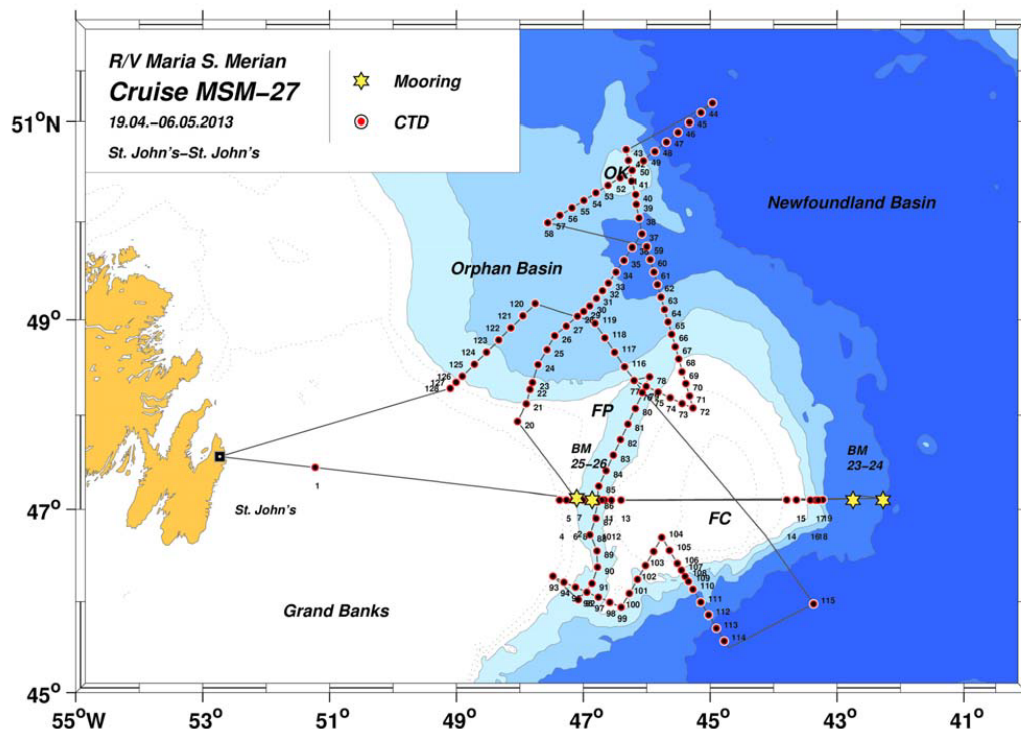


# CRUISE REPORT: MSM-27

(Updated OCT 2021)



## Highlights

### Cruise Summary Information

|                                    |                                       |         |
|------------------------------------|---------------------------------------|---------|
| Section Designation                | <b>MSM-27</b>                         |         |
| Expedition designation (ExpoCodes) | <b>06M220130419</b>                   |         |
| Chief Scientists                   | <b>Dagmar Kieke / IUPHB</b>           |         |
| Dates                              | 2013 APR 19 - 2013 MAY 06             |         |
| Ship                               | <i>RV Maria S. Merian</i>             |         |
| Ports of call                      | St. John's, Newfoundland – St. John's |         |
| Geographic Boundaries              | 51.1817                               |         |
|                                    | -51.225                               | -43.226 |
|                                    | 45.572                                |         |
| Stations                           | 125                                   |         |
| Floats and drifters deployed       | 0                                     |         |
| Moorings deployed or recovered     | 4 moorings recovered                  |         |

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**Short Cruise Report**  
**- RV Maria S. Merian, cruise MSM-27 -**

**St. John's – St. John's**  
**19<sup>th</sup> April - 06<sup>th</sup> May 2013**  
**Chief Scientist: Dr. Dagmar Kieke**  
**Captain: Ralf Schmidt**

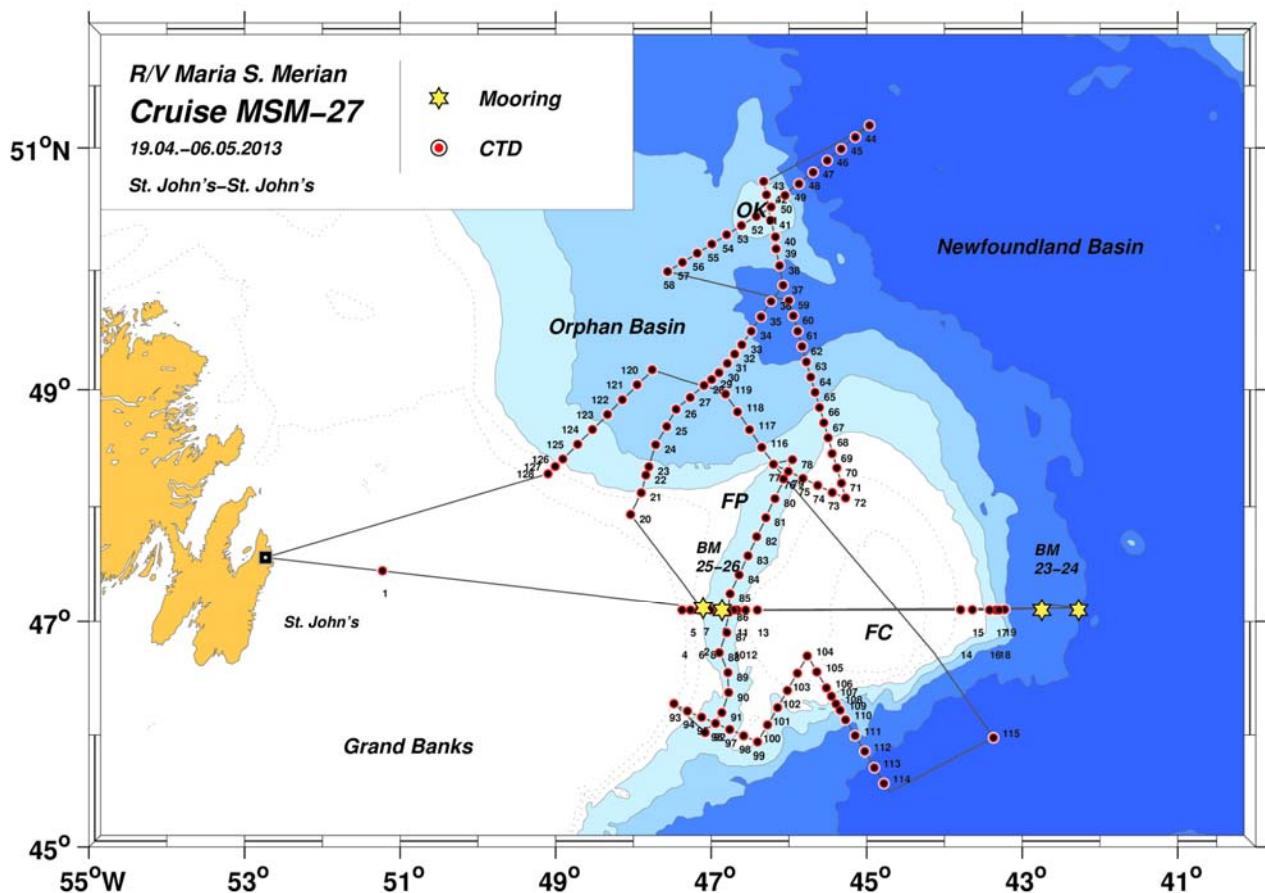


Figure 1: Track of RV Maria S. Merian, cruise MSM-27.

FC: Flemish Cap, FP: Flemish Pass; OK: Orphan Knoll.

## **1. Objectives**

Measurements conducted during cruise MSM-27 contribute to the project FLEPVAR, funded by the German Science Foundation (DFG) and jointly conducted by the Universities of Bremen and Hamburg. Mooring activities carried out in the Deep Western Boundary Current east of Flemish Cap are funded by the German Ministry of Education and Research (BMBF) as part of RACE, work package 1.2, affiliated to the University of Bremen.

The primary objectives of cruise MSM-27 are:

- 1) To exchange two deep-sea mooring arrays installed at about 47°N in Flemish Pass and in the Deep Western Boundary Current (DWBC) east of Flemish Cap. The Flemish Pass array aims at measuring the velocity structure and temperature and salinity of different types of Labrador Sea Water exported through Flemish Pass. The DWBC array is a full water-column mooring array. It serves to establish time series of volume transport and water mass properties related to the different components contributing to the DWBC and the North Atlantic Current (NAC).
- 2) To analyze the deep water characteristics in the vicinity of Flemish Pass and Flemish Cap, with particular focus on the different types of Labrador Sea Water.
- 3) To investigate how much of the water gathering in the Orphan Basin does enter Flemish Pass, and how much water propagates to the south east around Flemish Cap.
- 4) To estimate the export of Labrador Sea Water through Flemish Pass in 2012/2013.
- 5) To assess whether hydraulic control is one of the mechanisms governing the variability of the flow through Flemish Pass.

## 2. Narrative of cruise MSM-27

*RV Maria S. Merian* left St. John's/Newfoundland on April 19<sup>th</sup>, 2012, at 13:00 UTC. Having passed the 12 nm-zone<sup>1</sup>, continuous logging of underway data (thermosalinograph and vessel-mounted Acoustic Doppler Current Profiler) was switched on at 14:35 UTC. At 18:30 UTC, a first hydrographic station (station 138, profile 001) was conducted on the shallow Grand Banks of Newfoundland with the purpose to check the performance of the carousel water sampler, the conductivity/temperature/depth/oxygen (CTDO) sensor package, the oxygen titration system, the salinometer and the two attached lowered Acoustic Doppler Current Profilers (IADCP).

One April 20<sup>th</sup> the vessel arrived in Flemish Pass. Multibeam data logging was switched on and the location of mooring BM-25/1, deployed at 47°07.13'N/47°06.20'W in summer 2012 was visited. While the mooring was still in place a CTDO/IADCP cast (139/002) was carried out nearby. Recovery activities started shortly after the cast (10:19 UTC) and were successfully finished at 11:16 UTC. Afterwards, the vessel headed towards the location of mooring FP-02-11, installed at a more southern location (47°05.99'N/47°06.18'W) in summer 2011. The release of this mooring could not be contacted during several previous attempts made in 2012. Foggy conditions prevented any attempt to recover the mooring now. Afterwards, the vessel headed towards the location of mooring BM-26/1, installed in summer 2012 in the center of Flemish Pass. The release could be contacted successfully, but still visibility conditions were too low because of fog to start recovering the mooring. After another hydrographic cast near the mooring site (140/003) the vessel headed again towards the western side of Flemish Pass. Following the latitude of 47°06'N a first hydrographic section including water sampling for the onboard analysis of oxygen and salinity as well as for home-based analysis of the anthropogenic tracers CFC-12 and CFC-11 was carried out. Sampling in Flemish Pass stopped on April 21<sup>st</sup>, 22:10 UTC when the hydrographic station 151/013 was finished at the eastern side of Flemish Pass.

Course was set towards east, and on April 21<sup>st</sup>, *RV Maria S. Merian* arrived the location of mooring BM-22/4, installed at 47°06.00'N/43°13.70'W in summer 2012. The releases of the mooring were contacted, and the mooring was released at 17:29 UTC. Watch-keepers were sent out to bridge to assist in spotting the mooring after its ascend to the surface. Neither was the mooring identified at the surface, nor was any radio signal stemming from

---

1 nm = nautical mile

the top buoy received. Thus, the mooring could not be recovered. One of the releases responded information indicating it was lying horizontally on the sea floor, while the second did not reply to acoustic commands. Activities to approach the releases and spot the mooring ended at 19:04 UTC. Overnight the vessel headed back to the eastern flank of Flemish Cap, and a hydrographic section across the DWBC including stations 152/014 to 157/019 was performed. On April 22<sup>nd</sup>, BM-22/4 was visited again. Another attempt was made to acoustically contact the two releases of BM-22/4. This time both replied its horizontal position, and the mooring was considered lost.

*RV Maria S. Merian* headed further east and visited mooring BM-23/4 and BM-24/2 the same day. Both moorings were successfully recovered, and activities carried out in the DWBC region ended at 19:00 UTC. Subsequently, western course was set to visit again the moorings installed in Flemish Pass. Throughout April 23<sup>rd</sup>, atmospheric pressure rose to values exceeding 1040 hPa. Mooring BM-26/2 was successfully recovered the same day. Subsequently releasing mooring FP-02-11 failed. Since it was unclear whether the mooring was still in place but the release could not respond, a dredging attempt was carried out, but was not successful. Therefore, also mooring FP-02-11 was considered lost. Due to the loss of instruments, especially necessary acoustic releases, damages in recovered floatation elements, shackles and rings, the intended deployment of the DWBC and Flemish Pass mooring arrays was abandoned during this cruise, and the following scientific program of cruise MSM-27 consisted of CTDO/IADCP casts, water sampling, and underway measurements.

On April 24<sup>th</sup>, the vessel arrived in the southern Orphan Basin. A hydrographic section led from the shelf break to the center of the Orphan Basin and ended on the top of Orphan Knoll, a topographic feature located at 50°30'N/46°30'W (stations 162/020 to 185/043). At station 175/033 two acoustic releases were attached to the water sampler system with the purpose of testing their function. Stations 177/035 and 184/042 were used for calibrating recovered MicroCAT instruments. Water samples were taken along this section on every second station with the intention of a later home-based analysis.

On April 26<sup>th</sup>, 15:58 UTC, the section from the shelf break towards Orphan Knoll was finished (station 185/043). Since the bottle release unit of the water sampler system showed failures, it was replaced by another release unit while on transit to the next station location. A subsequent section started at 51°11'N/44°58'W on April 26<sup>th</sup>, 20:20 UTC, and

crossed Orphan Knoll again in westward direction (stations 186/044 to 200/058). The section was ended on April, 28<sup>th</sup>, 14:07 UTC, at 49°59'N/47°33'W.

After a transit of about 62 nm *RV Maria S. Merian* arrived at 49°45'N/46°00'W and extended the hydrographic line from Orphan Knoll towards Flemish Cap. Stations were carried out at distances of 9 nm. The southern end of the line located at Flemish Cap was reached on April, 30<sup>th</sup>, 00:30 UTC (station 214/072, 350m water depth).

A short section from Flemish Cap towards Sackville Spur at the northern entrance to Flemish Pass followed on April 30<sup>th</sup> (stations 215/073 to 219/077, 8 nm distances between stations).

Beginning at 48°14'N/46°04'W a hydrographic section followed the central axis of Flemish Pass towards its southern exit (stations 220/078 to 234/092, distances of 11 nm between stations, April 30<sup>th</sup> to May 01<sup>st</sup>). At station 222/080 the uncharted drilling platform West Aquarius was passed.

Having arrived at the southern exit of Flemish Pass, a short section running from the shelf break towards Beothuk Knoll and later on Flemish Cap was conducted (stations 235/093 to 246/104, station distances of 8 nm, May 01<sup>st</sup> to May 02<sup>nd</sup>). Starting at a water depth of about 260 nm (station 246/104) station work was conducted following a course towards the southeast across the DWBC (end of section at station 256/114, 4372m water depth, May 03<sup>rd</sup>, 09:54 UTC). Wind had continuously increased since April 29<sup>th</sup> and peaked on May 03<sup>rd</sup>. Recorded wind speeds exceeded 8 Bf. A last station intended to be carried out at a water depth of around 4700m had to be canceled since high sea state and strong winds experienced during the night of May 02nd to May 03rd put the vessel into strong pitching and rolling movements. This severely hampered station work and caused kinks in the sea cable connected to the water sampler unit. Data quality of lowered ADCP data is expected to be low for stations 250/108 to 256/114.

After a transit of 67 nm towards the northeast, a second section across the DWBC was planned, and station 257/115 was conducted at 45°58'N/43°22'W at a water depth of 4633m. While sea state conditions still allowed deploying the water sampler unit, the cast was aborted while the unit was at 1500 dbar, since the wind and sea conditions again led to massive pitch and roll movements of the vessel that impacted on the data quality. Therefore, no further station work was conducted along this second line across the DWBC. Instead, *RV Maria S. Merian* was in transit along the intended track to the top of Flemish

Cap, and underway measurements were carried out. Multibeam logging was switched off while crossing the shallow top of Flemish Cap.

On May 05<sup>th</sup> *RV Maria S. Merian* arrived again at the northern entrance of Flemish Pass. Wind and sea state had significantly reduced over night. Thus, the remaining ship time was spent to carry out a short section across the southern Orphan Basin as well as a final section from the central Orphan Basin towards the shelf break. Station work began the same day at 12:31 UTC (station 258/116) and lasted on until May 05<sup>th</sup>, 18:39 UTC (station 270/128). Multibeam data logging was stopped for the remaining time of the cruise. After station work was finished, *RV Maria S. Merian* started sailing towards St. John's, Canada. Logging of underway measurements was stopped on May 05<sup>th</sup> at 23:30 UTC. Cruise MSM-27 ended on May 06<sup>th</sup>, 10:30 UTC when the vessel moored at Pier 17 of St. John's harbor.

## **Acknowledgements**

This was a short but nevertheless intense cruise that led us up and down the slopes of Flemish Cap and Flemish Pass. We all benefited from the great hospitality granted to us aboard *RV Maria S. Merian*. Therefore, we would like to thank the master of *RV Maria S. Merian*, Ralf Schmidt, and his entire crew for the support during cruise MSM-27 which made our stay aboard very comfortable. Further thanks goes to the agencies (*DFG-FLEPVAR*, *BMBF-RACE-WP 1.2*, the *Senatskommission für Ozeanographie*, and the *Leitstelle Deutsche Forschungsschiffe*) that provided the necessary ship time, funding, and support to pursue all scientific work. Special thanks goes to Klaus Bohn (*LPL Projects + Logistics GmbH*) and Francis Kenny (*Avalon Customs Brokers*) who both made it possible that our containers arrived on schedule in St. John's, besides the bad weather conditions on the North Atlantic in early April.



**Table 1. Participants, RV Maria S. Merian, cruise MSM-27**

|     | Name                 | Institution | Field of Activity                                       |
|-----|----------------------|-------------|---|
| 1.  | Kieke, Dagmar        | IUPHB       | chief scientist   |
| 2.  | de Abreu Nunes, Nuno | IFM-ZMAW    | oxygen analysis, data evaluation                        |
| 3.  | Grieshaber, Björn    | IFM-ZMAW    | CTD/IADCP watch   |
| 4.  | Horn, Myriel         | IUPHB       | CTD/IADCP watch   |
| 5.  | Hinrichs, Claudia    | IFM-ZMAW    | CTD/IADCP watch   |
| 6.  | Jochumsen, Kerstin   | IFM-ZMAW    | CTD calibration, Flemish Pass moorings, data evaluation |
| 7.  | Mertens, Christian   | IUPHB       | vm-ADCP processing, DWBC moorings, data evaluation      |
| 8.  | Moritz, Martin       | IFM-ZMAW    | CTD/IADCP watch   |
| 9.  | Peters, Maike        | IUPHB       | CTD/IADCP watch   |
| 10. | Schneider, Linn      | IUPHB       | IADCP processing, data evaluation                       |
| 11. | Sültenfuß, Pia       | IUPHB       | CTD/IADCP watch, tracer sampling                        |
| 12. | Varotsou, Eirini     | IFM-ZMAW    | CTD/IADCP watch, salinometry                            |
| 13. | Welsch, Andreas      | IFM-ZMAW    | technics, moorings, CTD                                 |

IFM-ZMAW: Universität Hamurg, Institut für Meereskunde, Zentrum für Marine und Atmosphärische Wissenschaften, Hamburg, Germany

IUPHB: Universität Bremen, Institut für Umweltphysik, AG Ozeanographie Bremen, Germany

**Table 2. Flemish Pass Moorings, MSM-27, 2013**

| Mooring ID | Latitude   | Longitude  | Depth [m] | Deployment Date/Time | Recovery Date/Time                     |
|------------|------------|------------|-----------|----------------------|--|
| FP-02-11   | 47°05.99'N | 47°06.18'W | 1001      | ---                  | recovery/dredging attempt unsuccessful |
| BM-25/1    | 47°07.13'N | 47°06.20'W | 1009      | ---                  | 20.04.2012<br>10:32-11:16              |
| BM-26/1    | 47°05.94'N | 46°51.58'W | 1170      | ---                  | 23.04.2013<br>12:31-13:04              |

All times are given as UTC. All moorings except FP-02-11 were equipped with radio beacons, flashers, and flags. FP-02-11 carried an *Argos* beacon. During this cruise no moorings were deployed in the Flemish Pass region.

**Table 3. Deep Western Boundary Current Moorings, MSM-27, 2013**

| Mooring ID | Latitude   | Longitude  | Depth [m] | Deployment Date/Time | Recovery Date/Time             |
|------------|------------|------------|-----------|----------------------|--------------------------------|
| BM-22/4    | 47°06.00'N | 43°13.70'W | 3000      | ---                  | mooring could not be recovered |
| BM-23/4    | 47°06.00'N | 42°45.00'W | 3622      | ---                  | 22.04.2013<br>10:30-13:11      |
| BM-24/2    | 47°06.00'N | 42°16.50'W | 4050      | ---                  | 22.04.2013<br>15:01-19:00      |

All times are given as UTC. All moorings were equipped with two radio beacons, flashers, and flags. Mooring BM-24/2 carried an additional *Argos* beacon. During this cruise no moorings were deployed in the DWBC region.

Short Cruise Report, RV Maria S. Merian, cruise MSM-27, St. John's – St. John's, Apr 19<sup>th</sup> – May 06<sup>th</sup> 2013

Table 4. CTD/LADCP/Tracer-Stations. CFCs: chlorofluorocarbon sampling, O2: oxygen sampling, S: salinity sampling

| Stn | Prf | Date       | Time<br>[UTC] | Latitude   | Longitude  | Water<br>Depth<br>[m] | Max.<br>Pressure<br>[dbar] | CFCs | O2 | S | LADCP | Comment                   |
|-----|-----|------------|---------------|------------|------------|-----------------------|----------------------------|------|----|---|-------|---------------------------|
| 138 | 1   | 2013/04/19 | 18:32         | 47°26.73'N | 51°13.50'W | 127                   | 114                        | ---  | x  | x | x     | Test Station              |
| 139 | 2   | 2013/04/20 | 09:20         | 47°07.63'N | 47°05.70'W | 1028                  | 1015                       | ---  | x  | x | x     |                           |
| 140 | 3   | 2013/04/20 | 13:53         | 47°06.43'N | 46°51.24'W | 1100                  | 1165                       | ---  | x  | x | x     |                           |
| 141 | 4   | 2013/04/20 | 17:50         | 47°06.01'N | 47°22.56'W | 250                   | 227                        | x    | x  | x | x     |                           |
| 142 | 5   | 2013/04/20 | 18:55         | 47°05.98'N | 47°15.90'W | 490                   | 468                        | x    | x  | x | x     |                           |
| 143 | 6   | 2013/04/20 | 20:00         | 47°06.01'N | 47°09.36'W | 888                   | 877                        | x    | x  | x | x     |                           |
| 144 | 7   | 2013/04/20 | 21:10         | 47°06.62'N | 47°05.88'W | 1029                  | 1012                       | x    | x  | x | x     |                           |
| 145 | 8   | 2013/04/20 | 22:26         | 47°06.01'N | 47°00.48'W | 1137                  | 1126                       | x    | x  | x | x     |                           |
| 146 | 9   | 2013/04/21 | 00:10         | 47°06.42'N | 46°51.24'W | 1177                  | 1166                       | x    | x  | x | x     |                           |
| 147 | 10  | 2013/04/21 | 01:46         | 47°06.01'N | 46°42.48'W | 1148                  | 1138                       | x    | x  | x | x     |                           |
| 148 | 11  | 2013/04/21 | 03:04         | 47°06.03'N | 46°40.02'W | 1113                  | 1097                       | x    | x  | x | x     |                           |
| 149 | 12  | 2013/04/21 | 04:34         | 47°06.01'N | 46°33.36'W | 510                   | 493                        | x    | x  | x | x     |                           |
| 150 | 13  | 2013/04/21 | 05:55         | 47°06.01'N | 46°24.42'W | 365                   | 343                        | x    | x  | x | x     |                           |
| 152 | 14  | 2013/04/21 | 21:43         | 47°06.05'N | 43°47.52'W | 590                   | 575                        | x    | x  | x | x     |                           |
| 153 | 15  | 2013/04/21 | 23:01         | 47°06.02'N | 43°38.46'W | 770                   | 760                        | ---  | x  | x | x     |                           |
| 154 | 16  | 2013/04/22 | 00:41         | 47°05.98'N | 43°25.26'W | 1280                  | 1282                       | ---  | x  | x | x     |                           |
| 155 | 17  | 2013/04/22 | 02:21         | 47°05.93'N | 43°20.10'W | 1835                  | 1827                       | ---  | x  | x | x     |                           |
| 156 | 18  | 2013/04/22 | 04:08         | 47°06.00'N | 43°17.88'W | 2560                  | 2596                       | ---  | x  | x | x     |                           |
| 157 | 19  | 2013/04/22 | 06:38         | 47°06.13'N | 43°13.56'W | 3026                  | 3053                       | ---  | x  | x | x     |                           |
| 162 | 20  | 2013/04/24 | 04:09         | 47°56.05'N | 48°02.22'W | 321                   | 312                        | ---  | x  | x | x     |                           |
| 163 | 21  | 2013/04/24 | 05:51         | 48°07.27'N | 47°53.88'W | 853                   | 813                        | x    | x  | x | x     |                           |
| 164 | 22  | 2013/04/24 | 07:26         | 48°16.27'N | 47°50.40'W | 1762                  | 1777                       | ---  | x  | x | x     |                           |
| 165 | 23  | 2013/04/24 | 09:10         | 48°20.69'N | 47°48.06'W | 1952                  | 1951                       | x    | x  | x | x     |                           |
| 166 | 24  | 2013/04/24 | 11:36         | 48°31.95'N | 47°42.78'W | 2255                  | 2279                       | ---  | x  | x | x     |                           |
| 167 | 25  | 2013/04/24 | 14:10         | 48°41.27'N | 47°34.20'W | 2393                  | 2416                       | x    | x  | x | x     |                           |
| 168 | 26  | 2013/04/24 | 16:52         | 48°49.97'N | 47°27.06'W | 2502                  | 2527                       | ---  | x  | x | x     |                           |
| 169 | 27  | 2013/04/24 | 19:43         | 48°55.94'N | 47°16.20'W | 2591                  | 2613                       | x    | x  | x | x     |                           |
| 170 | 28  | 2013/04/24 | 22:19         | 49°02.20'N | 47°05.46'W | 2677                  | 2709                       | ---  | x  | x | x     |                           |
| 171 | 29  | 2013/04/25 | 00:47         | 49°05.18'N | 46°59.64'W | 2725                  | 2756                       | x    | x  | x | x     |                           |
| 172 | 30  | 2013/04/25 | 03:13         | 49°08.50'N | 46°53.88'W | 2773                  | 2805                       | ---  | x  | x | x     |                           |
| 173 | 31  | 2013/04/25 | 05:40         | 49°13.30'N | 46°47.64'W | 2845                  | 2875                       | x    | x  | x | ---   | no IADCP data available   |
| 174 | 32  | 2013/04/25 | 08:49         | 49°18.00'N | 46°41.76'W | 2884                  | 2920                       | ---  | x  | x | x     |                           |
| 175 | 33  | 2013/04/25 | 11:22         | 49°22.71'N | 46°36.24'W | 2933                  | 2968                       | x    | x  | x | x     | test of acoustic releases |
| 176 | 34  | 2013/04/25 | 14:23         | 49°29.47'N | 46°29.10'W | 3015                  | 3052                       | ---  | x  | x | x     |                           |

Short Cruise Report, RV Maria S. Merian, cruise MSM-27, St. John's – St. John's, Apr 19<sup>th</sup> – May 06<sup>th</sup> 2013

Table 4. continued ...

| Stn | Prf | Date       | Time<br>[UTC] | Latitude   | Longitude  | Water<br>Depth<br>[m] | Max.<br>Pressure<br>[dbar] | CFCs | O2  | S   | LADCP | Comment   |
|-----|-----|------------|---------------|------------|------------|-----------------------|----------------------------|------|-----|-----|-------|---|
| 177 | 35  | 2013/04/25 | 17:02         | 49°36.71'N | 46°21.42'W | 3117                  | 3154                       | x    | x   | x   | x     | MicroCAT calibration stops  |
| 178 | 36  | 2013/04/25 | 20:40         | 49°44.45'N | 46°13.74'W | 3184                  | 3227                       | ---  | x   | x   | x     |   |
| 179 | 37  | 2013/04/25 | 23:36         | 49°52.64'N | 46°04.50'W | 3293                  | 3340                       | x    | x   | x   | x     |   |
| 180 | 38  | 2013/04/26 | 02:31         | 50°02.33'N | 46°07.26'W | 2963                  | 2998                       | ---  | x   | x   | x     |   |
| 181 | 39  | 2013/04/26 | 05:05         | 50°10.60'N | 46°09.84'W | 2812                  | 2844                       | x    | x   | x   | x     | MicroCAT calibration stops  |
| 182 | 40  | 2013/04/26 | 07:28         | 50°16.54'N | 46°10.38'W | 2096                  | 2113                       | ---  | x   | x   | x     |   |
| 183 | 41  | 2013/04/26 | 09:38         | 50°24.66'N | 46°14.16'W | 1806                  | 1817                       | x    | x   | x   | x     |   |
| 184 | 42  | 2013/04/26 | 12:00         | 50°37.19'N | 46°17.28'W | 1821                  | 1757                       | ---  | x   | x   | x     |   |
| 185 | 43  | 2013/04/26 | 14:42         | 50°43.76'N | 46°19.44'W | 2168                  | 2190                       | x    | x   | x   | x     | release unit of water sampler system was replaced after station       |
| 186 | 44  | 2013/04/26 | 20:20         | 51°10.90'N | 44°57.84'W | 4126                  | 4203                       | ---  | --- | --- | ---   | no communication to water sampler unit at depth, exchange of COM port |
| 187 | 45  | 2013/04/27 | 00:27         | 51°05.18'N | 45°08.76'W | 4122                  | 4196                       | ---  | x   | x   | ---   | no IADCP data available, slave instrument was not woken up            |
| 188 | 46  | 2013/04/27 | 03:56         | 50°59.52'N | 45°19.62'W | 4115                  | 4189                       | ---  | x   | x   | x     |   |
| 189 | 47  | 2013/04/27 | 07:26         | 50°53.88'N | 45°30.48'W | 4101                  | 4176                       | ---  | x   | x   | x     |   |
| 190 | 48  | 2013/04/27 | 10:59         | 50°48.21'N | 45°41.28'W | 4093                  | 4161                       | ---  | x   | x   | x     |   |
| 191 | 49  | 2013/04/27 | 14:26         | 50°42.55'N | 45°52.26'W | 3624                  | 3706                       | ---  | x   | x   | x     |   |
| 192 | 50  | 2013/04/27 | 18:19         | 50°36.87'N | 46°03.00'W | 1952                  | 1959                       | ---  | x   | x   | x     |   |
| 193 | 51  | 2013/04/27 | 20:22         | 50°31.21'N | 46°13.80'W | 1761                  | 1772                       | ---  | x   | x   | x     |   |
| 194 | 52  | 2013/04/27 | 22:22         | 50°26.68'N | 46°25.20'W | 1785                  | 1799                       | ---  | x   | x   | x     |   |
| 195 | 53  | 2013/04/28 | 00:21         | 50°22.13'N | 46°36.60'W | 1859                  | 1869                       | ---  | x   | x   | x     |   |
| 196 | 54  | 2013/04/28 | 02:32         | 50°17.61'N | 46°48.00'W | 2289                  | 2308                       | ---  | x   | x   | x     |   |
| 197 | 55  | 2013/04/28 | 04:46         | 50°13.05'N | 46°59.40'W | 2865                  | 2899                       | ---  | x   | x   | x     |   |
| 198 | 56  | 2013/04/28 | 07:18         | 50°08.51'N | 47°10.80'W | 2853                  | 2885                       | ---  | x   | x   | x     |   |
| 199 | 57  | 2013/04/28 | 09:53         | 50°03.99'N | 47°22.20'W | 2808                  | 2841                       | ---  | x   | x   | x     |   |
| 200 | 58  | 2013/04/28 | 12:33         | 49°59.43'N | 47°33.54'W | 2742                  | 2772                       | ---  | x   | x   | x     |   |
| 201 | 59  | 2013/04/28 | 19:35         | 49°44.94'N | 46°00.00'W | 3306                  | 3349                       | ---  | x   | x   | x     |   |
| 202 | 60  | 2013/04/28 | 22:22         | 49°37.23'N | 45°56.64'W | 3331                  | 3375                       | ---  | x   | x   | x     |   |
| 203 | 61  | 2013/04/29 | 01:11         | 49°29.48'N | 45°53.22'W | 3285                  | 3330                       | ---  | x   | x   | x     |   |
| 204 | 62  | 2013/04/29 | 03:54         | 49°21.79'N | 45°49.86'W | 3098                  | 3137                       | ---  | x   | x   | x     |   |
| 205 | 63  | 2013/04/29 | 06:29         | 49°14.05'N | 45°46.56'W | 2935                  | 2970                       | ---  | x   | x   | x     |   |
| 206 | 64  | 2013/04/29 | 09:04         | 49°06.38'N | 45°43.20'W | 2730                  | 2759                       | ---  | --- | --- | ---   | bottle file was corrupt   |
| 207 | 65  | 2013/04/29 | 12:11         | 48°58.60'N | 45°39.78'W | 2374                  | 2393                       | ---  | x   | x   | x     |   |
| 208 | 66  | 2013/04/29 | 14:31         | 48°50.90'N | 45°36.42'W | 1772                  | 1785                       | ---  | x   | x   | x     |   |
| 209 | 67  | 2013/04/29 | 16:32         | 48°43.13'N | 45°33.06'W | 1120                  | 1120                       | ---  | x   | x   | x     |   |
| 210 | 68  | 2013/04/29 | 18:32         | 48°35.44'N | 45°29.70'W | 1030                  | 1031                       | ---  | x   | x   | x     |   |

Short Cruise Report, RV Maria S. Merian, cruise MSM-27, St. John's – St. John's, Apr 19<sup>th</sup> – May 06<sup>th</sup> 2013

Table 4. continued ...

| Stn | Prf | Date       | Time<br>[UTC] | Latitude   | Longitude  | Water<br>Depth<br>[m] | Max.<br>Pressure<br>[dbar] | CFCs | O2  | S   | LADCP | Comment                          |
|-----|-----|------------|---------------|------------|------------|-----------------------|----------------------------|------|-----|-----|-------|----------------------------------|
| 211 | 69  | 2013/04/29 | 20:08         | 48°27.70'N | 45°26.34'W | 790                   | 786                        | ---  | x   | x   | x     |                                  |
| 212 | 70  | 2013/04/29 | 21:37         | 48°19.96'N | 45°22.98'W | 640                   | 636                        | ---  | x   | x   | x     |                                  |
| 213 | 71  | 2013/04/29 | 22:57         | 48°12.22'N | 45°19.56'W | 456                   | 450                        | ---  | x   | x   | x     |                                  |
| 214 | 72  | 2013/04/30 | 00:09         | 48°04.54'N | 45°16.26'W | 350                   | 340                        | ---  | x   | x   | x     |                                  |
| 215 | 73  | 2013/04/30 | 01:20         | 48°07.38'N | 45°26.46'W | 427                   | 420                        | ---  | --- | x   | x     |                                  |
| 216 | 74  | 2013/04/30 | 02:32         | 48°11.02'N | 45°37.86'W | 680                   | 672                        | ---  | x   | x   | x     |                                  |
| 217 | 75  | 2013/04/30 | 03:53         | 48°14.67'N | 45°49.20'W | 956                   | 952                        | ---  | --- | x   | x     |                                  |
| 218 | 76  | 2013/04/30 | 05:22         | 48°18.26'N | 46°00.60'W | 1157                  | 1156                       | ---  | x   | x   | x     |                                  |
| 219 | 77  | 2013/04/30 | 06:58         | 48°21.90'N | 46°11.94'W | 1024                  | 1022                       | ---  | --- | x   | x     |                                  |
| 220 | 78  | 2013/04/30 | 08:44         | 48°24.23'N | 45°57.36'W | 1123                  | 1120                       | ---  | x   | x   | x     |                                  |
| 221 | 79  | 2013/04/30 | 10:41         | 48°14.26'N | 46°04.26'W | 1169                  | 1166                       | ---  | --- | x   | x     |                                  |
| 222 | 80  | 2013/04/30 | 12:33         | 48°04.22'N | 46°10.68'W | 1165                  | 1166                       | ---  | --- | --- | ---   | cast run without closing bottles |
| 223 | 81  | 2013/04/30 | 14:28         | 47°54.35'N | 46°17.88'W | 1172                  | 1170                       | ---  | --- | x   | x     |                                  |
| 224 | 82  | 2013/04/30 | 16:22         | 47°44.46'N | 46°24.78'W | 1169                  | 1170                       | ---  | x   | x   | x     |                                  |
| 225 | 83  | 2013/04/30 | 18:14         | 47°34.54'N | 46°31.62'W | 1162                  | 1162                       | ---  | --- | x   | x     |                                  |
| 226 | 84  | 2013/04/30 | 20:03         | 47°24.59'N | 46°38.52'W | 1158                  | 1158                       | ---  | x   | x   | x     |                                  |
| 227 | 85  | 2013/04/30 | 21:54         | 47°14.64'N | 46°45.30'W | 1154                  | 1151                       | ---  | --- | x   | x     |                                  |
| 228 | 86  | 2013/04/30 | 23:40         | 47°04.71'N | 46°47.04'W | 1164                  | 1168                       | ---  | x   | x   | x     |                                  |
| 229 | 87  | 2013/05/01 | 01:33         | 46°54.18'N | 46°48.84'W | 1186                  | 1186                       | ---  | --- | x   | x     |                                  |
| 230 | 88  | 2013/05/01 | 03:29         | 46°43.63'N | 46°53.76'W | 1218                  | 1220                       | ---  | x   | x   | x     |                                  |
| 231 | 89  | 2013/05/01 | 05:31         | 46°33.12'N | 46°46.98'W | 1225                  | 1226                       | ---  | --- | x   | x     |                                  |
| 232 | 90  | 2013/05/01 | 07:18         | 46°22.53'N | 46°46.50'W | 1258                  | 1256                       | ---  | x   | x   | x     |                                  |
| 233 | 91  | 2013/05/01 | 09:11         | 46°11.90'N | 46°51.78'W | 1264                  | 1264                       | ---  | --- | x   | x     |                                  |
| 234 | 92  | 2013/05/01 | 11:18         | 46°01.26'N | 47°04.74'W | 1430                  | 1433                       | ---  | x   | x   | x     |                                  |
| 235 | 93  | 2013/05/01 | 14:21         | 46°16.58'N | 47°28.74'W | 271                   | 258                        | ---  | --- | x   | x     |                                  |
| 236 | 94  | 2013/05/01 | 15:42         | 46°12.71'N | 47°18.24'W | 611                   | 603                        | ---  | x   | x   | x     |                                  |
| 237 | 95  | 2013/05/01 | 17:09         | 46°09.44'N | 47°07.38'W | 1452                  | 1451                       | ---  | --- | x   | x     |                                  |
| 237 | 96  | 2013/05/01 | 19:08         | 46°06.14'N | 46°56.58'W | 1288                  | 1291                       | ---  | x   | x   | x     |                                  |
| 239 | 97  | 2013/05/01 | 20:52         | 46°02.83'N | 46°45.72'W | 1267                  | 1270                       | ---  | --- | x   | x     |                                  |
| 240 | 98  | 2013/05/01 | 22:36         | 45°59.54'N | 46°34.92'W | 547                   | 540                        | ---  | x   | x   | x     |                                  |
| 241 | 99  | 2013/05/02 | 00:00         | 45°56.24'N | 46°24.12'W | 873                   | 871                        | ---  | --- | x   | x     |                                  |
| 242 | 100 | 2013/05/02 | 01:50         | 46°05.38'N | 46°16.44'W | 1150                  | 1156                       | ---  | x   | x   | x     |                                  |

Short Cruise Report, RV Maria S. Merian, cruise MSM-27, St. John's – St. John's, Apr 19<sup>th</sup> – May 06<sup>th</sup> 2013

Table 4. continued ...

| Stn | Prf | Date       | Time<br>[UTC] | Latitude   | Longitude  | Water<br>Depth<br>[m] | Max.<br>Pressure<br>[dbar] | CFCs | O2  | S   | LADCP | Comment                   |
|-----|-----|------------|---------------|------------|------------|-----------------------|----------------------------|------|-----|-----|-------|---------------------------|
| 243 | 101 | 2013/05/02 | 03:44         | 46°14.48'N | 46°08.82'W | 1309                  | 1314                       | ---  | --- | x   | x     |                           |
| 244 | 102 | 2013/05/02 | 05:43         | 46°23.60'N | 46°01.14'W | 494                   | 492                        | ---  | x   | x   | x     |                           |
| 245 | 103 | 2013/05/02 | 07:21         | 46°32.69'N | 45°53.52'W | 381                   | 373                        | ---  | --- | x   | x     |                           |
| 246 | 104 | 2013/05/02 | 08:53         | 46°41.83'N | 45°45.84'W | 264                   | 253                        | ---  | x   | x   | x     |                           |
| 247 | 105 | 2013/05/02 | 10:23         | 46°33.40'N | 45°38.46'W | 281                   | 273                        | ---  | --- | x   | x     |                           |
| 248 | 106 | 2013/05/02 | 11:53         | 46°24.97'N | 45°31.08'W | 540                   | 535                        | x    | x   | x   | x     |                           |
| 249 | 107 | 2013/05/02 | 13:11         | 46°20.52'N | 45°27.18'W | 1341                  | 1349                       | x    | --- | x   | x     |                           |
| 250 | 108 | 2013/05/02 | 14:47         | 46°16.53'N | 45°23.70'W | 1699                  | 1697                       | x    | x   | x   | x     |                           |
| 251 | 109 | 2013/05/02 | 16:32         | 46°13.12'N | 45°20.52'W | 2311                  | 2299                       | x    | --- | x   | x     |                           |
| 252 | 110 | 2013/05/02 | 18:50         | 46°08.07'N | 45°16.26'W | 2841                  | 2870                       | x    | x   | x   | x     |                           |
| 253 | 111 | 2013/05/02 | 21:38         | 45°59.60'N | 45°08.88'W | 3075                  | 3108                       | x    | x   | x   | x     |                           |
| 254 | 112 | 2013/05/03 | 00:42         | 45°51.20'N | 45°01.44'W | 3700                  | 3758                       | x    | x   | x   | x     |                           |
| 255 | 113 | 2013/05/03 | 03:56         | 45°42.76'N | 44°54.06'W | 4085                  | 4148                       | x    | x   | x   | x     |                           |
| 256 | 114 | 2013/05/03 | 07:28         | 45°34.32'N | 44°46.74'W | 4372                  | 4440                       | x    | x   | x   | x     |                           |
| 257 | 115 | 2013/05/03 | 18:33         | 45°58.47'N | 43°22.26'W | 4633                  | 1518                       | ---  | x   | x   | x     | cast aborted at 1518 dbar |
| 258 | 116 | 2013/05/04 | 12:32         | 48°30.56'N | 46°21.06'W | 1981                  | 1996                       | ---  | x   | x   | x     |                           |
| 259 | 117 | 2013/05/04 | 15:02         | 48°39.61'N | 46°30.36'W | 2636                  | 2664                       | ---  | x   | x   | x     |                           |
| 260 | 118 | 2013/05/04 | 17:40         | 48°48.63'N | 46°39.66'W | 2702                  | 2730                       | ---  | x   | x   | x     |                           |
| 261 | 119 | 2013/05/04 | 20:20         | 48°57.71'N | 46°48.96'W | 2766                  | 2796                       | ---  | x   | x   | x     |                           |
| 262 | 120 | 2013/05/05 | 01:22         | 49°10.03'N | 47°45.59'W | 2459                  | 2482                       | ---  | x   | x   | x     |                           |
| 263 | 121 | 2013/05/05 | 03:59         | 49°02.46'N | 47°57.08'W | 2361                  | 2383                       | ---  | x   | x   | x     |                           |
| 264 | 122 | 2013/05/05 | 06:28         | 48°54.89'N | 48°08.56'W | 2262                  | 2277                       | ---  | --- | x   | x     |                           |
| 265 | 123 | 2013/05/05 | 08:52         | 48°47.31'N | 48°20.04'W | 2117                  | 2135                       | ---  | x   | --- | x     |                           |
| 266 | 124 | 2013/05/05 | 11:14         | 48°39.74'N | 48°31.52'W | 1900                  | 1914                       | ---  | --- | x   | x     |                           |
| 267 | 125 | 2013/05/05 | 13:27         | 48°32.18'N | 48°43.01'W | 1685                  | 1684                       | ---  | x   | x   | x     |                           |
| 268 | 126 | 2013/05/05 | 15:35         | 48°24.57'N | 48°54.45'W | 1223                  | 1213                       | ---  | --- | x   | x     |                           |
| 269 | 127 | 2013/05/05 | 17:00         | 48°20.81'N | 49°00.40'W | 967                   | 960                        | ---  | x   | x   | x     |                           |
| 270 | 128 | 2013/05/05 | 18:19         | 48°16.97'N | 49°05.92'W | 397                   | 387                        | ---  | --- | --- | x     |                           |

## CCHDO Data History

- **File Generated Andrew barna**

[06M220130419su.txt \(download\)](#) #30d7a

**Date:** 2021-10-12

**Current Status:** dataset

**Notes**

Sumfile generated from 06M220130419\_ctd.nc (20579)

- **File Online Andrew Barna**

[06M220130419\\_ctd.nc \(download\)](#) #ad01a

**Date:** 2021-08-26

**Current Status:** dataset

**Notes**

CCHDO-1.0 CF netCDF files converted from ctd exchange file

- **File Merge CCHSIO**

[msm27.zip \(download\)](#) #4ef93

**Date:** 2020-09-03

**Current Status:** merged

- **File Merge CCHSIO**

[msm27\\_exchange\\_ct1.zip \(download\)](#) #f4763

**Date:** 2020-09-03

**Current Status:** merged

- **Submitted CTD files from As Received to Dataset CCHSIO**

**Date:** 2020-09-03

**Data Type:** CTD

**Action:** Website Update

**Note:**

2013 06M220130419 processing - CTD/merge - CTDPRS,CTDTMP,CTDSAL,CTDOXY

2020-09-03

Submission

| filename | submitted by | date  | id    |
|----------|--------------|-------|-------|
| -----    | -----        | ----- | ----- |

|                        |                   |                  |
|------------------------|-------------------|------------------|
| msm27_exchange_ct1.zip | Carolina Berys    | 2017-12-03 13790 |
| msm27.zip              | Reiner Steinfeldt | 2016-09-20 12320 |

#### Changes

-----

#### msm27.zip

- did not use this file. It is WOCE format. Moved into Data History

#### 06M220130419\_ct1.zip

- Changed file names from 06MM to 06M2 (ICES page says do not use 06MM )
- Changed EXPCODE from 06M220130419 to 06M220130419 in each file
- Removed NUMBER (units OBS) because all values -999.0
- Changed lines beginning with a "\_" to a comment
- Changed SECT\_ID from blank to MSM-27 to match cruise report
- If a data\_value=-999.0 and flag=2, changed the flag from 2 to 9
- Flagged CTDSAL Station 202 bad and CTDOXY Station 206 bad (Nico Lange)
- Added cruise comments and notes.
- Added citation information

#### Conversion

-----

| file                    | converted from       | software                |
|-------------------------|----------------------|-------------------------|
| 06M220130419_nc_ctd.zip | 06M220130419_ct1.zip | hydro 0.8.2-57-g8aa7d7a |

#### Updated Files Manifest

-----

| file                    | stamp          |
|-------------------------|----------------|
| 06M220130419_ct1.zip    | 20200903CCHSIO |
| 06M220130419_nc_ctd.zip | 20200903CCHSIO |

:Updated parameters: CTDPRS,CTDTMP,CTDSAL,CTDOXY

opened in JOA 5.2.1 with no apparent problems:

06M220130419\_ct1.zip  
06M220130419\_nc\_ctd.zip

opened in ODV with no apparent problems:

06M220130419\_ct1.zip

#### • File Online Carolina Berys

[06M220130419.exc.csv \(download\)](#) #03309

**Date:** 2020-04-28

**Current Status:** unprocessed



- **File Submission Robert Key**

[06M220130419.exc.csv \(download\)](#) #03309

**Date:** 2020-03-20

**Current Status:** unprocessed

**Notes**

MSM27

Cudos to Alex. there is one more. Cruise report and CTD files submitted for this one quite some time ago

- **File Online Carolina Berys**

[msm27\\_exchange\\_ct1.zip \(download\)](#) #f4763

**Date:** 2017-12-03

**Current Status:** merged

- **File Submission Carolina Berys**

[msm27\\_exchange\\_ct1.zip \(download\)](#) #f4763

**Date:** 2017-12-03

**Current Status:** merged

**Notes**

CTD data in Exchange format

- **File Online Carolina Berys**

[MM27.SUM \(download\)](#) #e50cd

**Date:** 2016-10-10

**Current Status:** unprocessed

- **File Online Carolina Berys**

[msm27.zip \(download\)](#) #4ef93

**Date:** 2016-10-10

**Current Status:** merged

- **File Online Carolina Berys**

[msm27.txt \(download\)](#) #6e483

**Date:** 2016-10-10

**Current Status:** unprocessed

- **File Online Carolina Berys**

[msm27-scr.pdf \(download\)](#) #fbba7

**Date:** 2016-10-10

**Current Status:** unprocessed

- **File Submission Reiner Steinfeldt**

[msm27-scr.pdf \(download\)](#) #fbba7

**Date:** 2016-09-20

**Current Status:** unprocessed

**Notes**

RV Maria S. Merian

Cruise MSM27

St. John's - St. John's

19th April - 06th May

Chief Scientist: Dagmar Kieke

Region:

Flemish Pass, Orphan Basin, DWBC east of Flemish Cap

- **File Submission Reiner Steinfeldt**

[msm27.txt \(download\)](#) #6e483

**Date:** 2016-09-20

**Current Status:** unprocessed

**Notes**

RV Maria S. Merian

Cruise MSM27

St. John's - St. John's

19th April - 06th May

Chief Scientist: Dagmar Kieke

Region:

Flemish Pass, Orphan Basin, DWBC east of Flemish Cap

- **File Submission Reiner Steinfeldt**

[msm27.zip \(download\)](#) #4ef93

**Date:** 2016-09-20

**Current Status:** merged

**Notes**

RV Maria S. Merian

Cruise MSM27

St. John's - St. John's

19th April - 06th May

Chief Scientist: Dagmar Kieke

Region:

Flemish Pass, Orphan Basin, DWBC east of Flemish Cap

- **File Submission Reiner Steinfeldt**

[MM27.SUM \(download\)](#) #e50cd

**Date:** 2016-09-20

**Current Status:** unprocessed

**Notes**

RV Maria S. Merian

Cruise MSM27

St. John's - St. John's

19th April - 06th May

Chief Scientist: Dagmar Kieke

Region:

Flemish Pass, Orphan Basin, DWBC east of Flemish Cap

- **File Online CCHDO System**

[06M220130419\\_ct1.zip \(download\)](#) #3bf31

**Date:** 2015-04-23

**Current Status:** dataset

**Notes**

Files migrated to new CCHDO backend, there is not enough information to know where this file should go in the timeline.

- **File Online CCHDO System**

[06M220130419\\_nc\\_ctd.zip \(download\)](#) #f9fb8

**Date:** 2015-04-23

**Current Status:** dataset

**Notes**

Files migrated to new CCHDO backend, there is not enough information to know where this file should go in the timeline.