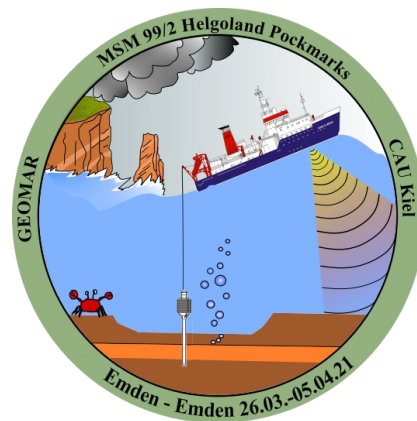


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Short Cruise Report
R/V MARIA S. MERIAN
Cruise MSM99/2 (GPF 21-1_013)

Emden (Germany) - Emden (Germany)
26.03.2021 - 04.04.2021

Chief Scientist: Dr. Christopher Schmidt
Captain: Ralf Schmidt

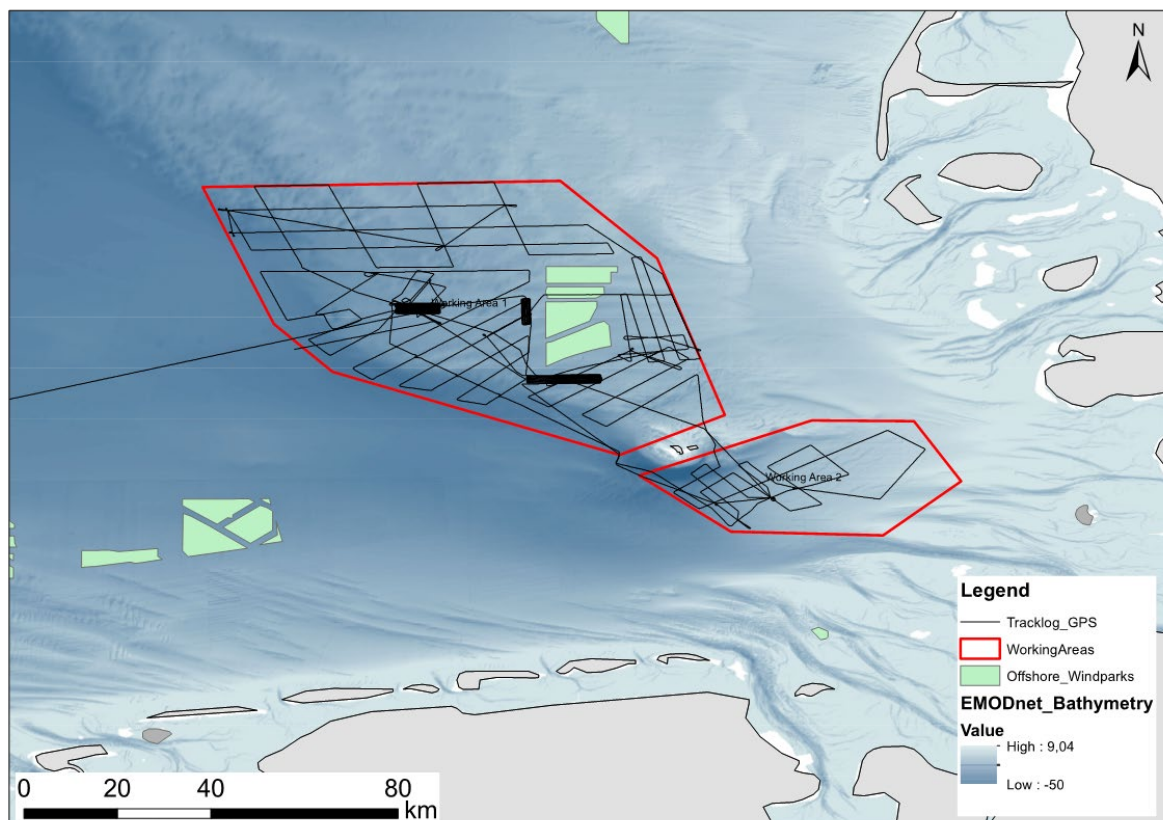


Fig. 1: ship track and the two working areas (WA) of R/V MARIA S. MERIAN cruise MSM 99/2

Objectives

The aim of R/V MARIA S. MERIAN expedition MSM99/2 was to investigate the periodic emergence of pockmarks north of Helgoland in the German Bight, North Sea. It is generally assumed that pockmarks in this area form during the occurrence of large storms. The proposed mechanism is based on the fact that wave movements lead to pressure changes in the sediment which can lead to spontaneous degassing and accumulation of free gas in the subsurface. This process is possible because the solubility of gas in pore water is pressure and temperature dependent. In particular wave-induced degassing and subsequent pockmark formation is dependent on a sufficiently high initial gas saturation in the pore water, and a high permeability. These parameters can vary considerably and on different spatial scales in the investigated area, which can influence the local occurrence of pockmarks.

To test this hypothesis, sampling stations in two working areas were planned during the cruise. The first working area is located north of Helgoland. In this area pockmarks were described for the first time in 2015 by Krämer et al. (2017). The second working area is located south of Helgoland in the "Helgoland Mud Area". In general, the proposed working areas differ in their sediment composition and total organic carbon (TOC) content. In WA1 we expect sandy sediments with high permeability and low TOC content. WA 2 in contrast is rather marked by clayey sediments with a low permeability but with a higher TOC content.

Specific project objectives are:

- What are the local variations of the TOC content of areas with pockmarks compared to areas without pockmarks on the Helgoland Reef?
- What are the concentrations of dissolved gasses e.g. CO₂ or CH₄ in the pore fluids and can we observe a regional heterogeneity of areas with pockmarks compared to areas without pockmarks?
- What are the hydraulic properties (e.g. permeability) of the sediments? Can we determine the efficiency of leakage pathways for fluid (water, methane) transfer?
- Do pockmarks correlate with paleo-channels (tunnel valleys) or local depocenters?
- How do these pockmarks evolve over time?

The planned investigations in both working areas include a high-resolution mapping of the study area as well as a targeted geochemical sampling of sediments and pore water. From the data obtained, we can deduce how dissolved gases are distributed locally in the sediments and determine spatial changes. Together with land-based laboratory studies of permeability, we expect to gain insights into the formation and occurrence of wave-induced pockmarks in the North Sea.

These findings are essential to understand if and how often such pockmarks can be generated and reactivated, thus allowing a better assessment of possible hazards for offshore structures.

Narrative

After a 10-day quarantine for all cruise participants in a hotel in Varel and three negative COVID-19 tests we were allowed to embark the R/V MARIA S. MERIAN on Thursday, March 25, in Emden. In the afternoon, we immediately started setting up the laboratories. On Friday, March 26, R/V MARIA S. MERIAN left at 08:30 the port of Emden and after an 8-hour long transit we reached our first working area (WA 1) in the German Bight, North Sea, north of Helgoland. Immediately upon reaching the work area, the recording of the hydroacoustic data started. On the first station a CTD-Rosette was deployed to generate a sound velocity profile (SVP) and test CH₄, CO₂ and N₂ sensors. We then conducted a calibration survey for the hydroacoustic systems over a ship wreck. On the following night a regional hydroacoustic survey was planned to get an overview about the working area, and find pockmarks and to identify possible sediment sampling locations for the next days.

Due to sediment properties gravity coring is a challenging task in the area. Over the night we identified 5 coring stations where the deployment of the gravity corer and a Van-Veen grab was planned for Saturday, March 27. However, gravity coring was not that successful but we could take the first sediment samples from the seafloor surface with the Van-Veen grab. In the afternoon another CTD rosette was deployed in an area where many pockmarks are present. During the night a detailed hydroacoustic survey of a region where many pockmarks were found the night before, was planned.

Following on the next morning (Sunday, March 28) we planned 6 sediment coring stations. Additional to the gravity core deployments we also used the Mini-MUC. We received successfully sediment samples from four Mini-MUCs and four Van-Veen grab samples, from different pockmarks. After the sediment sampling campaign finished we started in the following night with mapping of the south western part of our WA 1.

On Monday, March 29, we started with another CTD-Rosette cast above a pockmark. For sediment sampling we planned for the day a transect from an area with thousands of pockmarks to an area with no pockmarks to an area again with thousands of pockmarks. The goal was to understand the differences of the areas with to areas without pockmarks. The deployment of 8 successful Mini-MUCs was followed in the afternoon by four CTD-Rosette casts in the southern part of WA1. We then began the short transit from WA1 to WA 2. The following night was used for a hydroacoustic survey in WA2. In WA2 no pockmarks could be found, as expected.

The next morning (March 30) started with CTD-Rosette cast in order to get a new sound velocity profile as this area is influenced by the fresh water inflow from the river Elbe. This was followed by two Mini MUC and two Gravity Core deployments in the western and eastern part of the WA. Dissolved gas concentrations are higher in WA2 compared to WA1 indicated by a high total alkalinity. Also, sediment properties are different here. Sediments are composed of clayey material rather than sandy sediments in the north. Afterwards, mapping of WA2 continued, while starting the transit late evening back to WA1.

North of Helgoland we identified again an area where gravity coring could be possible in WA1. On Wednesday, March 31, we successfully deployed four gravity cores, always followed by Mini-MUC deployments over a paleo valley north of Helgoland. This success allows us to better understand whether pockmarks are tied to the paleo valleys.

In the afternoon we started our transit to the northern part of WA1 passing by R/V HEINCKE on their way back to Bremerhaven. The northern part of WA1 partly overlaps with the Natura 2000 marine protection area "Sylter Auseriff". Here we had to turn off the Multibeam system. We could only continue mapping then with the Parasound system. The Parasound survey took about 18 hours.

In the afternoon of Thursday, April 1, we deployed several Mini-MUCs in the northern part of WA 1. In the most north western part we also tried to deploy a gravity core. But sediments did not allow a successful recovery.

Over the next night we continued Parasound mapping in the most eastern part of WA1, east of the wind farms Amrumbank West, Nordsee Ost and Meerwind Süd/ost and still in the marine protection area.

The next day, April 2, started with a successful deployment of the gravity core in a paleo valley. After a short transit through the windfarms we deployed the Mini MUC three times in an area where the seafloor was covered by thousands of pockmarks south of the wind farm Meerwind Süd/Ost. During the following night we did a high-resolution mapping with Multibeam system which was allowed to be used again. On the next morning, April 3, we started a transit to WA2 at 6 am. Here we deployed successfully the gravity core and Mini-MUC again. The goal of the additional deployments here was to understand why no pockmarks occur in the area where high concentrations of dissolved gases are present. After 4 hours we left WA2 again for a short transit to WA1. Here we wanted to take more sediment samples in Pockmarks which were mapped the night before. In the afternoon we reached our first station and deployed three Mini-MUCs. With this we have finished our sedimentological and geochemical work program. Afterwards packing of the equipment started immediately.

Scientific work continued with a Multibeam survey for the next 30 hours but had to stop on Sunday morning, April 4, at 10 am due to bad weather conditions. We then decided to start our transit back to Emden where the cruise ended on Sunday evening, April 4.

Acknowledgements

The scientific crew of MSM99/2 (GPF 21-1_013) would like to thank Captain Ralf Schmidt and his crew for their excellent support during the cruise and the great working atmosphere on board R/V MARIA S. MERIAN. We are also thankful for the great support of the Leitstelle Deutsche Forschungsschiffe (Universität Hamburg) and the Gutachterpanel Forschungsschiffe (GPF). The cruise was funded by the German Research Foundation (DFG).

Teilnehmerliste

1. Christopher Schmidt	Chief Scientist	GEOMAR
2. Christoph Böttner	Co-Chief Scientist/Hydroacoustics	CAU
3. Marie Lindner	Hydroacoustics	CAU
4. Anette Hunkemöller	Hydroacoustics	CAU
5. Frieda Müller	Hydroacoustics	CAU
6. Mark Schmidt	CTD/ Geochemistry	GEOMAR
7. Thomas Müller	CTD/ Geochemistry	GEOMAR
8. Timo Spiegel	CTD/ Geochemistry	GEOMAR
9. Tim Willems	Sedimentology	CAU
10. Anna Wünsche	Sedimentology	CAU/BAW

Institutes

GEOMAR	- Helmholtz Centre for Ocean Research Kiel
CAU	- Christian-Albrechts University Kiel
BAW	- Bundesanstalt für Wasserbau

Stationsliste

Activity	Device	Area	Date	Time (UTC)	Lat.	Long.	Water Depth (m)
MSM99/2_1-1	CTD1	WA1	26.03.2021	16:27:12	54° 25,990' N	007° 25,644' E	28,3
MSM99/2_2-1	EM712	WA1	26.03.2021	17:15:14	54° 25,978' N	007° 25,652' E	28,3
MSM99/2_2-2	Parasound	WA1	26.03.2021	17:15:14	54° 25,978' N	007° 25,652' E	28,3
MSM99/2_3-1	EM712	WA1	26.03.2021	18:59:24	54° 26,031' N	007° 25,777' E	29,3
MSM99/2_3-2	Parasound	WA1	26.03.2021	18:59:24	54° 26,031' N	007° 25,777' E	29,3
MSM99/2_4-1	GC 1	WA1	27.03.2021	07:08:07	54° 27,027' N	007° 23,337' E	30,3
MSM99/2_4-2	GC2	WA1	27.03.2021	07:18:23	54° 27,027' N	007° 23,337' E	29,8
MSM99/2_4-3	GC3	WA1	27.03.2021	07:32:28	54° 27,032' N	007° 23,320' E	30,2
MSM99/2_4-4	VGRAB1	WA1	27.03.2021	07:46:30	54° 27,027' N	007° 23,336' E	30,1
MSM99/2_4-5	GC4	WA1	27.03.2021	08:09:31	54° 27,027' N	007° 23,338' E	30,3
MSM99/2_4-6	GC5	WA1	27.03.2021	08:28:11	54° 26,994' N	007° 23,397' E	30,5
MSM99/2_4-7	VGRAB2	WA1	27.03.2021	08:43:17	54° 26,994' N	007° 23,399' E	30,8
MSM99/2_5-1	GC6	WA1	27.03.2021	09:13:28	54° 27,092' N	007° 23,094' E	31,3
MSM99/2_5-2	GC7	WA1	27.03.2021	09:21:47	54° 27,092' N	007° 23,094' E	31,1
MSM99/2_5-3	VGRAB3	WA1	27.03.2021	09:28:52	54° 27,092' N	007° 23,094' E	31
MSM99/2_5-4	VGRAB4	WA1	27.03.2021	09:47:52	54° 27,103' N	007° 23,100' E	31,1
MSM99/2_5-5	GC8	WA1	27.03.2021	10:01:51	54° 27,092' N	007° 23,093' E	31
MSM99/2_6-1	GC9	WA1	27.03.2021	10:57:44	54° 27,228' N	007° 22,656' E	31,4
MSM99/2_6-2	GC10	WA1	27.03.2021	11:28:58	54° 27,292' N	007° 22,423' E	31,5
MSM99/2_7-1	GC11	WA1	27.03.2021	12:36:43	54° 30,806' N	007° 24,970' E	30,7
MSM99/2_7-2	VGRAB5	WA1	27.03.2021	12:56:45	54° 30,806' N	007° 24,972' E	29,6
MSM99/2_7-3	CTD2	WA1	27.03.2021	13:21:20	54° 30,805' N	007° 24,971' E	29,4
MSM99/2_8-1	EM712	WA1	27.03.2021	14:25:47	54° 27,792' N	007° 26,163' E	28

MSM99/2_8-2	Parasound	WA1	27.03.2021	14:25:47	54° 27,792' N	007° 26,163' E	28
MSM99/2_9-1	VGRAB6	WA1	28.03.2021	06:58:06	54° 26,120' N	007° 16,952' E	34,3
MSM99/2_9-2	GC12	WA1	28.03.2021	07:19:42	54° 26,121' N	007° 16,951' E	34,6
MSM99/2_9-3	MIC1	WA1	28.03.2021	07:46:07	54° 26,121' N	007° 16,952' E	34,8
MSM99/2_10-1	VGRAB7	WA1	28.03.2021	09:09:28	54° 25,182' N	007° 14,466' E	38
MSM99/2_10-2	GC13	WA1	28.03.2021	09:26:27	54° 25,182' N	007° 14,465' E	37,6
MSM99/2_10-3	GC14	WA1	28.03.2021	09:59:45	54° 25,182' N	007° 14,467' E	37,6
MSM99/2_10-4	MIC2	WA1	28.03.2021	10:20:00	54° 25,182' N	007° 14,468' E	37,1
MSM99/2_11-1	VGRAB8	WA1	28.03.2021	11:02:33	54° 26,751' N	007° 12,333' E	40,3
MSM99/2_11-2	MIC3	WA1	28.03.2021	11:21:04	54° 26,750' N	007° 12,328' E	41,2
MSM99/2_11-3	GC15	WA1	28.03.2021	12:03:03	54° 26,751' N	007° 12,333' E	39,4
MSM99/2_11-4	CTD3	WA1	28.03.2021	12:33:27	54° 26,750' N	007° 12,327' E	38,7
MSM99/2_12-1	VGRAB9	WA1	28.03.2021	13:37:37	54° 31,488' N	007° 18,748' E	46,6
MSM99/2_12-2	GC16	WA1	28.03.2021	13:57:42	54° 31,488' N	007° 18,749' E	33,1
MSM99/2_12-3	MIC4	WA1	28.03.2021	14:14:02	54° 31,488' N	007° 18,749' E	32,3
MSM99/2_13-1	EM712	WA1	28.03.2021	14:38:17	54° 31,629' N	007° 18,348' E	32,4
MSM99/2_13-2	Parasound	WA1	28.03.2021	14:38:17	54° 31,629' N	007° 18,348' E	32,4
MSM99/2_14-1	CTD4	WA1	29.03.2021	06:22:03	54° 27,792' N	007° 22,601' E	29,2
MSM99/2_14-2	MIC5	WA1	29.03.2021	06:49:51	54° 27,791' N	007° 22,598' E	29,5
MSM99/2_14-3	MIC6	WA1	29.03.2021	07:28:39	54° 27,792' N	007° 22,597' E	28,7
MSM99/2_15-1	MIC7	WA1	29.03.2021	08:04:12	54° 27,799' N	007° 22,581' E	30,4
MSM99/2_16-1	MIC8	WA1	29.03.2021	08:50:16	54° 28,039' N	007° 21,887' E	29,4
MSM99/2_16-2	MIC9	WA1	29.03.2021	10:05:02	54° 28,040' N	007° 21,888' E	30,1
MSM99/2_17-1	MIC10	WA1	29.03.2021	10:32:46	54° 28,319' N	007° 20,877' E	32,6
MSM99/2_18-1	MIC11	WA1	29.03.2021	11:25:02	54° 28,332' N	007° 20,861' E	30,8
MSM99/2_18-2	MIC12	WA1	29.03.2021	12:02:47	54° 28,330' N	007° 20,860' E	32,7
MSM99/2_19-1	EM712	WA1	29.03.2021	13:18:00	54° 23,369' N	007° 20,599' E	31,7
MSM99/2_19-2	Parasound	WA1	29.03.2021	13:18:00	54° 23,369' N	007° 20,599' E	31,7
MSM99/2_20-1	CTD5	WA1	29.03.2021	13:47:24	54° 22,055' N	007° 23,494' E	31,8
MSM99/2_21-1	CTD6	WA1	29.03.2021	14:48:35	54° 19,872' N	007° 28,146' E	32,2

MSM99/2_22-1	CTD7	WA1	29.03.2021	15:58:00	54° 17,496' N	007° 33,210' E	38,2
MSM99/2_23-1	CTD8	WA 2	30.03.2021	06:07:47	54° 03,089' N	008° 00,603' E	28,5
MSM99/2_23-2	MIC13	WA 2	30.03.2021	06:37:23	54° 03,091' N	008° 00,606' E	28,1
MSM99/2_23-3	GC17	WA 2	30.03.2021	08:10:59	54° 03,090' N	008° 00,596' E	29,5
MSM99/2_24-1	EM712	WA 2	30.03.2021	08:25:00	54° 03,140' N	008° 00,537' E	29,3
MSM99/2_24-2	Parasound	WA 2	30.03.2021	08:25:00	54° 03,140' N	008° 00,537' E	29,3
MSM99/2_25-1	MIC14	WA 2	30.03.2021	13:38:50	54° 06,769' N	008° 07,504' E	23,1
MSM99/2_25-2	GC18	WA 2	30.03.2021	14:45:21	54° 06,770' N	008° 07,497' E	22,3
MSM99/2_26-1	EM712	WA 2	30.03.2021	15:22:23	54° 06,765' N	008° 07,507' E	22,1
MSM99/2_26-2	Parasound	WA 2	30.03.2021	15:22:23	54° 06,765' N	008° 07,507' E	22,1
MSM99/2_27-1	MIC15	WA1	31.03.2021	07:19:01	54° 22,640' N	007° 48,232' E	24
MSM99/2_28-1	EM712	WA1	31.03.2021	07:30:30	54° 22,638' N	007° 48,234' E	24,2
MSM99/2_28-2	Parasound	WA1	31.03.2021	07:30:30	54° 22,638' N	007° 48,234' E	24,2
MSM99/2_29-1	CTD9	WA1	31.03.2021	08:48:03	54° 21,868' N	007° 50,173' E	24
MSM99/2_29-2	MIC16	WA1	31.03.2021	09:07:34	54° 21,874' N	007° 50,200' E	24,3
MSM99/2_29-3	GC19	WA1	31.03.2021	10:04:56	54° 21,871' N	007° 50,203' E	24,7
MSM99/2_29-4	GC20	WA1	31.03.2021	10:24:13	54° 21,874' N	007° 50,203' E	25,2
MSM99/2_29-5	GC21	WA1	31.03.2021	11:09:43	54° 22,057' N	007° 50,611' E	25,4
MSM99/2_29-6	GC22	WA1	31.03.2021	12:49:51	54° 22,057' N	007° 50,608' E	25,8
MSM99/2_29-7	MIC17	WA1	31.03.2021	14:11:35	54° 22,551' N	007° 51,552' E	25,7
MSM99/2_30-2	EM712	WA1	31.03.2021	14:29:42	54° 22,523' N	007° 51,774' E	24,6
MSM99/2_30-1	Parasound	WA1	31.03.2021	14:29:42	54° 22,523' N	007° 51,774' E	24,6
MSM99/2_31-1	CTD10	WA1	01.04.2021	10:15:01	54° 39,452' N	007° 33,686' E	24,8
MSM99/2_31-2	MIC18	WA1	01.04.2021	10:34:37	54° 39,404' N	007° 33,697' E	25,4
MSM99/2_32-1	Parasound	WA1	01.04.2021	10:40:00	54° 39,404' N	007° 33,698' E	24,2
MSM99/2_33-1	MIC19	WA1	01.04.2021	12:17:19	54° 34,683' N	007° 26,709' E	30,1
MSM99/2_33-2	MIC20	WA1	01.04.2021	12:29:51	54° 34,682' N	007° 26,710' E	28,6
MSM99/2_34-1	Parasound	WA1	01.04.2021	12:44:30	54° 34,711' N	007° 26,577' E	30,3
MSM99/2_35-1	MIC21	WA1	01.04.2021	15:11:13	54° 38,782' N	007° 01,712' E	37,9
MSM99/2_35-2	VGRAB10	WA1	01.04.2021	15:27:41	54° 38,782' N	007° 01,713' E	38

MSM99/2_36-1	Parasound	WA1	01.04.2021	15:37:38	54° 38,835' N	007° 01,635' E	37,5
MSM99/2_37-1	MIC22	WA1	01.04.2021	16:23:56	54° 36,179' N	007° 02,286' E	42,3
MSM99/2_37-2	GC23	WA1	01.04.2021	16:46:09	54° 36,182' N	007° 02,283' E	41,7
MSM99/2_37-3	GC24	WA1	01.04.2021	17:00:38	54° 36,182' N	007° 02,283' E	41,4
MSM99/2_38-1	MIC23	WA1	02.04.2021	07:06:22	54° 24,201' N	007° 51,264' E	22,9
MSM99/2_38-2	GC25	WA1	02.04.2021	07:35:52	54° 24,130' N	007° 51,276' E	22,5
MSM99/2_39-1	Parasound	WA1	02.04.2021	07:52:00	54° 24,155' N	007° 51,468' E	22,1
MSM99/2_40-1	GC26	WA1	02.04.2021	08:36:27	54° 22,865' N	007° 55,739' E	22,2
MSM99/2_41-1	Parasound	WA1	02.04.2021	08:51:00	54° 22,879' N	007° 55,731' E	21,8
MSM99/2_42-1	MIC24	WA1	02.04.2021	10:01:31	54° 28,999' N	007° 52,972' E	20,2
MSM99/2_43-1	Parasound	WA1	02.04.2021	10:13:51	54° 28,998' N	007° 52,970' E	20,8
MSM99/2_43-2	EM712	WA1	02.04.2021	10:50:03	54° 29,108' N	007° 46,994' E	22,6
MSM99/2_44-1	CTD11	WA1	02.04.2021	12:17:02	54° 27,026' N	007° 36,481' E	27,3
MSM99/2_44-2	MIC25	WA1	02.04.2021	12:35:58	54° 27,027' N	007° 36,480' E	26,5
MSM99/2_45-1	EM712	WA1	02.04.2021	12:53:03	54° 27,027' N	007° 36,481' E	27
MSM99/2_45-2	Parasound	WA1	02.04.2021	12:53:03	54° 27,027' N	007° 36,481' E	27
MSM99/2_46-1	MIC26	WA1	02.04.2021	13:19:26	54° 25,841' N	007° 34,558' E	28
MSM99/2_46-2	MIC27	WA1	02.04.2021	13:36:05	54° 25,842' N	007° 34,558' E	29,3
MSM99/2_47-1	EM712	WA1	02.04.2021	13:52:41	54° 25,840' N	007° 34,554' E	28,5
MSM99/2_47-2	Parasound	WA1	02.04.2021	13:52:41	54° 25,840' N	007° 34,554' E	28,5
MSM99/2_48-1	MIC28	WA1	02.04.2021	14:23:48	54° 24,235' N	007° 31,641' E	28,7
MSM99/2_48-2	MIC29	WA1	02.04.2021	14:36:06	54° 24,235' N	007° 31,641' E	29
MSM99/2_49-1	EM712	WA1	02.04.2021	15:25:14	54° 19,753' N	007° 36,314' E	29,6
MSM99/2_49-2	Parasound	WA1	02.04.2021	15:25:14	54° 19,753' N	007° 36,314' E	29,6
MSM99/2_50-1	EM712	WA2	03.04.2021	04:05:49	54° 18,555' N	007° 35,903' E	33,3
MSM99/2_50-2	Parasound	WA2	03.04.2021	04:05:49	54° 18,555' N	007° 35,903' E	33,3
MSM99/2_51-1	MIC30	WA2	03.04.2021	06:06:56	54° 05,007' N	007° 58,038' E	32,9
MSM99/2_51-2	GC27	WA2	03.04.2021	07:09:12	54° 05,009' N	007° 58,039' E	32,7
MSM99/2_51-3	GC28	WA2	03.04.2021	07:37:56	54° 05,003' N	007° 58,035' E	33,3
MSM99/2_52-1	EM712	WA2	03.04.2021	07:58:30	54° 05,074' N	007° 58,158' E	32,5

MSM99/2_52-1	Parasound	WA2	03.04.2021	07:58:30	54° 05,074' N	007° 58,158' E	32,5
MSM99/2_53-1	MIC31	WA 2	03.04.2021	08:55:18	54° 05,705' N	008° 04,385' E	23,7
MSM99/2_54-2	EM712	WA 2	03.04.2021	09:14:00	54° 05,971' N	008° 04,186' E	23,6
MSM99/2_54-1	Parasound	WA 2	03.04.2021	09:14:00	54° 05,971' N	008° 04,186' E	23,6
MSM99/2_55-1	MIC32	WA1	03.04.2021	11:51:52	54° 19,675' N	007° 39,605' E	29,1
MSM99/2_56-1	MIC33	WA1	03.04.2021	12:32:50	54° 19,668' N	007° 39,586' E	29,6
MSM99/2_56-2	MIC34	WA1	03.04.2021	12:46:02	54° 19,668' N	007° 39,586' E	30,1
MSM99/2_57-1	MIC35	WA1	03.04.2021	13:29:34	54° 19,662' N	007° 39,573' E	30,1
MSM99/2_58-1	EM712	WA1	03.04.2021	13:52:06	54° 19,650' N	007° 39,793' E	30,1
MSM99/2_58-2	Parasound	WA1	03.04.2021	13:52:06	54° 19,650' N	007° 39,793' E	30,1
MSM99/2_59-1	EM712	WA1	03.04.2021	17:11:53	54° 19,222' N	007° 41,107' E	28,1
MSM99/2_59-2	Parasound	WA1	03.04.2021	17:11:53	54° 19,222' N	007° 41,107' E	28,1
MSM99/2_60-1	EM712	WA1	03.04.2021	18:26:45	54° 25,585' N	007° 36,722' E	26,2
MSM99/2_60-2	Parasound	WA1	03.04.2021	18:26:45	54° 25,585' N	007° 36,722' E	26,2
MSM99/2_61-1	EM712	WA1	04.04.2021	00:24:30	54° 28,717' N	007° 36,126' E	25,2
MSM99/2_61-2	Parasound	WA1	04.04.2021	00:24:30	54° 28,717' N	007° 36,126' E	25,2
MSM99/2_62-1	EM712	WA1	04.04.2021	01:16:00	54° 27,842' N	007° 26,271' E	27,8
MSM99/2_62-2	Parasound	WA1	04.04.2021	01:16:00	54° 27,842' N	007° 26,271' E	27,8
MSM99/2_63-2	EM712	WA1	04.04.2021	07:55:00	54° 27,808' N	007° 26,638' E	27,4
MSM99/2_63-1	Parasound	WA1	04.04.2021	07:55:00	54° 27,808' N	007° 26,638' E	27,4