western Gotland Basin	2023-10-06	7563	D	3

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Table 1: Info summary for all the missions deployed with a FLBBCD sensor.The different basins mentioned in the 'Location' column, follow the division made by HELCOM which is shown in A.1 (Continued)

	19	Western Gotland Basin	2023-12-06	7563	D	3
SEA079	9	Northern Baltic Proper, Eastern Gotland Basin	2023-02-14	7619	D	3
	11	Eastern Gotland Basin	2023-04-11	7619	D	3
	12	Eastern Gotland Basin, Northern Baltic Proper	2023-06-20	7619	D	3
	14	Eastern Gotland Basin, Northern Baltic Proper	2023-09-06	7619	D	3
	16	Eastern Gotland Basin, Northern Baltic Proper	2023-11-11	7619	D	3
	18	Eastern Gotland Basin, Northern Baltic Proper	2024-01-07	7619	D	3

Legend		**Flag**
A	Data is good	1
B	Apparent temporal decrease in the intensity of the CDOM signal. Cause unknown.	4
C	Apparent temporal increase in the intensity of the CDOM signal. Cause unknown. In this mission, the protective copper plate over the CDOM sensor was removed.	4
D	Previous deployments with this sensor showed a temporal decrease in CDOM. The copper plate protecting the optics sensor was removed and this issue appears to be resolved in this mission. The issue with the sensor has not yet been identified, further controls are recommended.	3

2 Examples

Table 2: CDOM data for each glider to highlight the evolution of the observed issue.

Glider	**Plots**

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Table 2: CDOM data for each glider to highlight the evolution of the observed issue. (Continued)

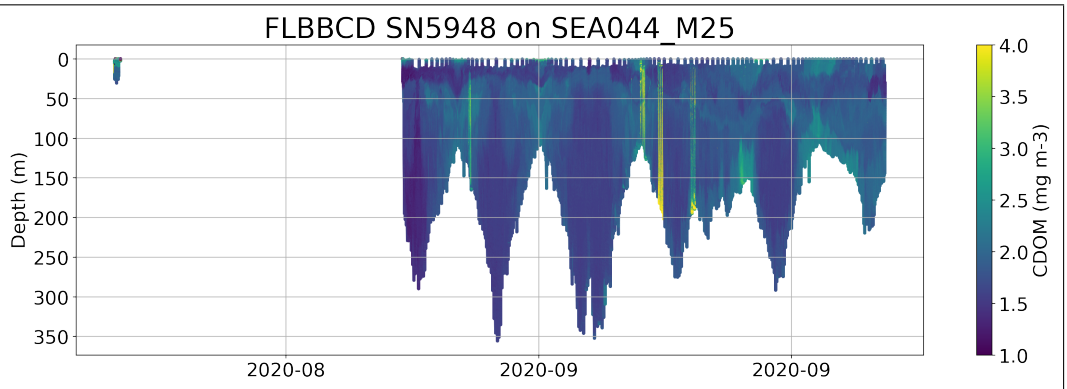
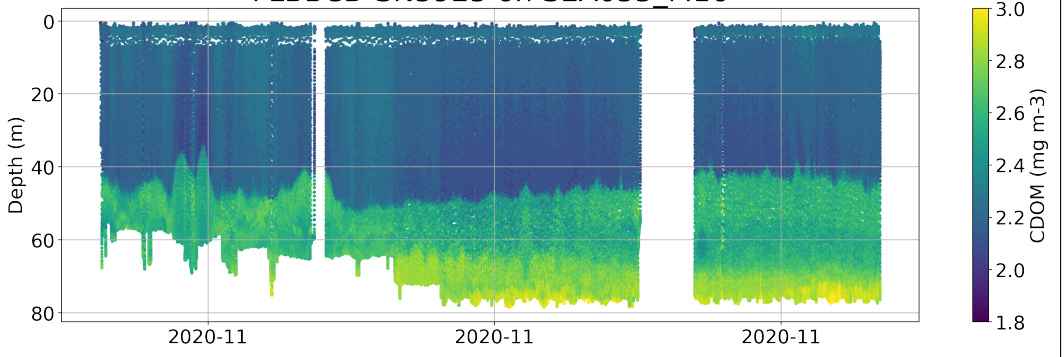
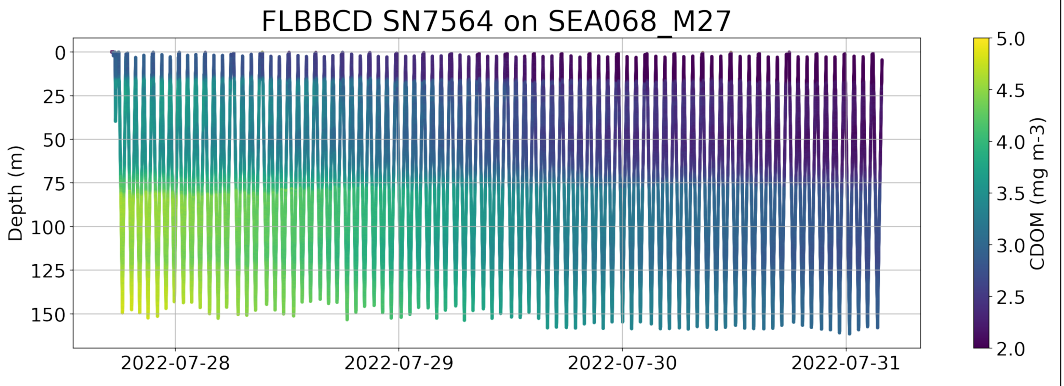
SEA044	 **Comment:** This mission in summer 2020 in Skagerrak showed no temporal drift. The protective copper plate was present.
SEA055	 **Comment:** This mission in late 2020 in Bornholm, where the glider surveys anoxic water, showed no temporal drift. The protective copper plate was present.
SEA068	 **Comment:** The short mission in Gotland shows an evident and rather strong temporal drift. Values decrease from 5 to 2 mg m-3. The protective copper plate was present.

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Table 2: CDOM data for each glider to highlight the evolution of the observed issue. (Continued)

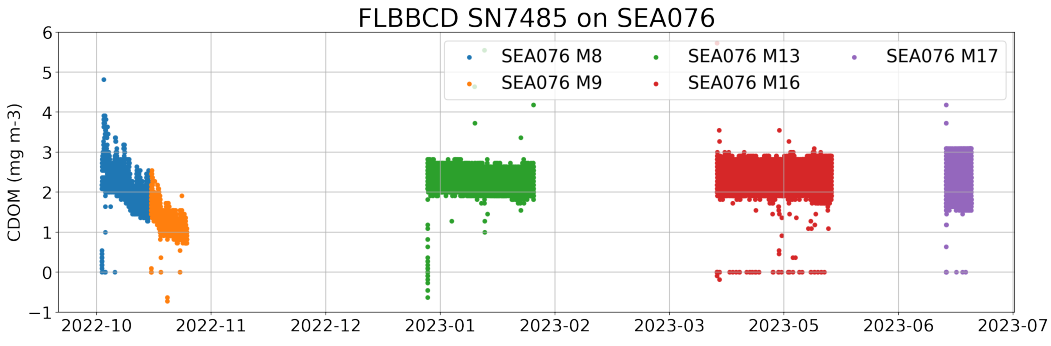
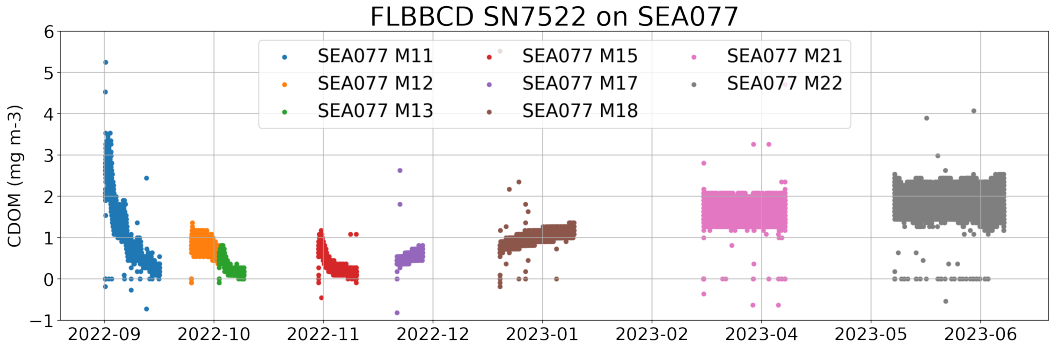
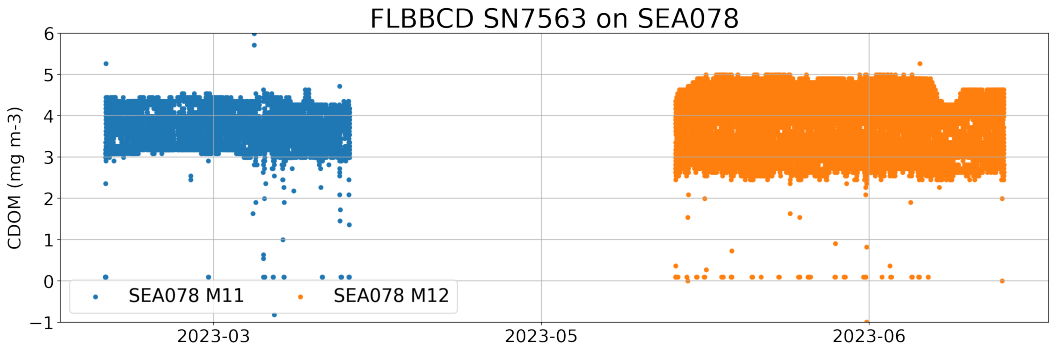
SEA076	 **Comment:** The first 2 missions in Bornholm (M8-9) show an evident temporal decrease in CDOM concentration. The protective copper plate was removed (M13-16-17 in Gotland) and data shows no temporal drift. All those missions surveyed anoxic areas.
SEA077	 **Comment:** The first 4 missions (M11-12-13-15) show an evident temporal decrease in CDOM concentration. The protective copper plate on the sensor was removed before the start of mission 17 (in purple in Figure 1). The first two missions after the copper plate is removed (mission 17-18) show a temporal increase instead. Finally, the last two missions (21-22) show no temporal drift. All those missions surveyed anoxic areas.
SEA078	 **Comment:** The protective copper plate was removed before the first deployment. Data never showed a temporal drift. All those missions surveyed anoxic areas.

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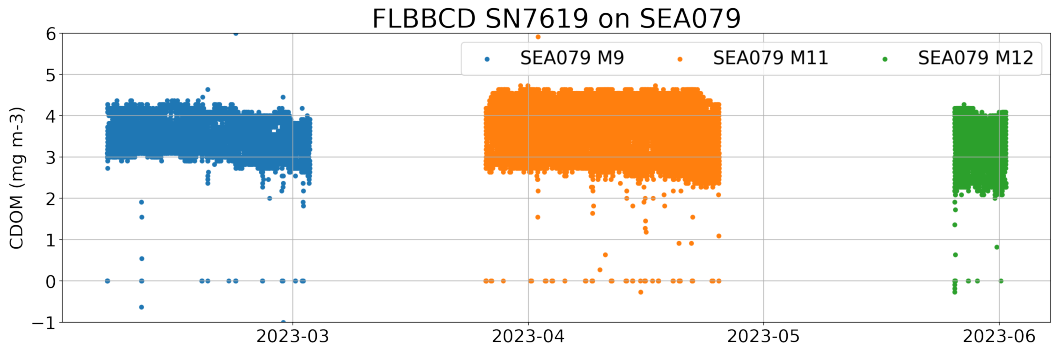
Table 2: CDOM data for each glider to highlight the evolution of the observed issue. (Continued)

SEA079	 **Comment:** The copper plate protecting the sensor was removed before the first deployment of the glider. Data has never showed a temporal drift. All those missions surveyed anoxic areas.

A Appendix

Figure A.1: Map of the Baltic Sea showing the 17 sub-basins (Map taken from http://stateofthebalticsea.helcom.fi/in-brief/our-baltic-sea/)