

# Investigating the Underwater Archaeological potential of the Danish Trade Monopoly Period – Grundarfjörður Trade Port 2023

Results of a side-scan sonar survey and target inspection



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Minjastofnun Íslands rannsóknarleyfið: **202303-0133**  
Survey No: **3169**  
November 2023

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## Summary

During a 5-day period in late August, early September 2023, marine archaeologists Dr Kevin Martin, Jens Lindström Nordic Maritime Group (NMG) and Dr Philipp Grassel (German Maritime Museum) carried out a non-invasive side-scan sonar survey within Grundarfjörður bay followed up by a series of underwater archaeological inspection dives on selected sonar targets. The project was funded by a research grant from the Forminjasjóður 2023 fund under the research permit number **202303-0133**. The survey number for the project is **3169**. The aim of the project was to identify potential underwater archaeological features and any cultural heritage deposits connected with the historic use of the bay as a trade port during the Danish Trade Monopoly Period 1602-1787. The side-scan survey was conducted over 3-days from an inflatable zodiac boat towing a sonar fish behind along overlapping transects parallel with the coastline. A total area of approximately 4.6km<sup>2</sup> was side-scan sonar surveyed with a depth range recorded of 3-30m. A total of 61 submerged sonar targets were initially identified and 13 of these were further examined by archaeological dive inspections. This report summarises the results of their inspection. Only one inspected target M230829\_26 proved to be of cultural significance. Archaeological inspection diving was carried out over 2-days from an inflatable zodiac during mostly dry but windy weather.

## Íslensk samantekt

Yfir fimm daga tímabil, í lok ágúst og byrjun september 2023, framkvæmdu neðansjávarfor-nleifafræðingarnir Dr. Kevin Martin, Jens Lindström (Nordic Maritime Group NMG) og Dr. Philipp Grassel (German Maritime Museum) óraskandi hliðarsónarskönnun *e. Side-scan sonar survey* í Grundarfirði ásamt nokkrum sérvöldum neðansjávar könnunarköfunum. Verkefnið var fjármagnað með rannsóknarstyrk úr Fornminjasjóði 2023, rannsóknarleyfisnúmer **202303-0133**. Rannsóknarnúmer vegna verkefnisins er **3169**. Markmið verkefnisins var að greina mögulegar fornleifar neðansjávar og mögulegan menningarsögulegan arf í tengingu við sögu svæðisins sem viðskiptahöfn á tímum dönsku einokunarverslunarinnar 1602-1787. Hliðarsónarskönnunin var framkvæmd yfir þrjá daga úr uppblásnum zodiac gúmmibát sem dró á eftir sér skannann eftir ákveðnum leiðum sem eru samsíða strandlengjunni. Alls var um 4.6 km<sup>2</sup> svæði skannað á 3-30 m dýpi. Alls fundust 61 einkenni *e. submerged sonar targets* þar af voru 13 skoðuð nánar með rannsóknarköfun. Í þessari skýrslu er samantekt frá þeim köfunum. Aðeins eitt einkenni M230829\_26 reyndist hafa menningarsögulegt gildi. Neðansjávarfornleifarannsóknin var framkvæmd yfir tveggja daga tímabil, að mestu leiti í þurrum aðstæðum en vindasömum.



## Side-scan survey location and historical background

The following sections summarises the results of the side-scan sonar survey and also provides essential context and historical background information from which the diving inspections were based on. Grundarfjörður is located along the northern coast of the Snæfellsnes Peninsula in the western part of Iceland (Figure 1, 2). The survey was concentrated in the area directly outside of and to the north and east of the modern harbour of Grundarfjörður and more specifically focused within the vicinity of the former Danish trade port located at Grundarkampur approximately 2.5km east of the modern town of Grundarfjörður and its surrounding coastline (Figure 2). Though it was a trade port since the beginning of the trade monopoly in 1602, in 1786, Grundarfjörður received an official royal town charter status (*kaupstaðir*).

There are a number of historic references to ships wrecking within and near to Grundarfjörður over the last 300yrs. A French whaling ship which was subsequently the subject of a long-protracted court case ran aground at Melrakkaey in the summer of 1720. The crew managed to rescue the ship but it then ran aground again and wrecked under Kirkjufell. Additionally, in November of 1720 according to Hvammsannáll, four ships wrecked at Vatnabúðir and a French sloop wrecked at Krossanes in bad weather (Guðmundsson 2002)

Today the town of Grundarfjörður comprises a rural community with a population of approximately 900 people and a large working modern harbour area with a large active fishing fleet. The harbour area has been significantly developed, expanded and likely repeatedly dredged during the 20<sup>th</sup> century. Gravel extraction has also taken place periodically during the 20<sup>th</sup> century in the bay. Today tourism including the frequent arrival of large cruise boats which anchor in the bay during the summer months plays an important role for the economics of the town. The centre point GPS coordinates of the survey area was 64.927219, -23.229433 (64° 55.633'N, 23° 13.766'W), ISN93: 300097, 498575. This area was targeted primarily as it was determined based on a review of the historical maps and sources to be the most likely area to contain potential underwater archaeological remains connected with the historic use of bay particularly around the site of Grundarkampur (Martin 2022). Surveying this area would also allow for an archaeological assessment of the most frequently utilised areas of the port today by modern fishing and cruise boat traffic and better determine potential risks and impacts to submerged archaeological features.

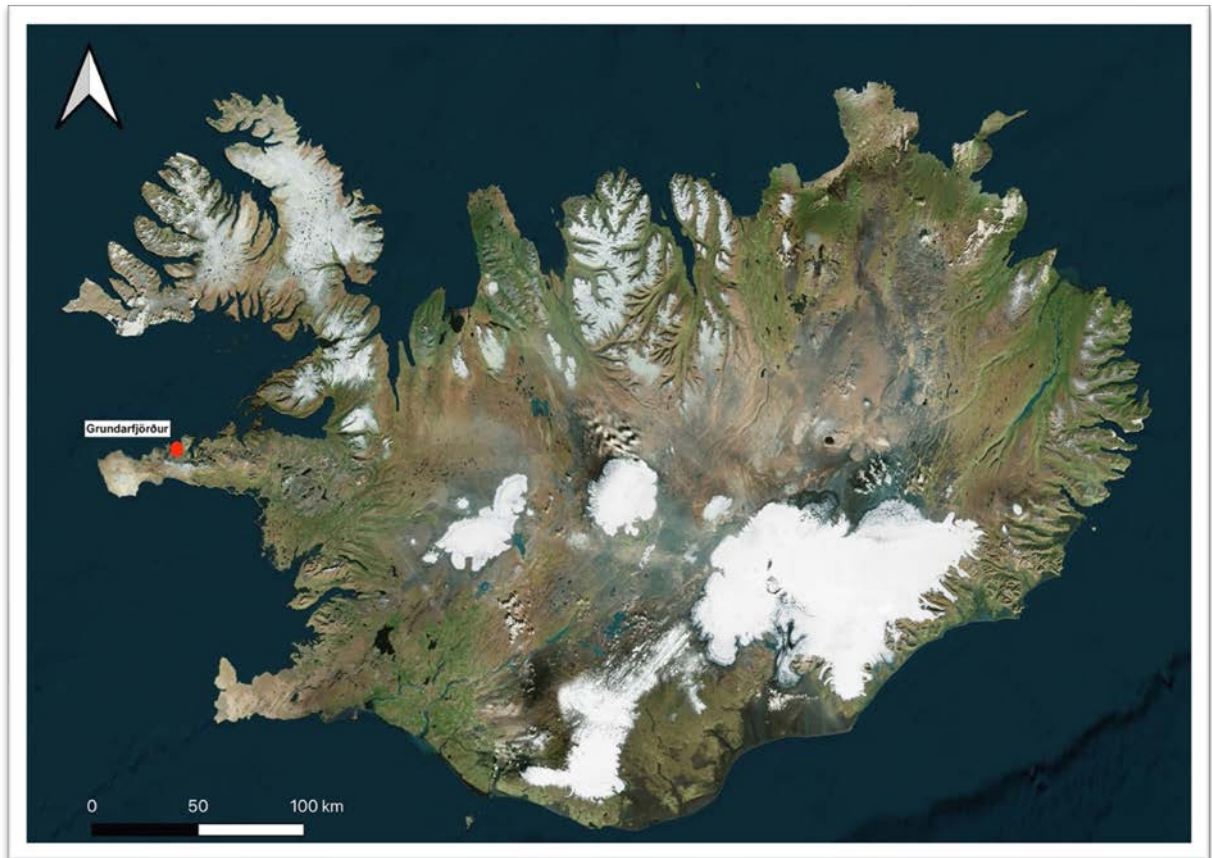


Figure 1. Side-scan survey and dive inspection location at Grundarfjörður (red dot) (Google basemap/KM 2023)



Figure 2. Side-scan sonar mosaic showing area of the survey in Grundarfjörður and the location of Grundarkampur trade station (JL /KM 2023)



### Grundarfjörður (Grundarkampur)

This section provides some background to the Grundarkampur trade station which is a protected *fríðlýst* site Nr. **37001501**. In 1998, Bjarni F. Einarsson carried out a preliminary archaeological registration of the visible remains at Grundarkampur which extended over an area of 300m x 80m (Einarsson 1998). Einarsson (ibid.) noted that the visible ruins most likely represented evidence from several phases of activity at the site in addition to its use as a Danish trade port. During the mid-19th century, French immigrants built a saltfish processing plant, a church and a hospital at the site (Kristjánsdóttir, 2000). It is therefore highly likely that some of the remains visible today relate to this activity. In 2001, prior to the installation of a visitor information panel, a survey was carried out by Guðmundur Ólafsson and Magnus A. Sigurðsson of the above-ground remains at the site (Ólafsson / Sigurðsson 2001). Most of the features recorded on the site clustered in the northern part of it. These consisted of rectangular and linear features, some up to 0.60m in height, which were interpreted to be the remains of walls and rooms from former structures at the site.

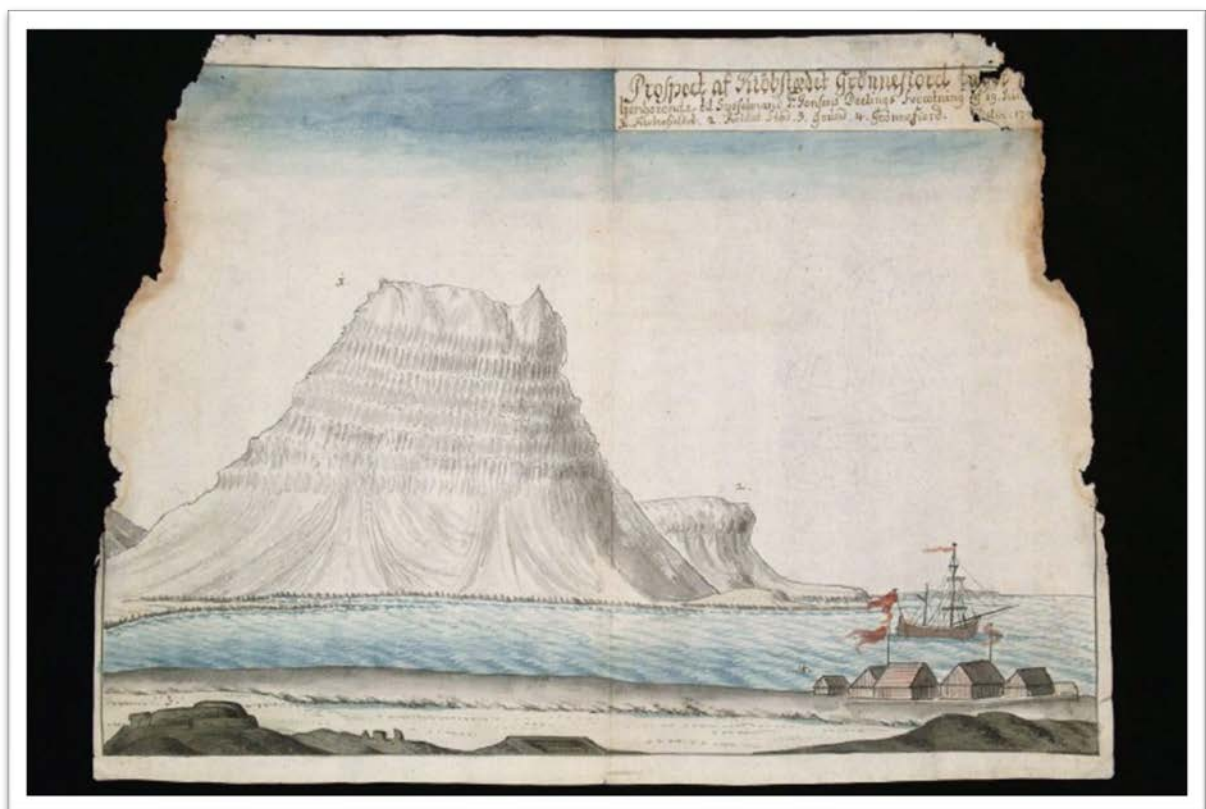


Figure 3. Sketch of the trade station at Grundarkampur in Grundarfjörður by Sæmundur Hólm from 1792. The perspective looks to the west towards Kirkjufell mountain and shows a visiting merchant ship likely at anchor. (Þjóðskjalasafn Íslands, Reykjavík, Drawing Collection 5/5)

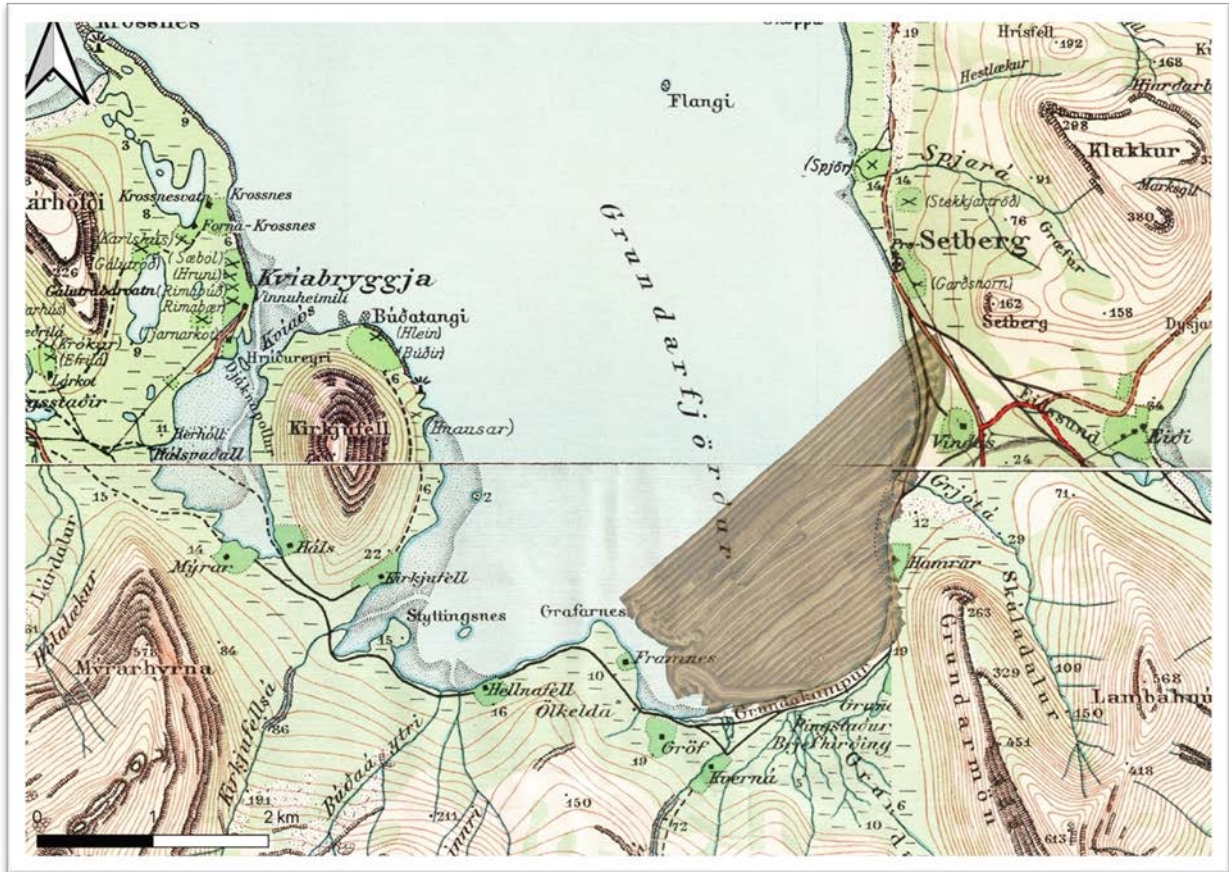


Figure 4. The side-scan sonar mosaic overlaid on the Herforingjaráðskort (1905-1915) (Landmælingar Íslands)



Figure 5. Painting by W. G. Collingwood 1897 of Grundarkampur and Kirkjufell (Collingwood 1897)



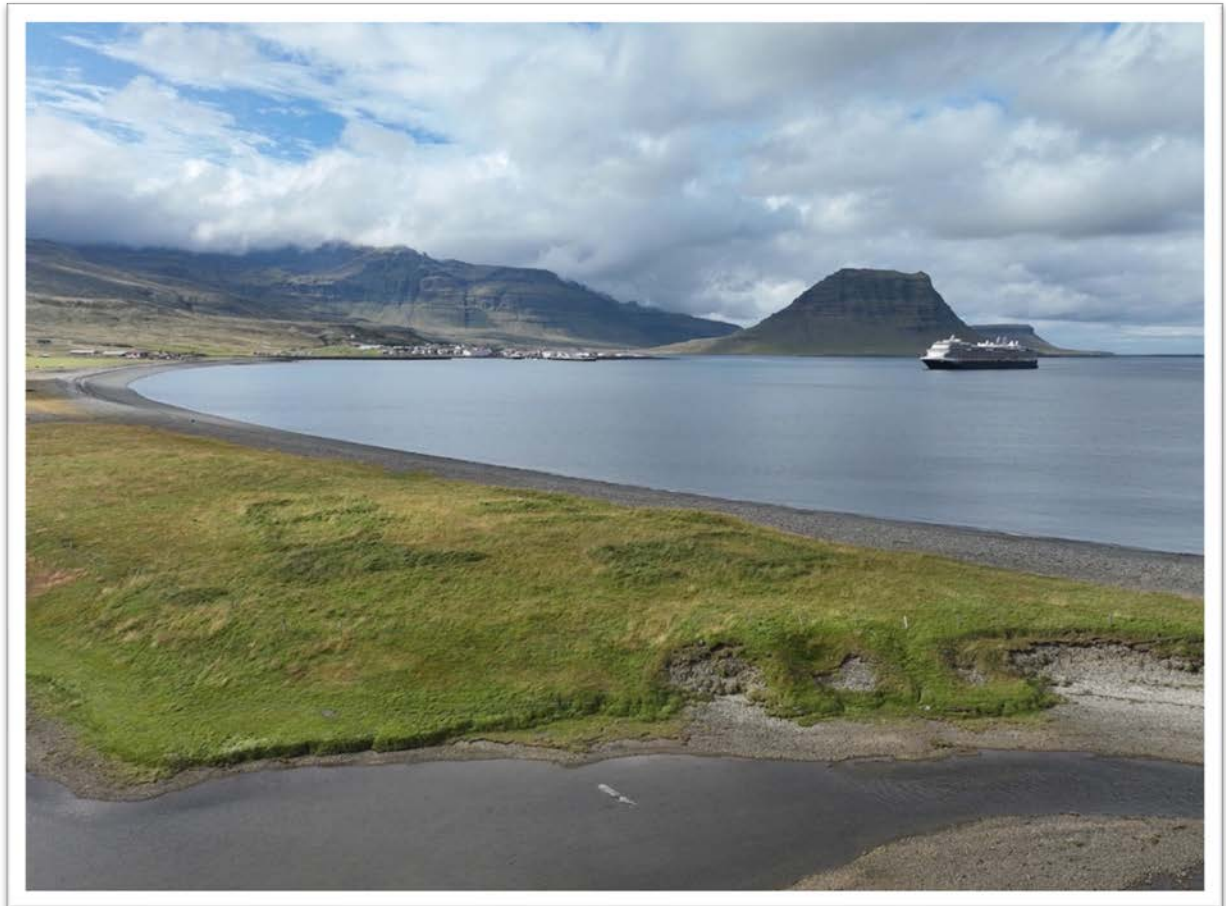


Figure 6. View today west over the ruins of the trade station at Grundarkampur towards the modern town of Grundarfjörður (KM 2023)

## Technical information

The side-scan sonar used for the Grundarfjörður survey was manufactured by DeepVision AB. The model of the sonar is LE340 (Little Eye, 340-680kHz) and for depth recording a DeepVision depth logger was used. The sonar was suspended from the boat between 1 and 5m underwater depending on the depth of the seabed below. The sonar range used during the survey was 150 meters (2x75 meters). For geographical positioning a Bluetooth GPS - Qstarz BT- Q818XT- was used which has an accuracy of approximately 3 meters.



## Side-scan target inspection results



Figure 7. Location of sonar targets and archaeological inspection Dives 1-5 (KM 2023)

Over the course of 3-days a total area of 4.6km<sup>2</sup> was side scan sonar surveyed in Grundarfjörður bay in late August, early September 2023 (Figure 7). An initial assessment of the raw sonar survey data identified 61 sonar targets of potential interest.<sup>1</sup> These are listed below in Table 1 and within an accompanying sonar survey report attached to the end of this report. The recorded maximum extent (length & width) measurement, depth and a suggested interpretation for each target are also included. A close-up sonar image of each of the targets is included in the attached sonar report. The dive target identification and selection was based on a number of factors including the regularity of the targets form, appearance, shape, projection off the seabed and the targets comparison to its immediate surroundings. Additionally sonar targets which were in close proximity to each other were prioritised during the inspection dives. This would allow the marine archaeologist diving to inspect several targets at the same time where possible during each dive. The targets which were dived are highlighted on Table 1.

<sup>1</sup> Table 1 lists 62 targets but M230831\_24 was invalid so the actual total was 61.

Target Id.	Size (m)	Depth (m)	Interpretation/Confirmation	Dive Inspection	Coordinates
M230828_3	12x5	8	Rectangular shaped structure. Could be part of a wreck or a natural formation.	Recommended in future project	64° 55.686'N, 23° 15.278'W
M230828_4	5x4	8	Possible wreck shaped angular formation. Could be part of a wreck or also a natural formation possibly part of lava flow.	Recommended in future project	64° 55.522'N, 23° 15.037'W
M230829_1	25x17	9	Pile of dumped rocks. Near to M230829_2		64° 55.664'N, 23° 15.190'W
M230829_2	25x17	9	Linear ridge. Likely natural bedrock. Near to M230829_1		64° 55.655'N, 23° 15.192'W
M230829_3	40x8	7	Long structure, may represent a bedrock ridge. Raised approx. 1m off the bottom.		64° 56.397'N, 23° 12.947'W
M230829_4	10x5	24	Vague structure present, marks evident on seabed		64° 55.968'N, 23° 14.069'W
M230829_5	60x20	3	Large kelp forest over probable natural bed rock outcrop		64° 56.900'N, 23° 12.460'W
M230829_6	7 x 3.5	9	Small isolated object. May be cultural?	Recommended in future project	64° 56.398'N, 23° 13.033'W
M230829_7	25x1.5	10	Linear bed rock structure		64° 56.337'N, 23° 610935'W
M230829_8	7x2.5	11	Possible pit feature, natural hollow		64° 56.345'N, 23° 13.188'W
M230829_9	4x2	18	Bed rock outcrop		64° 55.776'N, 23° 14.787'W
M230829_10	15x9.1	10	Rock outcrop		64° 55.811'N, 23° 15.502'W
M230829_11	150x6	12	Linear ridge, geological		64° 56.592'N, 23° 13.782'W
M230829_12	8x5	15	Linear feature, likely natural bed rock		64° 56.578'N, 23° 13.857'W
M230829_13	20x1	15	Linear feature, possibly iron chain?	Recommended in future project	64° 56.563'N, 23° 13.836'W
M230829_14	10x4	5	Linear feature, possibly cultural?	Recommended in future project	64° 57.053'N, 23° 12.702'W
M230829_15	1.5x1	11.5	Small object, possibly rock or potential cultural feature.	Recommended in future project	64° 56.889'N, 23° 12.973'W
M230829_16	9x4	16.5	Linear rock outcrop. Likely natural.		64° 56.478'N, 23° 13.657'W
M230829_17	10x4	14.5	Rock ridge, likely natural geological feature		64° 56.652'N, 23° 13.347'W
M230829_18	10x4	6	Kelp forest?		64° 56.998'N, 23° 12.654'W
M230829_19	10x4	6	Kelp forest?		64° 56.986'N, 23° 12.682'W
M230829_20	50x4	14	Linear feature / geological feature	Y, Dive 3	64° 56.629'N, 23° 12.302'W

M230829_21	8x10	15	Linear ridge, likely a geological feature		64° 56.508'N, 23° 12.703'W
M230829_22	2x0.5	14.5	Linear feature, possibly timber log or part of a wreck?	Recommended in future project	64° 56.520'N, 23° 13.684'W
M230829_23	7x30	16	Linear ridge, likely geological?		64° 56.475'N, 23° 13.624'W
M230829_24	9x9	10.4	4 features, maybe modern material dumped near harbour	Recommended in future project	64° 55.724'N, 23° 15.291'W
M230829_25	18x5	15	Linear rock ridge		64° 56.489'N, 23° 13.658'W
M230829_26	40x7	14	Linear feature/ bed rock with chain and iron patent anchor	Y, Dive 3	64° 56.634'N, 23° 13.308'W
M230829_27	5x5	9	Small unknown object inside harbour, modern garbage?, potentially cultural material?	Recommended in future project	64° 55.454'N, 23° 15.093'W
M230829_28	14x1	8	Linear feature, rock outcrop		64° 56.914'N, 23° 12.673'W
Wreck location		20	Location of possible wreck from modern Sea chart / no cultural remains evident on seabed	Y, Dive 5	64° 55.983'N, 23° 13.167'W
M230830_1	20x40	12	Rock ridge, geological feature	Y, Dive 1	64° 56.037'N, 23° 12.905'W
M230830_2	5x5	8	Rock outcrop		64° 56.008'N, 23° 12.859'W
M230831_1	15x3	11	Rock ridge		64° 55.667'N, 23° 15.201'W
M230831_2	20x10	13	Area with multiple unknown objects on the seabed	Recommended in future project	64° 56.578'N, 23° 13.300'W
M230831_3	9x5	14	Unknown object, with angular forms, may be part of a wreck	Recommended in future project	64° 55.731'N, 23° 15.286'W
M230831_4	20x8	11	Area with a number of unknown targets		64° 56.528'N, 23° 13.306'W
M230831_5	21x4	12	Linear alignment of several unknown objects		64° 56.527'N, 23° 13.316'W
M230831_6	6.5x5	5	Rock outcrop, or poss. Cultural feature.		64° 56.564'N, 23° 13.306'W
M230831_7	26x0.5	23	Unknown linear object, possibly chain or pipe	Recommended in future project	64° 55.922'N, 23° 14.099'W
M230831_8	20x1.5	8	Linear feature, possibly cultural	Recommended in future project	64° 56.202'N, 23° 12.973'W
M230831_9	10x5	20	Area of the seabed with several unknown features present	Recommended in future project	64° 55.963'N, 23° 13.541'W
M230831_10	13x9	9	Area of the seabed with several unknown features present	Recommended in future project	64° 55.452'N, 23° 14.670'W
M230831_11	8x30	5	Cultural feature? / Confirmed as natural bed rock ridge	Y, Dive 2	64° 55.408'N, 23° 14.687'W

M230831_12	8x8	20	Possibly frames from a shipwreck?	Recommended in future project	64° 55.837'N, 23° 13.732'W
M230831_13	10x10	12	Possible ballast mound / Rock outcrop	Y, Dive 1	64° 56.069'N, 23° 12.927'W
M230831_14	10x6	5	Possible ballast mound / natural bed rock outcrop	Y, Dive 2	64° 55.400'N, 23° 14.664'W
M230831_15	15x10	4	Unknown large feature likely natural rock outcrop		64° 55.359'N, 23° 14.413'W
M230831_16	8x10	8	Rock outcrop		64° 55.915'N, 23° 12.817'W
M230831_17	10x10	9	Rock outcrop	Y, Dive 1	64° 56.048'N, 23° 12.899'W
M230831_18	5x5	11	Rock outcrop	Y, Dive 1	64° 56.069'N, 23° 12.915'W
M230831_19	7x6	11	Rock outcrop	Y, Dive 1	64° 56.065'N, 23° 12.923'W
M230831_20	40x35	8	Large rock outcrop	Y, Dive 1	64° 56.046'N, 23° 12.897'W
M230831_21	12x2	9	Prominent unknown object	Recommended in future project	64° 56.018'N, 23° 12.879'W
M230831_22	10x10	11		Y, Dive 1	64° 56.042'N, 23° 12.904'W
M230831_23	25x10	6	Prominent unknown object	Recommended in future project	64° 55.409'N, 23° 14.095'W
M230831_24			Invalid target		
M230831_25	10x5	10	Bedrock geological feature		64° 56.482'N, 23° 13.211'W
M230831_26	20x7	7	Rock ridge or cultural feature?	Recommended in future project	64° 56.736'N, 23° 12.757'W
M230831_27	18x6	14	Unknown feature, possibly cultural?	Recommended in future project	64° 56.402'N, 23° 13.385'W
M230831_28	30x10	11	Unknown feature, possibly cultural?	Recommended in future project	64° 56.427'N, 23° 13.160'W
Gravel pits	30x30	20	Gravel extraction pits/ no evidence of cultural remains	Dive 4	64° 55.350'N, 23° 13.380'W

Table 1. Summary of the identified side-scan sonar targets from the Grundarfjörður survey. The targets highlighted in red are those which are of potential archaeological interest and are recommended for further inspection

## Archaeological diving inspection results

Following the assessment of the side-scan sonar survey results, five archaeological inspection dives were carried out in Grundarfjörður over the course of two days in September 2023. The following targets of potential archaeological interest were examined during each of the dives.

Dive 1: M230830\_1, M230831\_13, M230831\_17, M230831\_18, M230831\_19, M230831\_20, M230831\_22

Dive 2: M230831\_11, M230831\_14

Dive 3: M230829\_20, M230829\_26

Dive 4: Location of gravel extraction pits<sup>2</sup>

Dive 5: Wreck site location marked on the modern sea chart and the site of historic anchorage marked on a French sea chart of Grundarfjörður from 1888

### Archaeological Inspection Dive 1

Diving Marine Archaeologists: Dr Kevin Martin, Dr Philipp Grassel

Boat Support: Jens Lindström

Date: 01 Sept, 2023, Dive Time: 50mins, Visibility: 5-8m, Depth: 8-12m

Targets examined: M230830\_1, M230831\_13, M230831\_17, M230831\_18, M230831\_19, M230831\_20, M230831\_22

Coordinates: 64° 56.037'N, 23° 12.905'W, 64° 56.069'N, 23° 12.927'W, 64° 56.048'N, 23° 12.899'W, 64° 56.069'N, 23° 12.915'W, 64° 56.065'N, 23° 12.923'W, 64° 56.042'N, 23° 12.904'W

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<sup>2</sup> The project team were informed by a number of locals that remains of a historic wreck had been uncovered during the mid-20th century during gravel extraction in the bay.



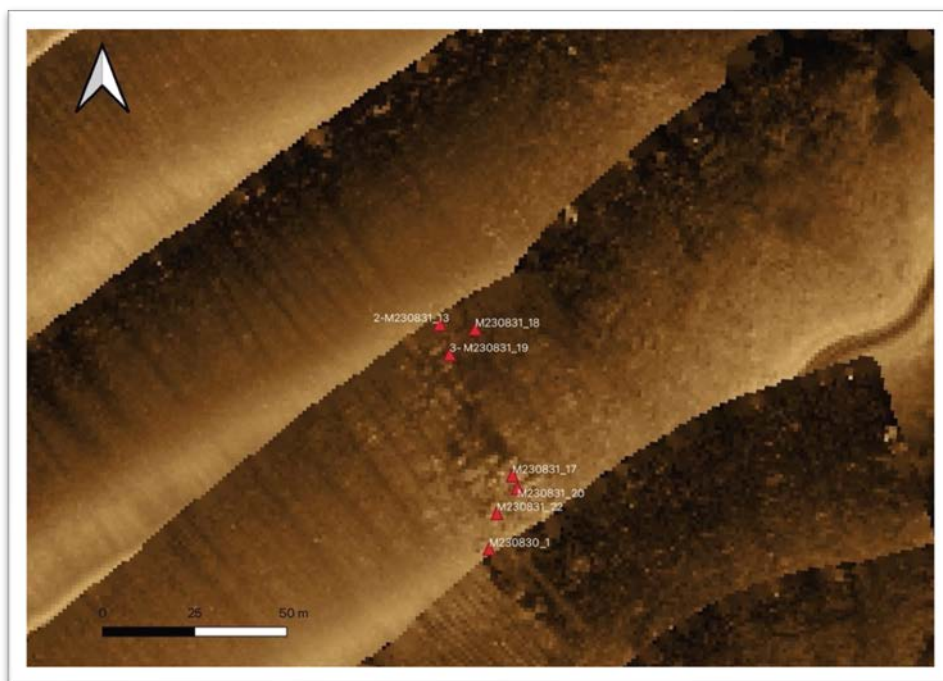


Figure 8. Cluster of sonar targets investigated during Dive 1

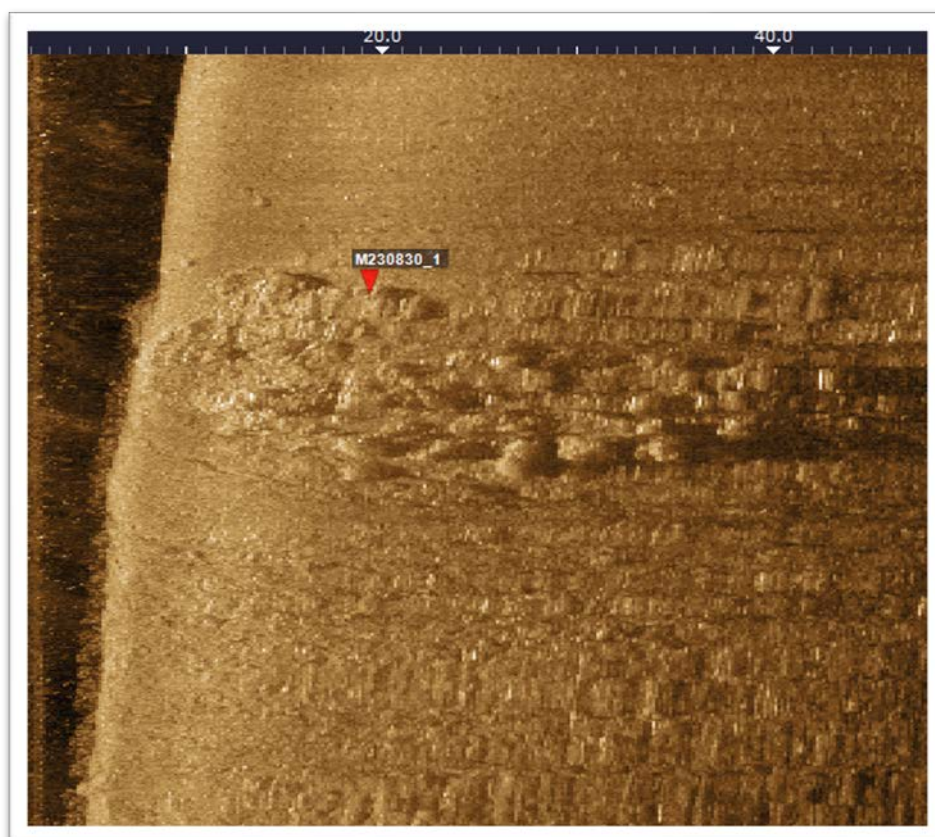


Figure 9. Close up sonar image of target M230830\_1



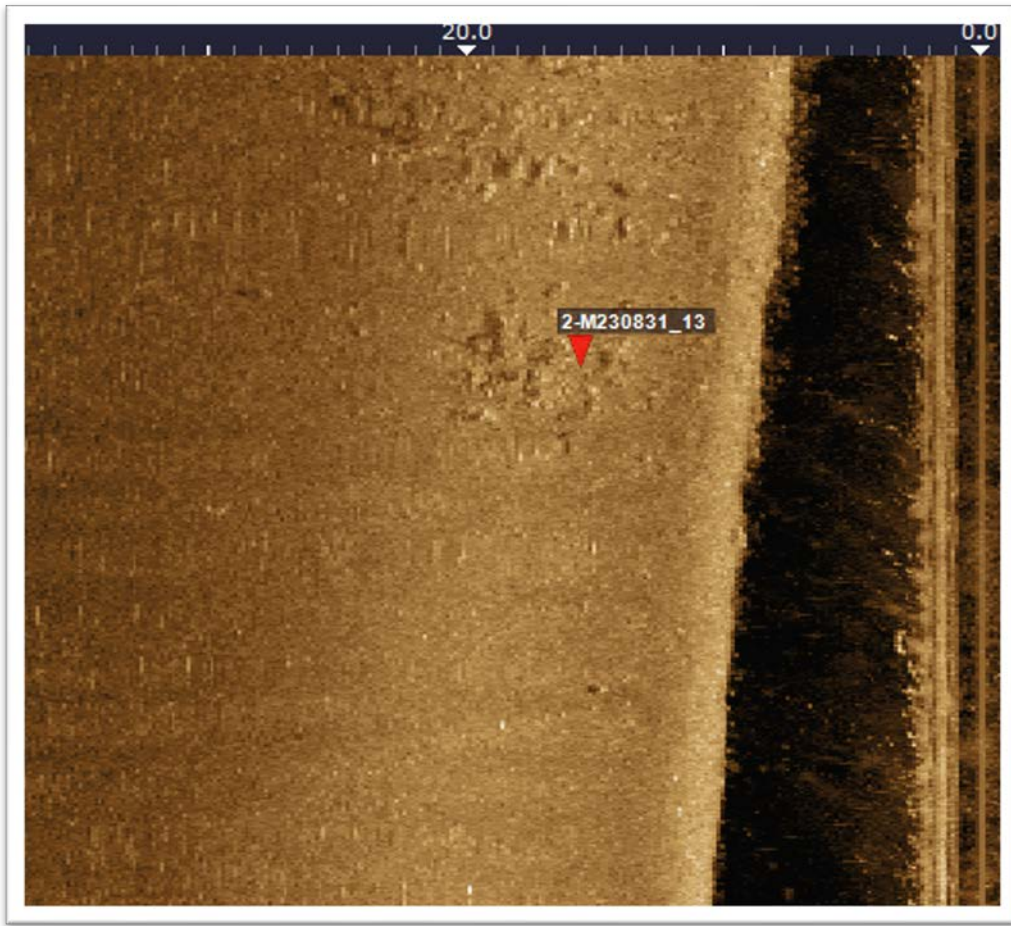


Figure 10. Close up of sonar target M230831\_13

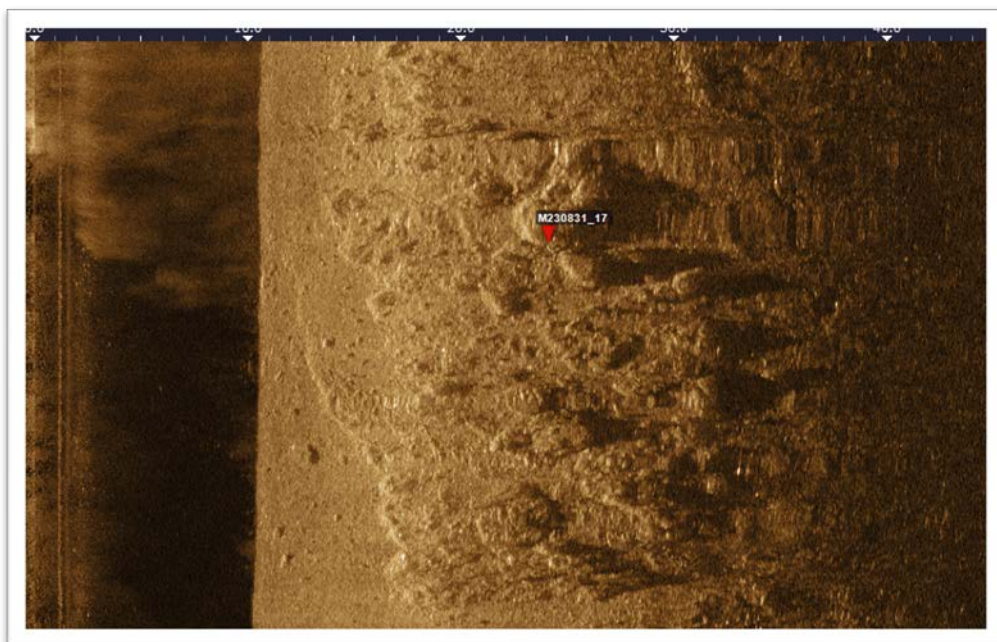


Figure 11. Close up of sonar target M230831\_17

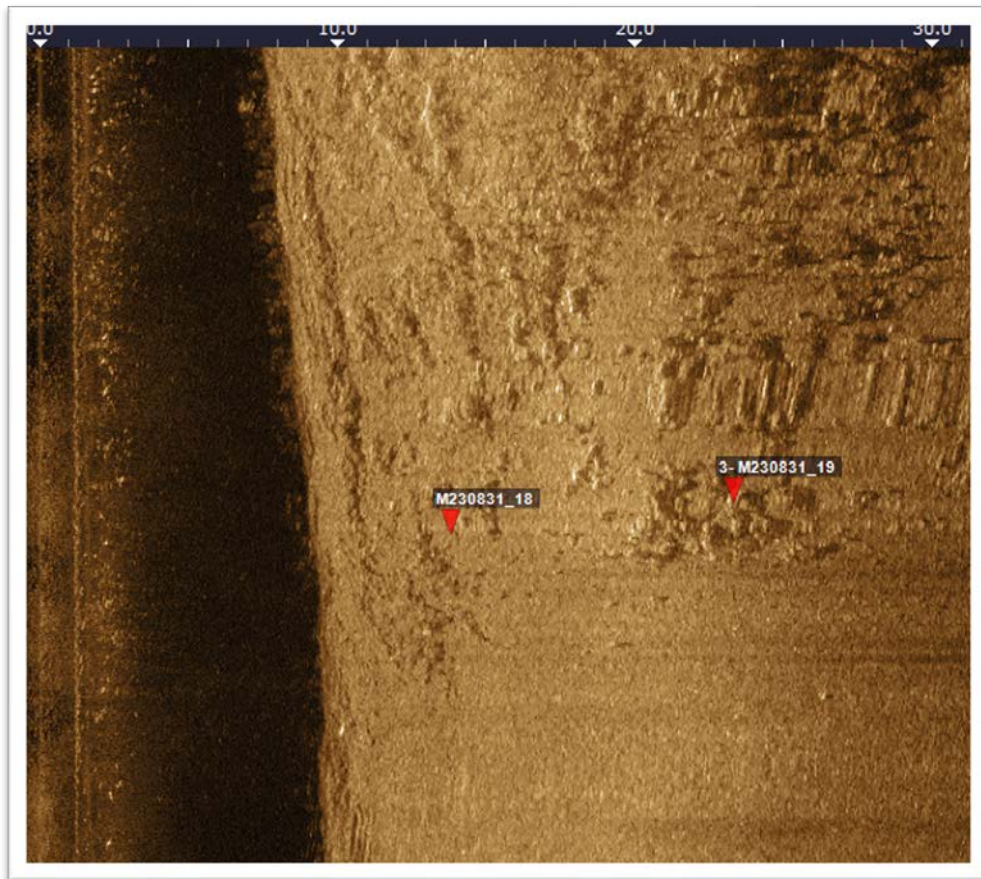


Figure 12. Close up of sonar targets M230831\_18 and M230831\_19



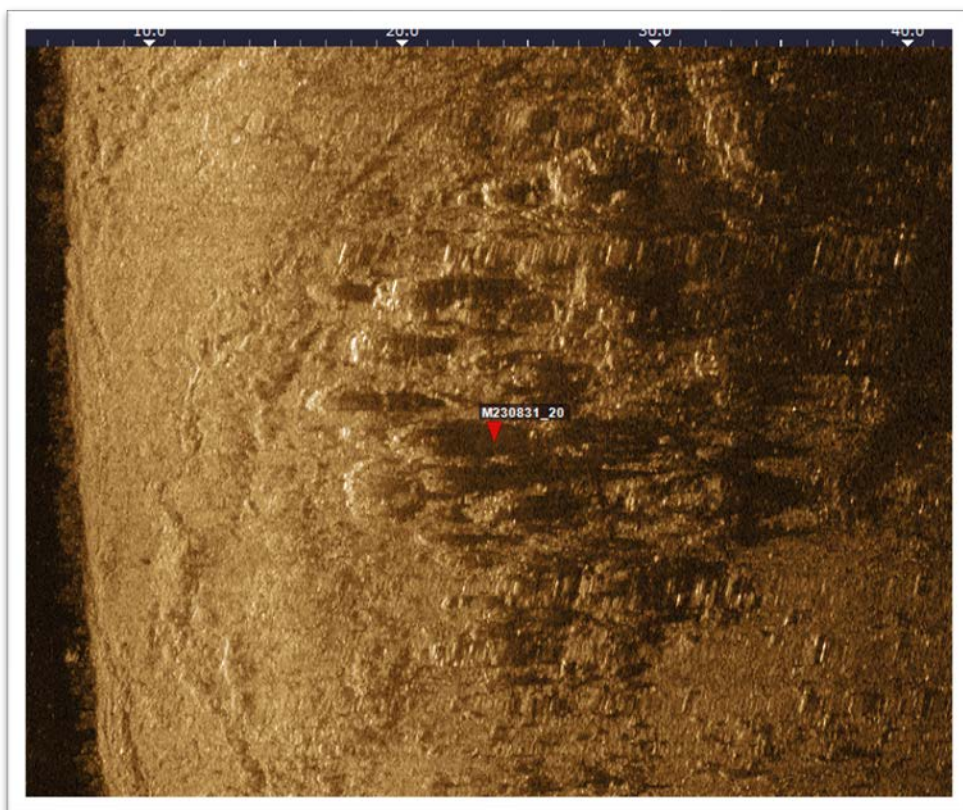


Figure 13. Close up of sonar target M230831\_20

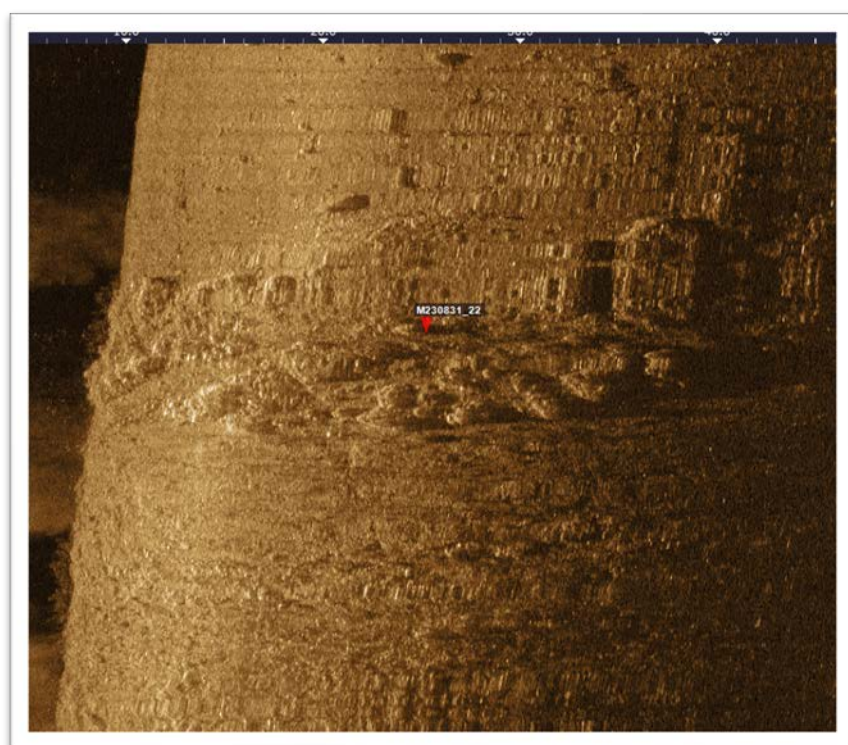


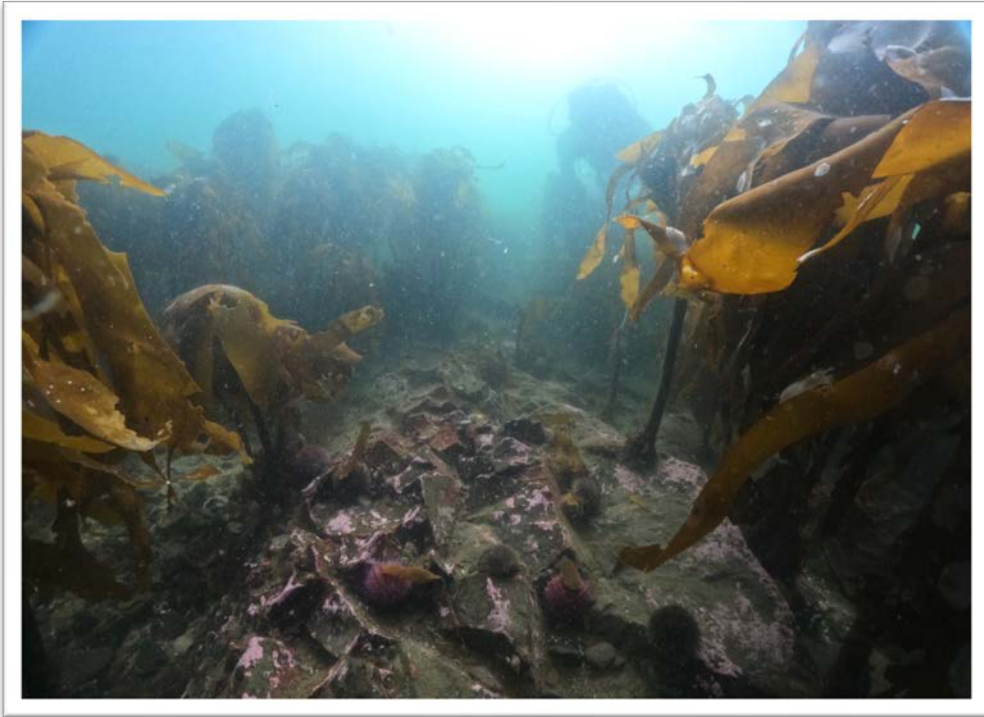
Figure 14. Close up of sonar target M230831\_22

Dive 1 was organised so that two marine archaeologists (Dr Kevin Martin & Dr Philipp Grassel) were dropped together into the water directly over target M230831\_13 from where they swam south underwater towards target M230830\_1 where they were retrieved by the surface support vessel after completing their dive. The purpose of the dive in addition to the specific target examination was to get a general sense of the bottom composition and sedimentation of the seabed and to assess visibility and currents in the water. All 7 targets inspected on this dive comprised natural geological features mostly consisting of bedrock outcrops from the seabed with kelp growth (Figures 8-18). No archaeological features or deposits of cultural heritage were identified during the dive.

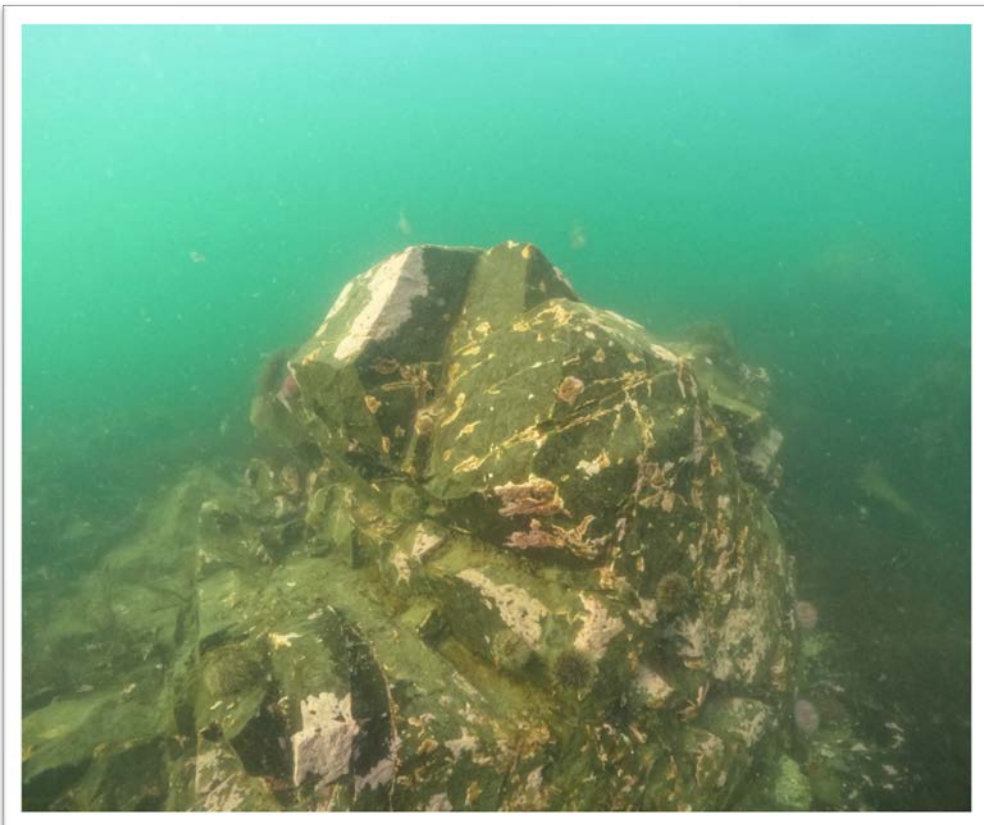


*Figure 15. Kelp and bedrock outcrops observed during Dive 1 (KM 2023)*





*Figure 16. Bedrock outcrop with kelp growing from it observed during Dive 1 (KM 2023)*



*Figure 17. Bedrock pinnacle observed during Dive 1 (KM 2023)*



*Figure 18. Marine archaeologist Dr. Philipp Grassel during archaeological inspection Dive 1 (KM 2023)*



## Archaeological Inspection Dive 2

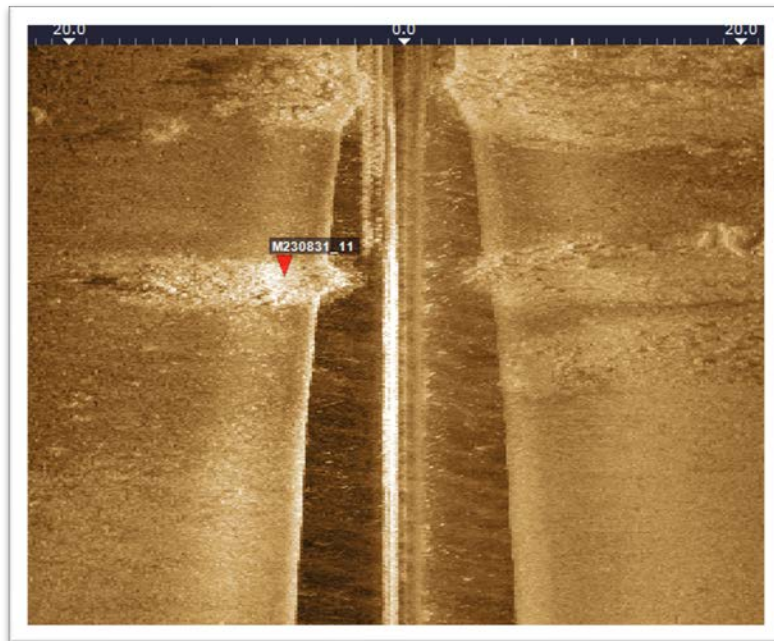
Marine Archaeologists: Dr Kevin Martin, Dr Philipp Grassel

Boat Support: Jens Lindström

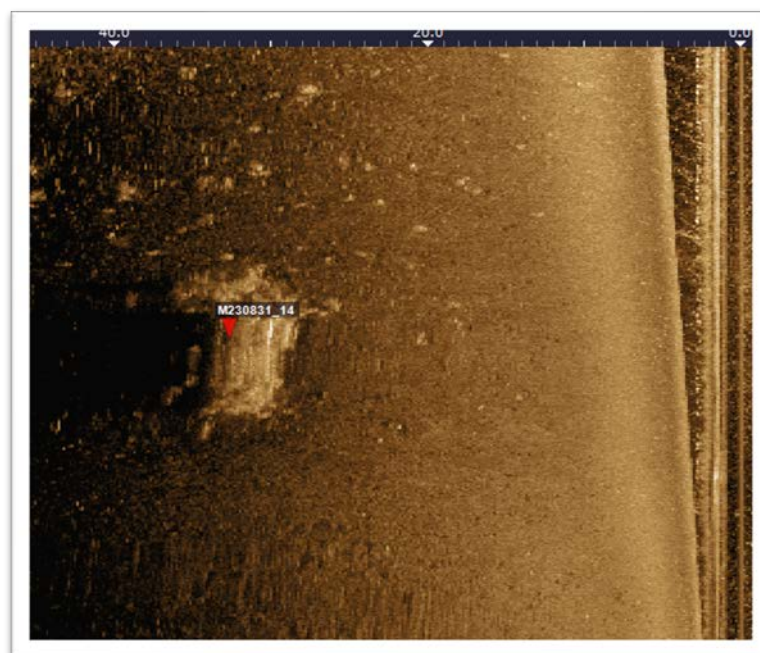
Date: 01 Sept, 2023, Dive Time: 45 mins, Visibility: 3m, Depth: 5m

Targets examined: M230831\_11, M230831\_14

Coordinates: 64° 55.408'N, 23° 14.687'W, 64° 55.400'N, 23° 14.664'W



*Figure 19. Close up of sonar target M230831\_11*



*Figure 20. Close up of sonar target M230831\_14*

Dive 2 was located in an area in close proximity to the modern harbour of Grundarfjörður approximately 100m east of the modern breakwater and boat harbour. There was an underwater visibility in this area of approximately 3m which was noticeably poorer than that experienced during Dive 1. The area also featured more traces of modern garbage on the seabed than was observed previously. However, this was not too surprising given its closer proximity to the modern harbour. Two targets were inspected during this dive: M230831\_11, M230831\_14 (Figures 19-22). The targets were 22m apart from each other. The seabed in this area was quite compact in places and comprised of compact small stones with almost no silt deposits evident. Where they were present the silt was not deeper than 20cm. The marine archaeologists descended a shot line directly onto Target M230831\_11 and once inspected swam southeast to target M230831\_14. M230831\_11 comprised a mound of large boulders (1-1.5m in diameter) with mixed inclusions of modern material including concrete blocks and iron rods. It's likely the boulders and associated material were dumped here during the construction of the breakwater. M230831\_14 was initially considered to possibly have represented a ballast mound but on inspection was of similar composition to target M230831\_11 and likely represented the same origins (dumped material during the construction of the nearby breakwater). No cultural heritage features or deposits were evident around these targets.



*Figure 21. Photo of target M230831\_11 mound of boulders, modern material (KM 2023)*



*Figure 22. Photo of target M230831\_14 (KM 2023)*



### Archaeological Inspection Dive 3

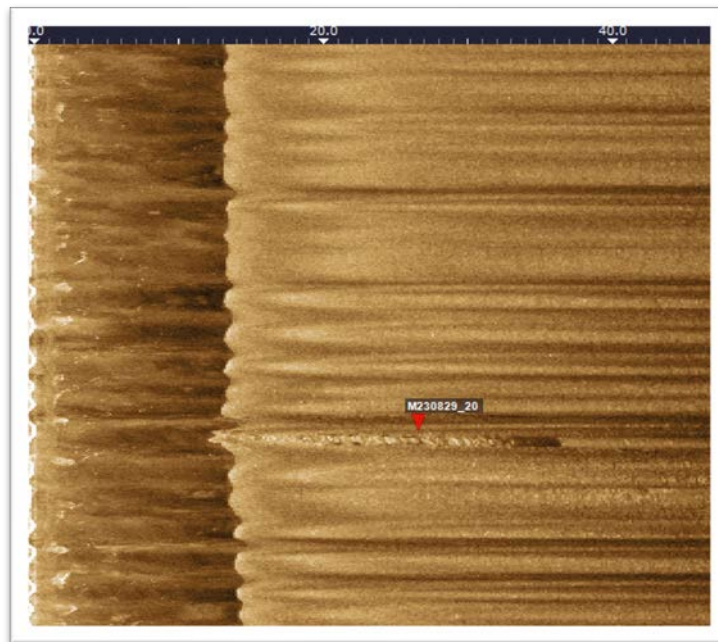
Diving Marine Archaeologists: Dr Kevin Martin, Jens Lindström

Boat Support: Dr Philipp Grassel

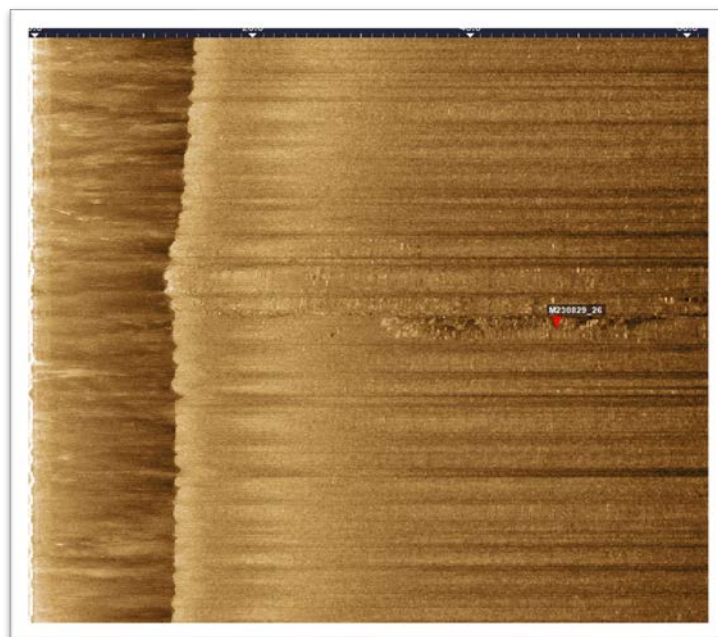
Date: 02 Sept, 2023, Dive Time: 40 mins, Visibility: 8m, Depth: 14m

Targets examined: M230829\_20, M230829\_26.

Coordinates: 64° 56.629'N, 23° 12.302'W, 64° 56.634'N, 23° 13.308'W



*Figure 23. Close up of sonar target M230929\_20*



*Figure 24. Close up of sonar target M230829\_26*

Dive 3 was located on the northern side of the survey area approximately 1km northwest of the location area of Dive 1. Two specific targets M230829\_20 and M230829\_26 were the focus of the dive but it was considered a high potential area to dive in based on a cluster of targets localised within the same general area. There was an underwater visibility in this area of approximately 8m. Both targets were linear in form and were interpreted as potentially representing either cultural material/deposits or geological features. The targets were positioned approximately 12m apart. The seabed in this area was siltier than observed in Dives 1 & 2. The marine archaeologists descended a shot line directly onto Target M230829\_20 and this was identified as a natural geological ridge of stone along the seabed (Figure 23, 25). Once this feature was inspected the divers swam northwest to target M230829\_26 (Figure 24). This target also comprised a narrow geological ridge of stone potentially part of the same feature observed in target M230829\_20. At the south end of this stone ridge a small iron stockless or patent anchor with approximately 20m of iron chain was discovered (Figure 26-29). The chain lay directly on the seabed and ran under the sand after approximately 20m. The patent anchor lies at 11m deep.

Overall, the anchor was in reasonably good condition showing little signs of heavy corrosion or deterioration. The iron chain which was attached was more noticeably corroded than the anchor. The anchor lay directly on top of a rocky outcrop, resting upright on its flukes and was not deeply set into the seabed. All the main components of the anchor were present including flukes, shank, crown and ring. The shank was measured at 1.5m long and 0.2m thick and the flukes were approximately 0.6m high.



*Figure 25. Natural ridge of bedrock identified at Target M230829\_20 (JL 2023)*



*Figure 26. Side view of the stockless/patent anchor Target M230829\_26 (JL 2023)*

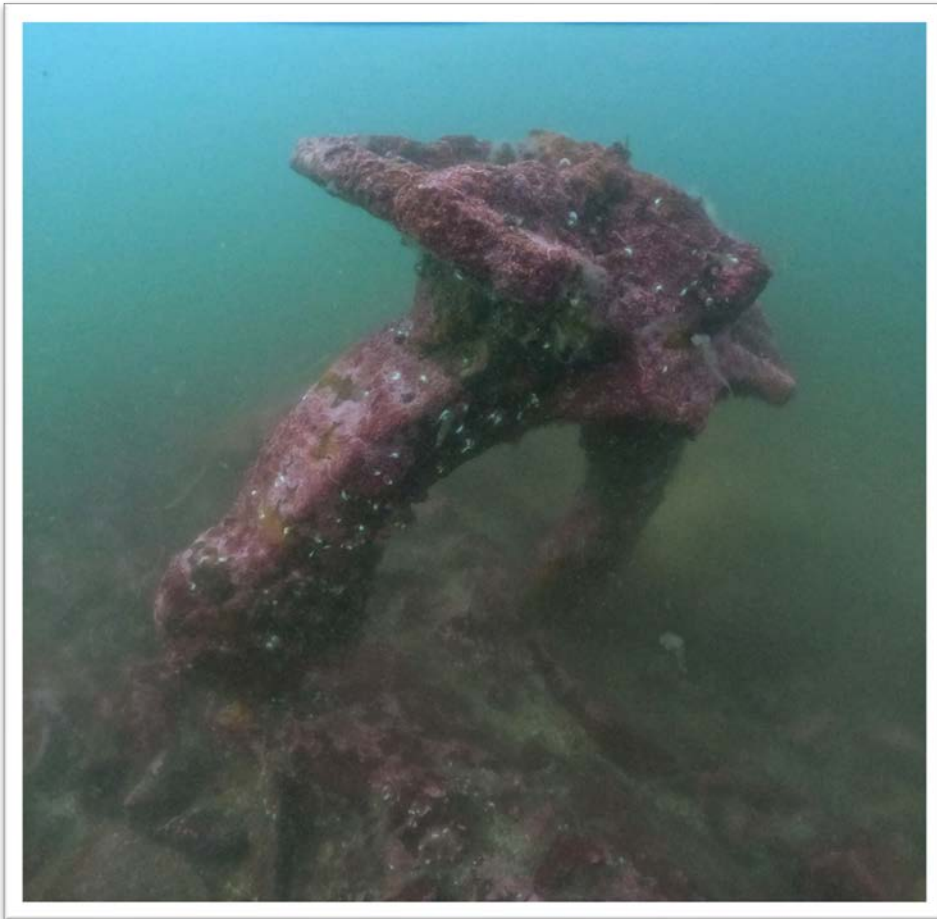




*Figure 27. Opposite side view of stockless/patent anchor Target M230829\_26 (JL 2023)*



*Figure 28. Chain and anchor ring resting on top of natural bedrock (JL 2023)*



*Figure 29. Close up of the anchor crown and flukes (JL 2023)*

#### Archaeological Inspection Dive 4

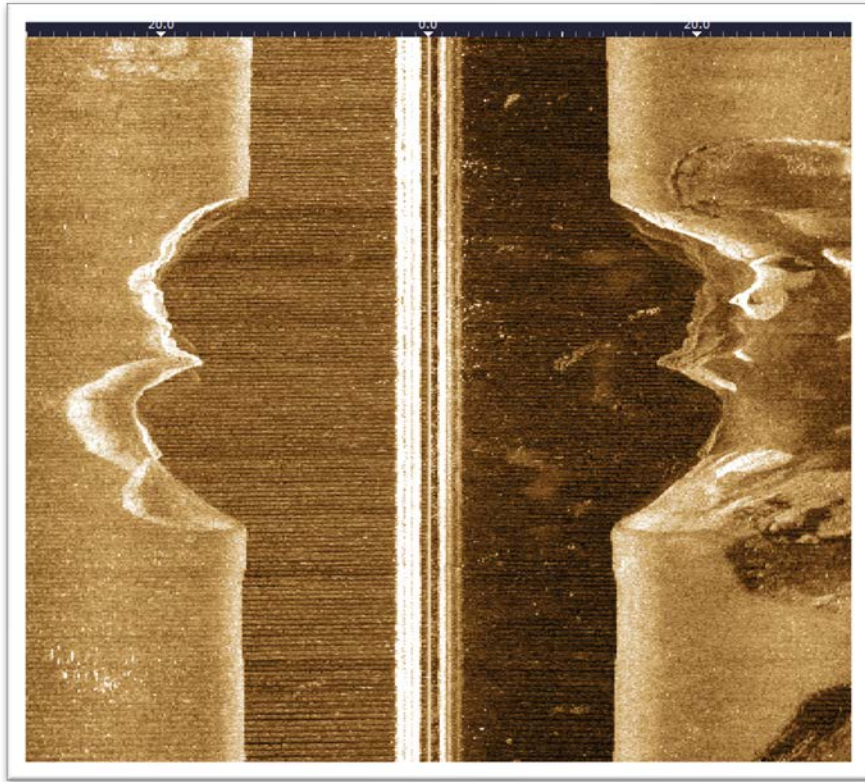
Diving Marine Archaeologists: Dr Kevin Martin, Jens Lindström

Boat Support: Dr Philipp Grassel

Date: 02 Sept, 2023, Dive Time: 35 mins, Visibility: 2-3m, Depth: 20m

Targets examined: Location of gravel extraction pits

Coordinates: 64° 55.350'N, 23° 13.380'W



*Figure 30. Close up of sonar image of gravel extraction pits*

Dive 4 focussed on the area of the bay where gravel extraction works from the seabed had occurred during the mid-20<sup>th</sup> century. The project team had been informed by the harbour master that remains of a historic wreck had been uncovered there during gravel extraction works in the 1960's. The location was also directly in the vicinity of a known historical anchorage which was seen on a French navigational chart from 1888 (Figure 31). The anchorage is also shown on the modern Navionics chart for the bay (Figure 32). The gravel extraction pits were situated in the south eastern part of the survey area approximately 300m west of the shoreline in a depth of 20m. The visibility during the dive was limited to 2-3m and the bottom composition was a mixture of gravel under a 20-30cm layer of loose fine silt/sediment (Figure 33). The divers descended into a number of steeply sloped pits which were approximately 4-5m deep but visibility was extremely limited once any bottom sediments were disturbed. They swam over an area measuring 40m x 50m examining a number of these pits but no cultural heritage features or deposits were evident.

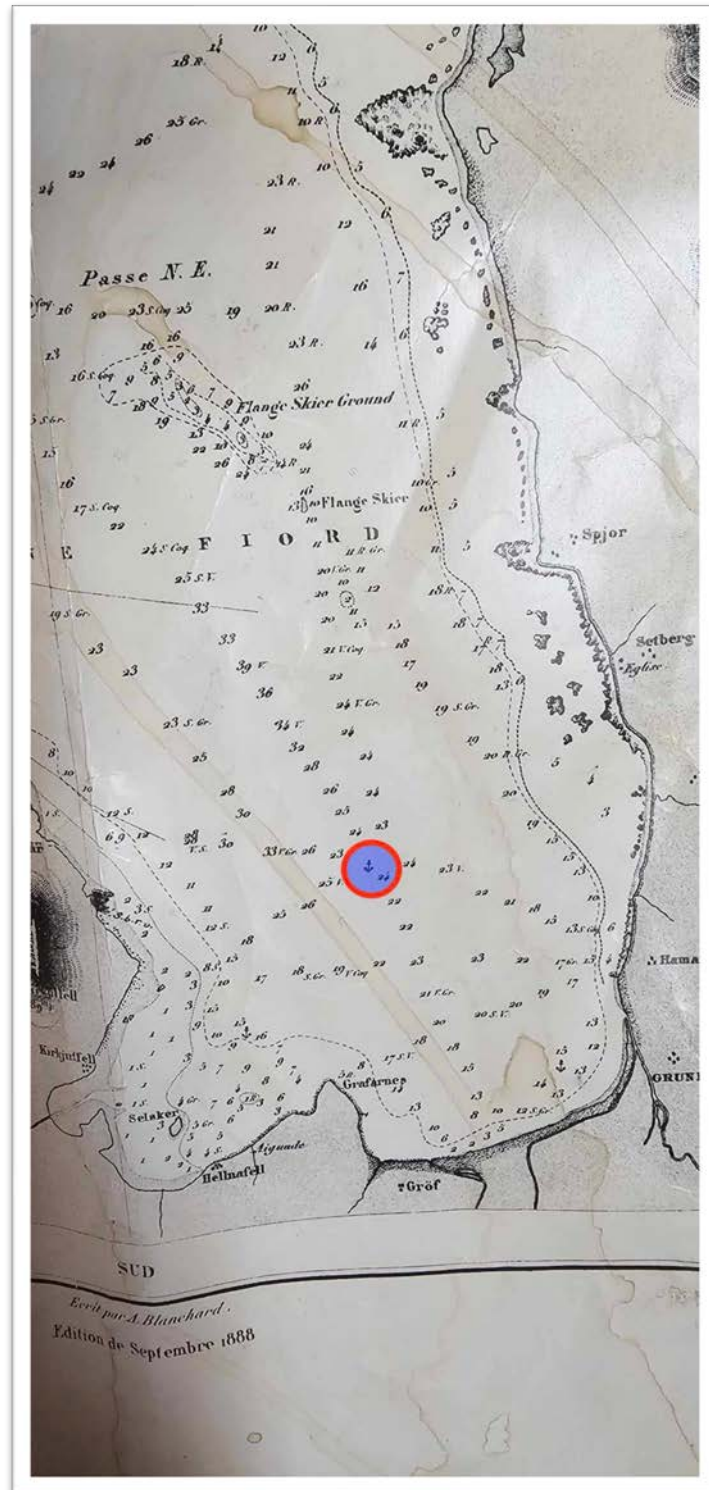


Figure 31. French sea chart from 1888 showing an anchorage location in Grindarfjörður (A. Blanchard 1888)



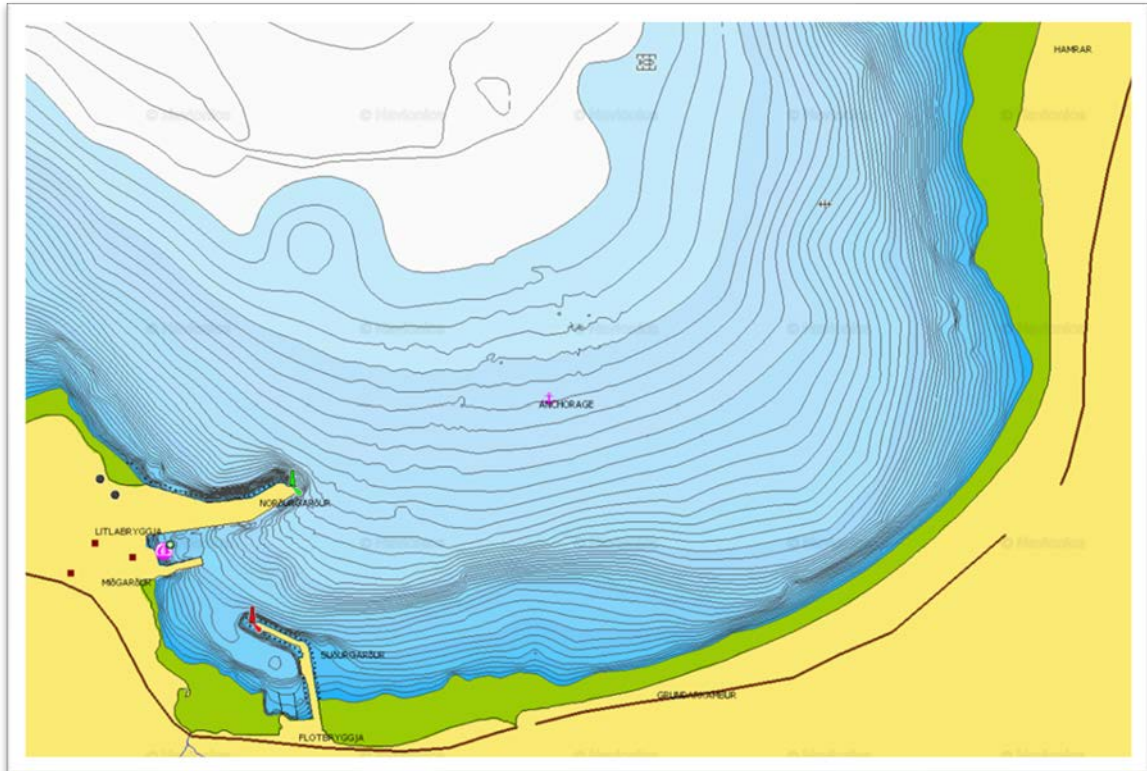


Figure 32. Navionics Sea chart for Grundarfjörður showing the anchorage area (marked with an anchor symbol and labelled anchorage) – Navionics 2023



Figure 33. Seabed bottom around the area of the gravel extraction pits during Dive 4 (JL 2023)

### Archaeological Inspection Dive 5

Diving Marine Archaeologists: Dr Kevin Martin, Jens Lindström

Boat Support: Dr Philipp Grassel

Date: 02 Sept, 2023, Dive Time: 30 mins, Visibility: 5m, Depth: 20m

Targets examined: Location of a potential wreck site marked on modern sea chart

Coordinates: 64° 55.983'N, 23° 13.167'W

Dive 5 was located close to the eastern extent of the area of Dive 1 and was selected as a dive target based on a position marked at this approximate location on the modern navigational charts (Navionics) indicating the presence of a wreck site (Figure 34). It was also in the general area of a known historic anchorage position marked on a French navigational chart of Grundarfjörður from 1888 which the archaeological team had examined previously at a museum in the town. The depth in this area was 20m and a recorded visibility of 5m. The seabed composition in this area was a mixture of bedrock with patches of compact gravel, silt and sediment (Figure 35). A circular search was conducted but no evidence of a wreck or other cultural heritage features or deposits were evident during this dive.

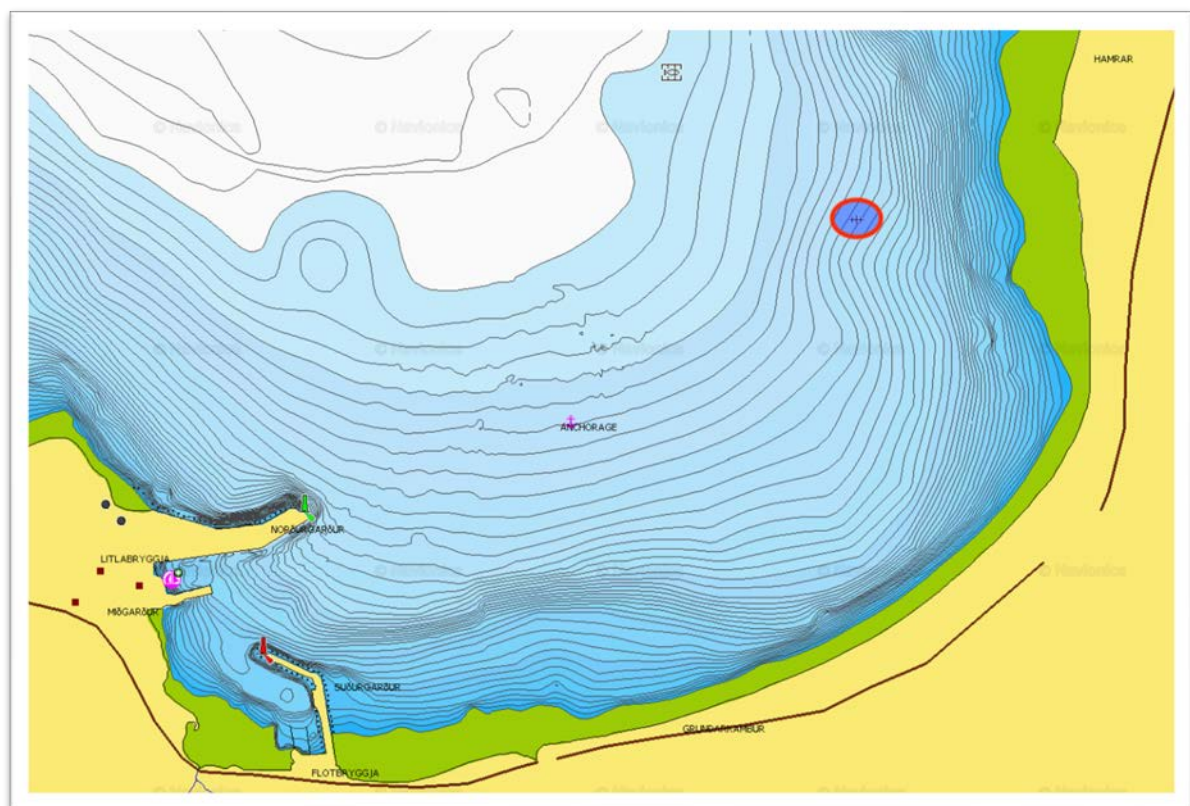


Figure 34. Navionics sea chart of Grundarfjörður with the position of a wreck marked (Navionics 2023)



*Figure 35. Seabed composition observed on Dive 5 (KM 2023)*



## Lög um skráningu fornleifa á Íslandi

Eftirfarandi tilvitnanir eru af vefsíðu Minjastofnunar Íslands ([www.minjastofnun.is](http://www.minjastofnun.is)). Þar kemur fram núverandi löggjöf á Íslandi er varða fornleifar (Lög um menningarminjar nr. 80/2012). Allar ráðleggingar varðandi fornleifar sem fram koma fylgja þeim lögum í hvívetna. Frekari skýringar á löggjöfinni má finna í hleknum hér að neðan.<sup>3</sup>

**Forngrípir** eru lausamunir 100 ára og eldri sem menn hafa notað eða mannaverk eru á og fundist hafa í eða á jörðu eða jökli, í vatni eða sjó. Skip og bátar frá því fyrir 1950 teljast til forngripa. Til forngripa teljast einnig leifar af líkómum manna og hræjum dýra sem finnast í fornleifum, svo sem fornum haugum, dysjum og leiðum.

Umhverfis friðaðar fornleifar er 15 metra friðhelgað svæði og gilda sömu reglur um það svæði og um fornleifarnar sjálfar. Hvers konar röskun, byggingarframkvæmdir eða aðrar framkvæmdir á fornleifum og á friðhelguðu svæði umhverfis þær eru óheimilar án leyfis Minjastofnunar Íslands. Friðlýsa má samfelld svæði þar sem fleiri en einn minjastaður telst hafa sérstakt menningarsögulegt gildi. Umhverfis friðlýstar fornleifar er 100 metra friðhelgað svæði út frá ystu sýnilegu mörkum þeirra.

**Fornleifar** teljast hvers kyns mannvistarleifar, á landi, í jörðu, í jökli, sjó eða vatni, sem menn hafa gert eða mannaverk eru á og eru 100 ára og eldri, svo sem:

1. búsetulandslag, skróðgarðar og kirkjugarðar, byggðaleifar, bæjarstæði og bæjarleifar ásamt tilheyrandi leifum mannvirkja og öskuhauga, húsaleifar hvers kyns, svo sem leifar kirkna, bænhúsa, klaustra, þingstaða og búða, leifar af verbúðum, naustum og verslunarstöðum og byggðaleifar í hellum og skútum,
2. vinnustaðir þar sem aflað var fanga, svo sem leifar af seljum, verstöðvum, bólum, mógröfum, kolagröfum og rauðablæstri,
3. tún- og akurgerði, leifar rétta, áveitumannvirkni og aðrar ræktunarminjar, svo og leifar eftir veiðar til sjávar og sveita,
4. vegir og götur, leifar af stíflum, leifar af brúm og öðrum samgöngumannvirkjum, vöð, varir, leifar hafnarmannvirkja og bátalægi, slippir, ferjustaðir, kláfar, vörður og önnur vega- og siglingamerki ásamt kennileitum þeirra,
5. virki og skansar og leifar af öðrum varnarmannvirkjum,
6. þingstaðir, meintir hörgar, hof og vé, brunnar, uppsprettur, álagablettir og aðrir staðir og kennileiti sem tengjast siðum, venjum, þjóðtrú eða þjóðsagnahefð,

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<sup>3</sup> <https://www.althingi.is/lagas/nuna/2012080.html>

7. áletranir, myndir eða önnur verksummerki af manna völdum í hellum eða skútum, á klettum, klöppum eða jarðföstum steinum og minningarmörk í kirkjugörðum,
8. haugar, dysjar og aðrir greftrunarstaðir úr heiðnum eða kristnum sið,
9. skipsflök eða hlutar þeirra.

**Varðveislustig fornminja eru tvö: friðun og friðlýsing.** Fornminjar (forngripir og fornleifar), 100 ára og eldri, eru sjálfkrafa **friðaðar** nema annað sé ákveðið af Minjastofnun Íslands. Þá eru skip og bátar eldri en 50 ára sjálfkrafa **friðuð**.

**Friðlýsa** má fornleifar, skip og báta sem hafa menningarsögulegt, vísindalegt eða listrænt gildi. Ráðherra ákveður friðlýsingu að fenginni tillögu Minjastofnunar Íslands.

## Discussion & Recommendations

A total of 13 side-scan sonar targets were visually examined during an underwater archaeological diving inspection conducted in August and September 2023. Five dives in total were conducted on sonar targets ranging in depth from 3-20m deep. The sonar targets were selected based on their potential to be of cultural significance either representing ship wrecks, parts of wrecks, ballast mounds, anchorage stones and other cultural heritage features or deposits. All archaeological diving was conducted within non-decompression limits and using US-NAVY dive tables. Of the 13 potential underwater archaeological targets inspected at Grundarfjörður only one (Target M230829\_26) identified during Dive 3 represented evidence of underwater cultural heritage. This target was identified as a stockless or patent anchor dating from the early to mid-20th century. A local historian Ingi Hans has suggested to the team that the anchor maybe from the ship Edda which tragically sank during a storm in Grundarfjörður bay in November 1953 with nine of its crew perishing in the wrecking (Figure 36).



Figure 36. Newspaper article referencing the sinking of the Edda in Grundarfjörður in November 1953 (Tímarit.is)<sup>4</sup>

<sup>4</sup> <https://timarit.is/page/1019442#page/n0/mode/2up>



While this feature isn't formally protected under the Icelandic heritage legislation, if the anchor is from the Edda wreck, then it should be recognised as an important relic from a modern Icelandic tragedy at sea and protected and respected on that basis. It would be recommended that the location and position of the anchor would be shared with the harbour master in Grundarfjörður so that modern boat traffic, in particular that from any visiting cruise ships would not anchor above or disturb its position.

In terms of the remaining sonar targets identified there is a total of 22 targets of potential archaeological interest which would be recommended to investigate and confirm further by diving inspection. These targets are listed below in Table 2. It is also recommended that the western half (approximately 6km<sup>2</sup>) of Grundarfjörður bay would be subject to a side-scan sonar and dive inspection survey at some point in the future to access the potential of this area for underwater cultural heritage remains (Figure 37). The areas of the sea around Melrakkaey, Vatnabúðir and Krossanes are also considered areas of submerged archaeological potential given the historical references to ships wrecking there previously (Figure 38). Further underwater archaeological survey of Grundarfjörður is advised considering the frequency of modern boat traffic which is active in the fjord particularly with regards to the arrival of multiple cruise ships during the summer months, any unknown submerged cultural heritage remains are at risk from being disturbed or damaged by anchoring vessels. It is also strongly recommended that any future gravel extraction or dredging being carried out in the bay of Grundarfjörður should be done under the supervision and in consultation with an experienced underwater archaeologist.

Af 13 mögulegum fornleifum neðansjávar *e. potential underwater archaeological targets* var aðeins ein (M230829\_26) sem taldist hafa fornleifagildi og fannst í þriðju köfun. Það var greint sem akkeri *e. stockless or patent anchor*, frá upphafi til miðrar tuttugustu aldar. Staðarbúinn og sagnfræðingurinn Ingi Hans taldi akkerið mögulega vera úr skipinu Eddu sem sökk í stormi í Grundarfirði í nóvember 1953, þar sem 9 menn týndu lífi sínu. Þó þetta akkeri teljist ekki hafa fornleifagildi samkvæmt íslenskum fornleifalögum þá er mikilvægt, ef það er úr flaki Eddu, að halda því til haga sem nýminjum um atburði á sjó sem mikilvægt er að þekkja. Lagt er til að staðsetning og lega akkerisins verði deilt með hafnarsögumanni Grundarfjarðar svo öll skipaumferð, þá sérstaklega umferð skemmtiferðaskipa muni ekki raska því eða staðsetningu þess. Hinir fundirnir sýna alls 22 einkenni sem hafa mögulegt fornleifagildi sem mælt er með að rannsaka nánar með könnunarköfun. Þessi einkenni eru talin upp hér að neðan í töflu 2. Þá er einnig mælt með að vestari helmingurinn (u.þ.b. 6 km<sup>2</sup>) af firðinum verði skannaður með hliðarsónar og könnunarkafanir framkvæmdar í

framhaldi til að leita að minjum sem kunna að leynast þar og eru í hættu á að verða fyrir raski vegna skipa sem liggja við akkeri. Þá er einnig mælt með að öll efnistaka eða dýpkun í Grundarfirði skuli vera framkvæmd undir eftirliti og í samráði við reyndan neðansjávarfornleifafræðing.



Figure 37. Recommended sonar survey area (in red) for future underwater assessment project (KM 2023)

Target ID	Coordinates	Target ID	Coordinates
M230828_3	64° 55.686'N, 23° 15.278'W	M230831_9	64° 55.963'N, 23° 13.541'W
M230828_4	64° 55.522'N, 23° 15.037'W	M230831_10	64° 55.452'N, 23° 14.670'W
M230829_6	64° 56.398'N, 23° 13.033'W	M230831_12	64° 55.837'N, 23° 13.732'W
M230829_13	64° 56.563'N, 23° 13.836'W	M230831_21	64° 56.018'N, 23° 12.879'W
M230829_14	64° 57.053'N, 23° 12.702'W	M230831_23	64° 55.409'N, 23° 14.095'W
M230829_15	64° 56.889'N, 23° 12.973'W	M230831_26	64° 56.736'N, 23° 12.757'W
M230829_22	64° 56.520'N, 23° 13.684'W	M230831_27	64° 56.402'N, 23° 13.385'W
M230829_24	64° 55.724'N, 23° 15.291'W	M230831_28	64° 56.427'N, 23° 13.160'W
M230829_27	64° 55.454'N, 23° 15.093'W		
M230831_2	64° 56.578'N, 23° 13.300'W		
M230831_3	64° 55.731'N, 23° 15.286'W		
M230831_6	64° 56.564'N, 23° 13.306'W		
M230831_7	64° 55.922'N, 23° 14.099'W		
M230831_8	64° 56.202'N, 23° 12.973'W		

Table 2. Sonar targets of archaeological potential to be inspected in future project

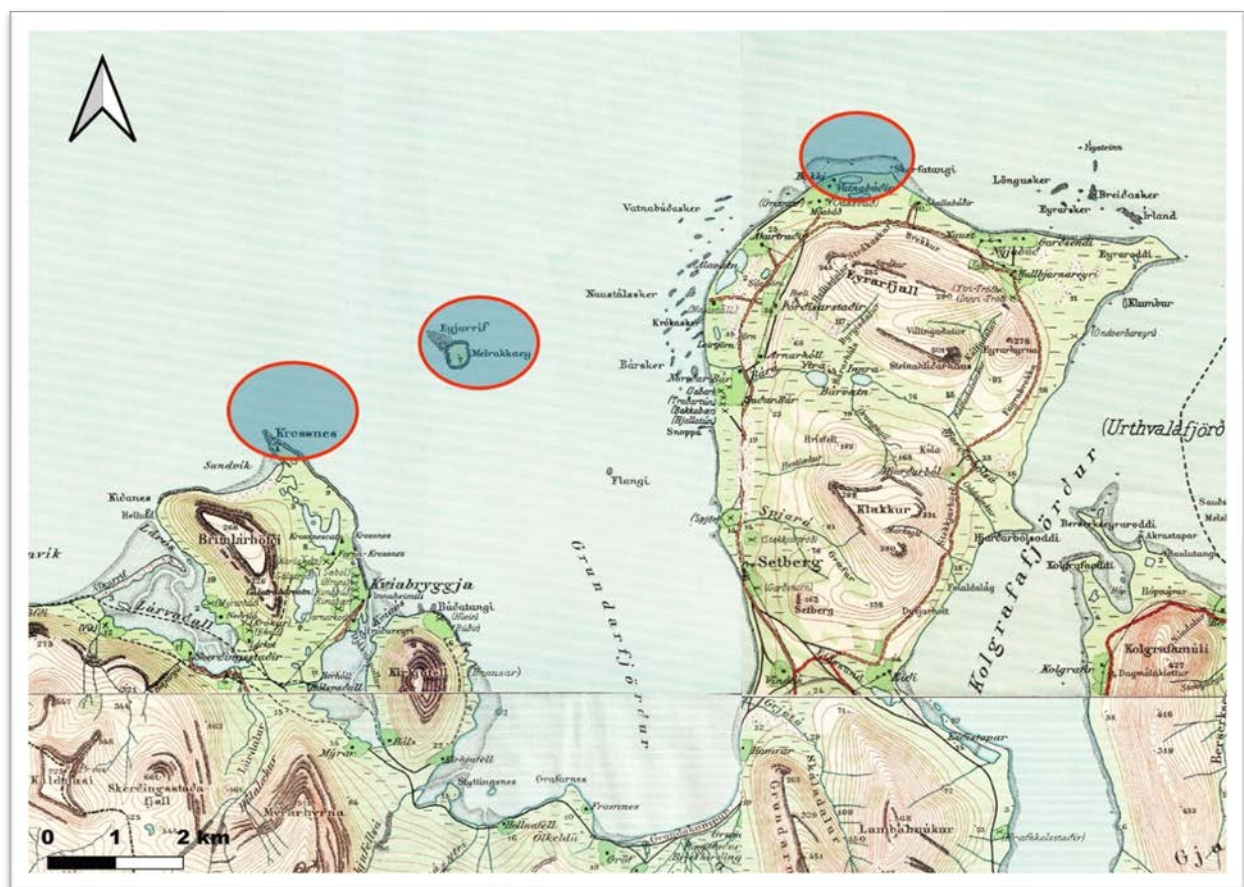


Figure 38. Herfingjaráðskort (1905-1915) with the 3 areas (Krossanes, Melrakkaey and Vatnabúðir) of submerged archaeological potential highlighted based on historical references in the Icelandic Annals (Landmælingar Íslands)



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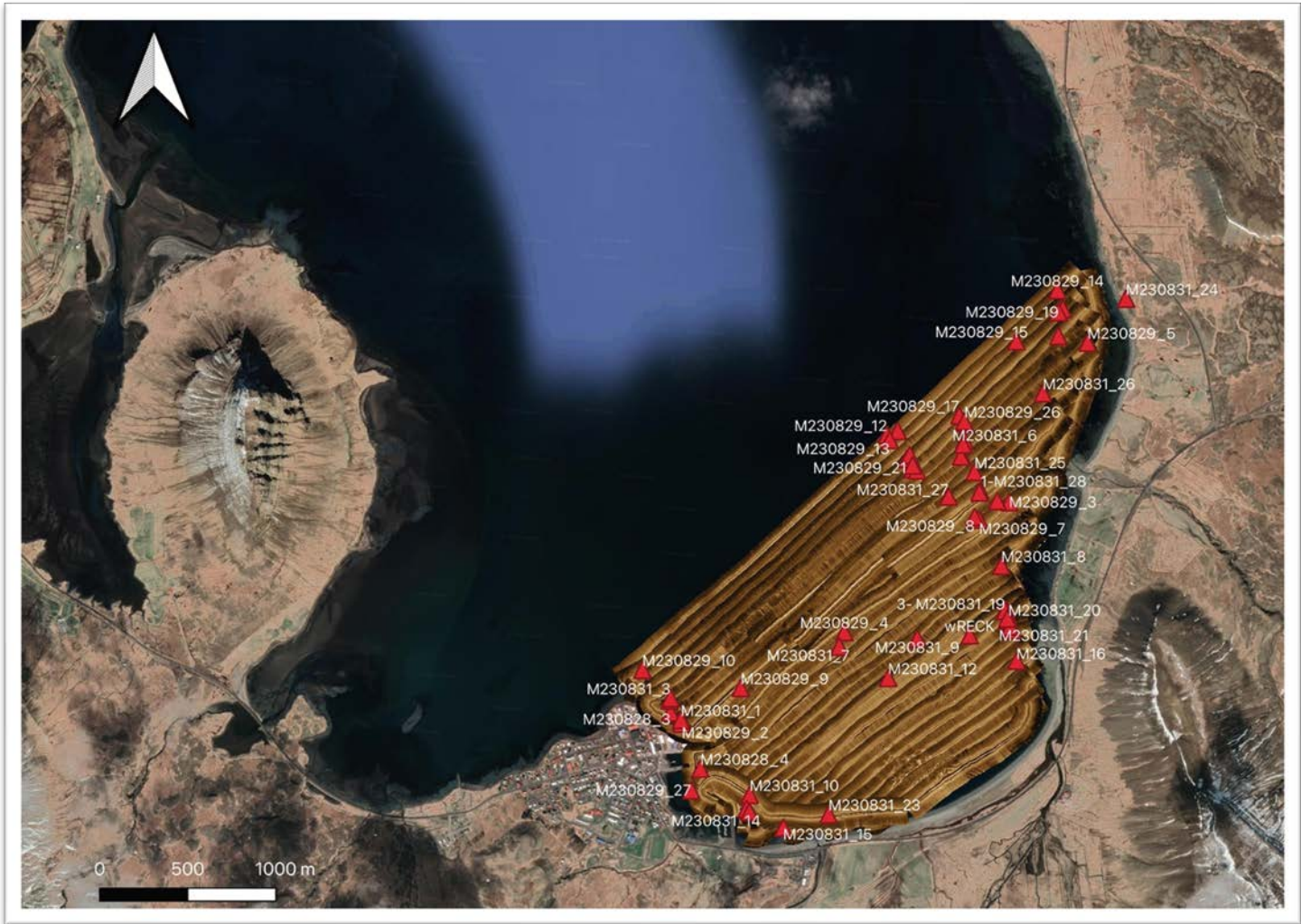
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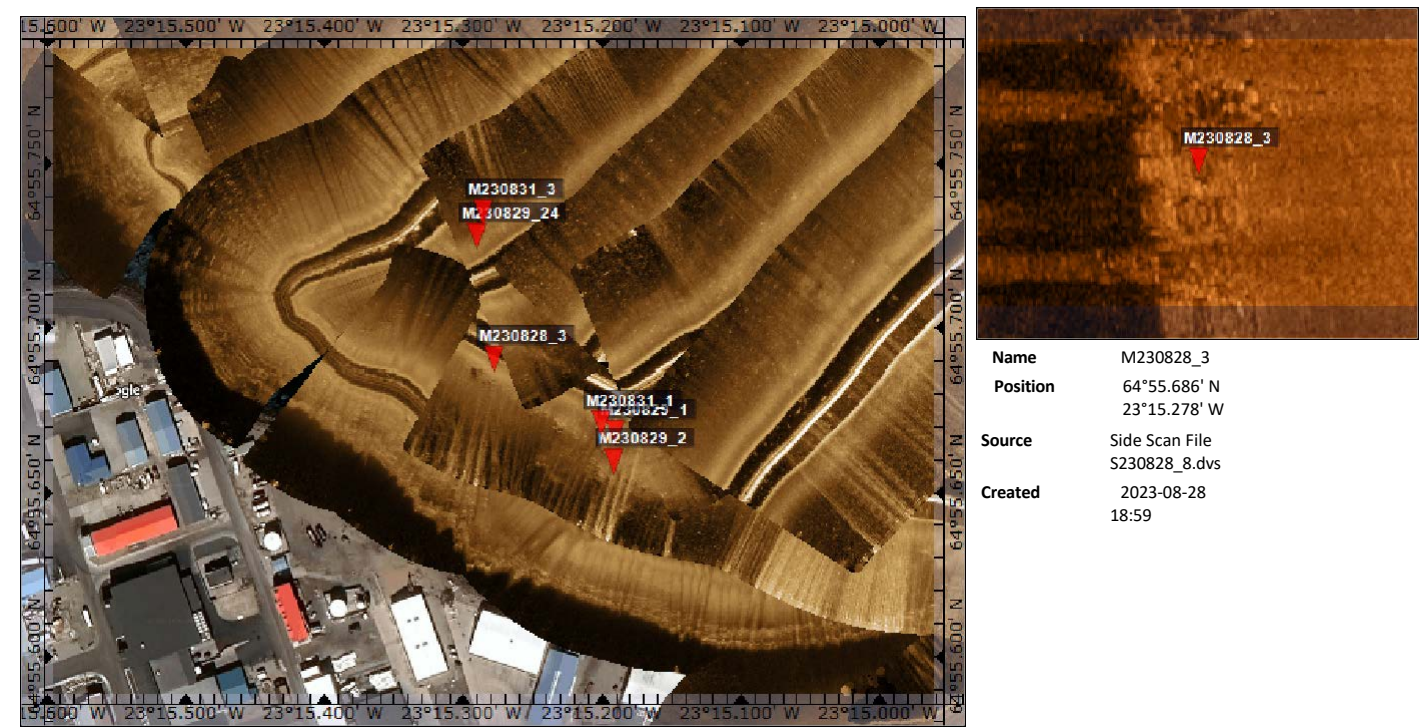
## Digital sources

<https://www.minjastofnun.is/minjar/>

Side-Scan Sonar Markers Report Grundarfjörður 2023



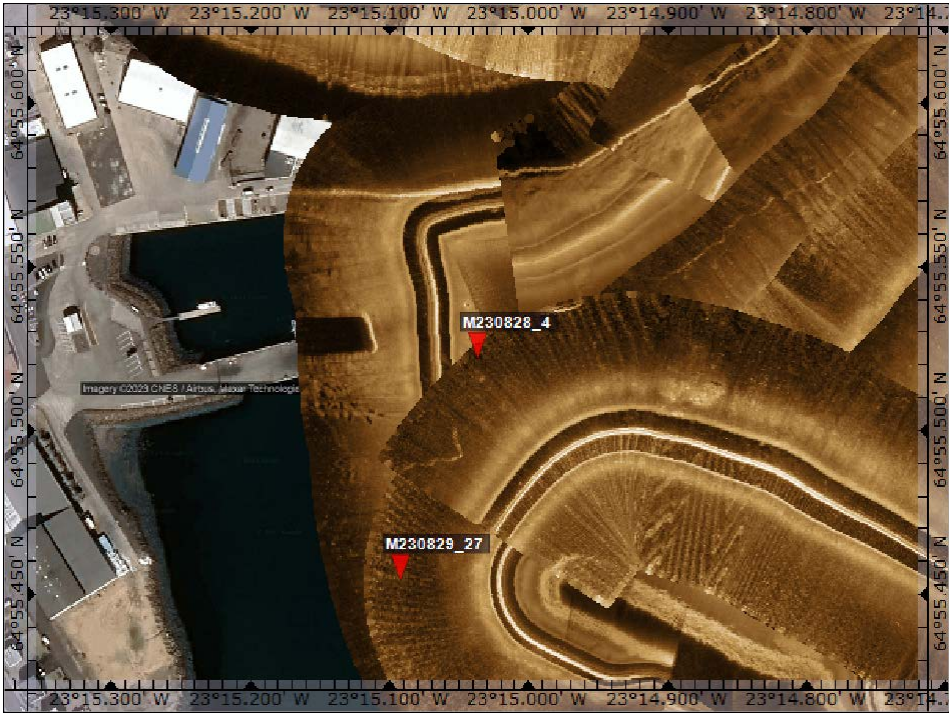
M230828\_3



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Created	2023-08-28 18:59



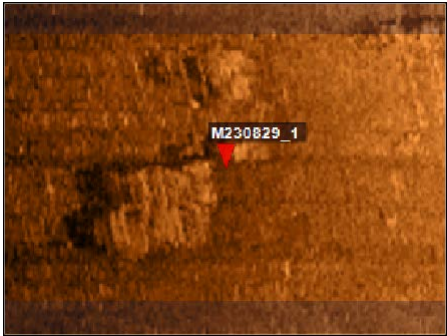
M230828\_4



**Name** M230828\_4  
**Position** 64°55.522' N  
23°15.037' W  
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**Name** M230829\_1  
**Position** 64°55.664' N  
23°15.190' W  
**Source** Side Scan File S230828\_8.dvs  
**Created** 2023-08-29  
02:01



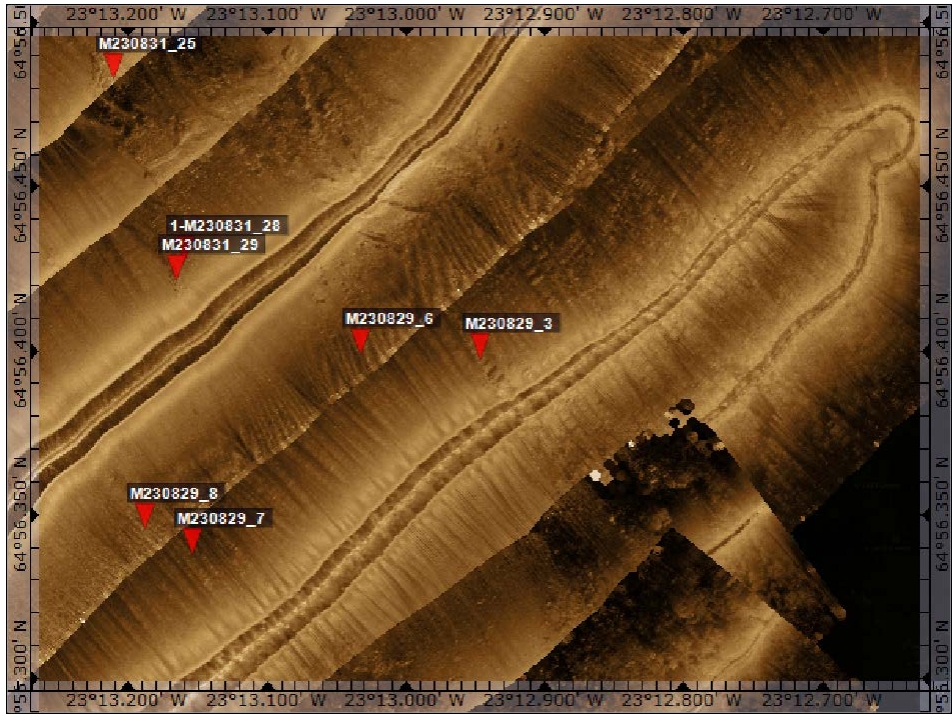


M230829\_2

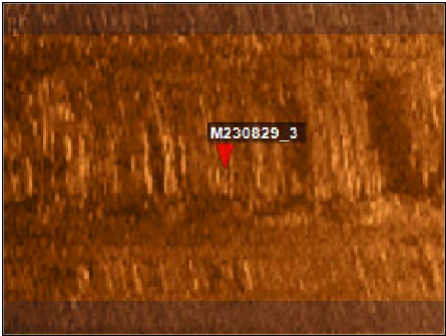


**Name** M230829\_2  
**Position** 64°55.655' N  
23°15.192' W  
**Source** Side Scan File S230828\_8.dvs  
**Created** 2023-08-29  
02:01

M230829\_3

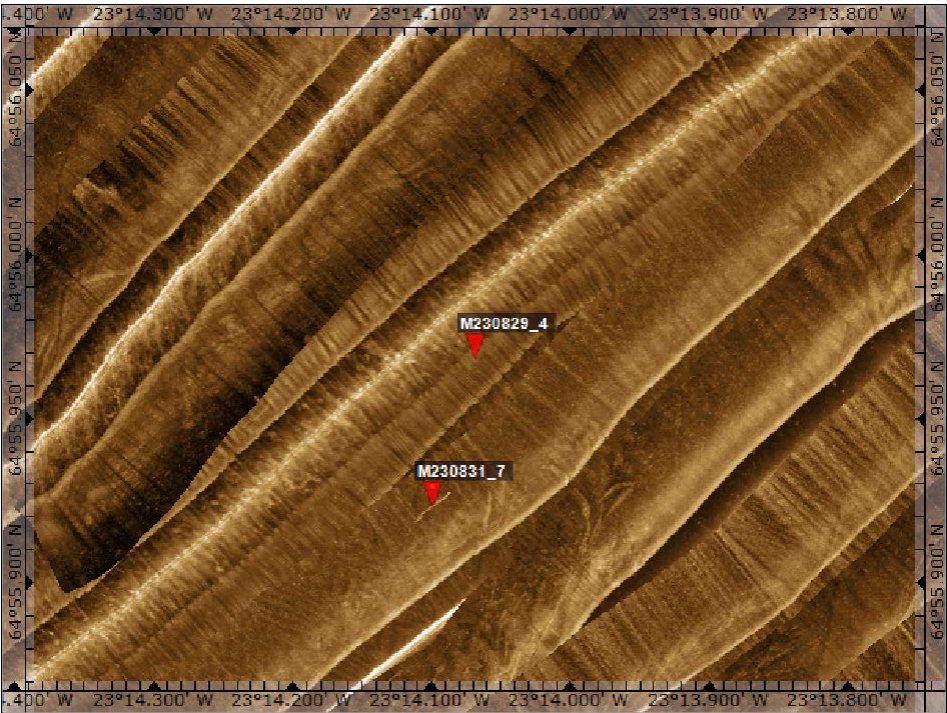


**Name** M230829\_3  
**Position** 64°56.397' N  
23°12.947' W  
**Source** Side Scan File S230828\_8.dvs  
**Created** 2023-08-29  
02:02

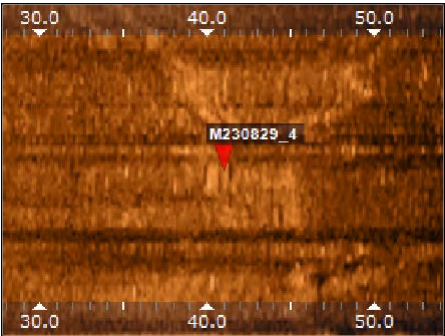




M230829\_4



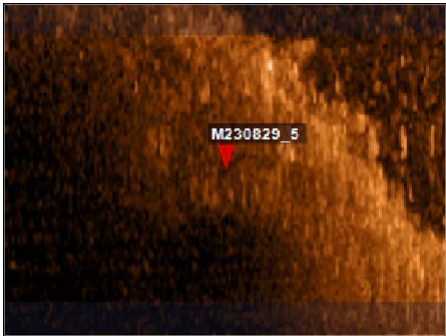
Name M230829\_4  
Position 64°55.968' N  
23°14.069' W  
Source Side Scan File S230828\_8.dvs  
Created 2023-08-29  
02:02



M230829\_5

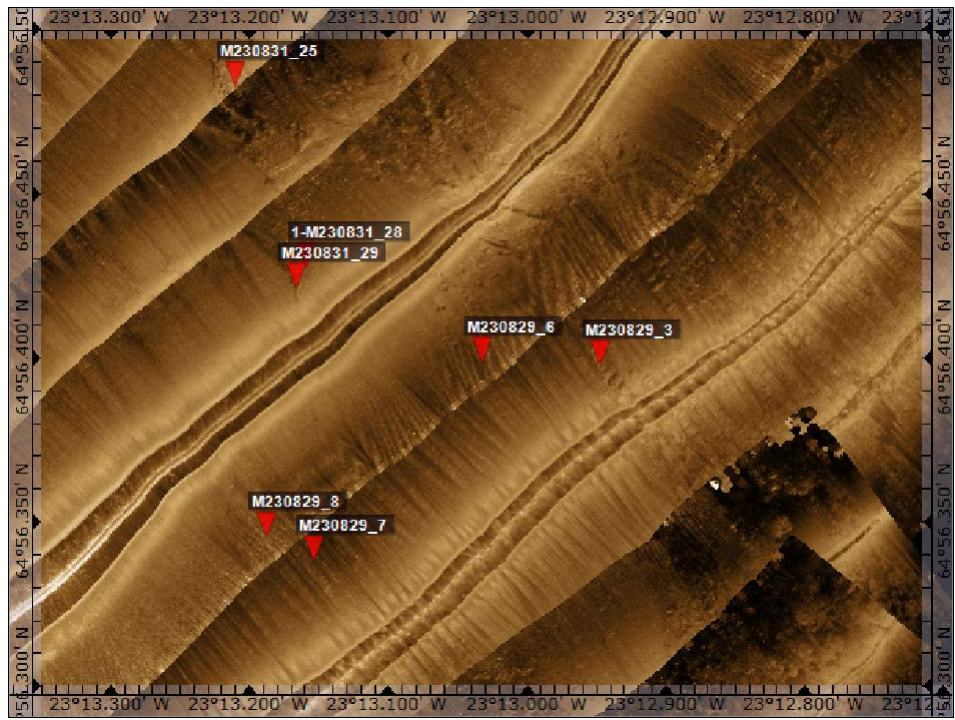


Name M230829\_5  
Position 64°56.900' N  
23°12.460' W  
Source Side Scan File S230828\_1.dvs  
Created 2023-08-29  
02:03



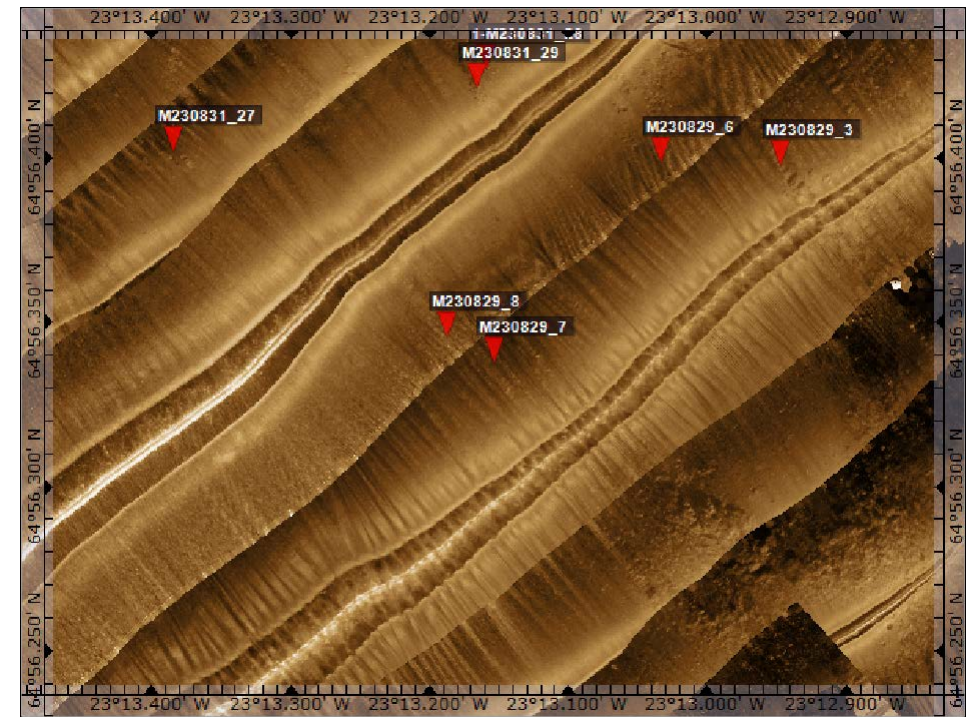


M230829\_6



Name M230829\_6  
Position 64°56.398' N  
23°13.033' W  
Source Side Scan File S230828\_1.dvs  
Created 2023-08-29  
02:04

M230829\_7

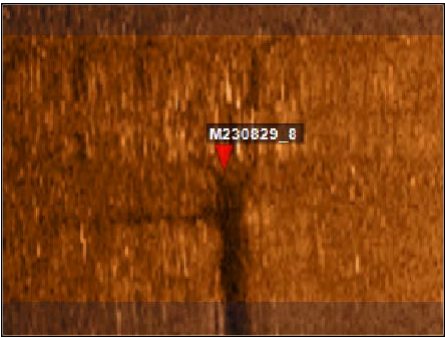
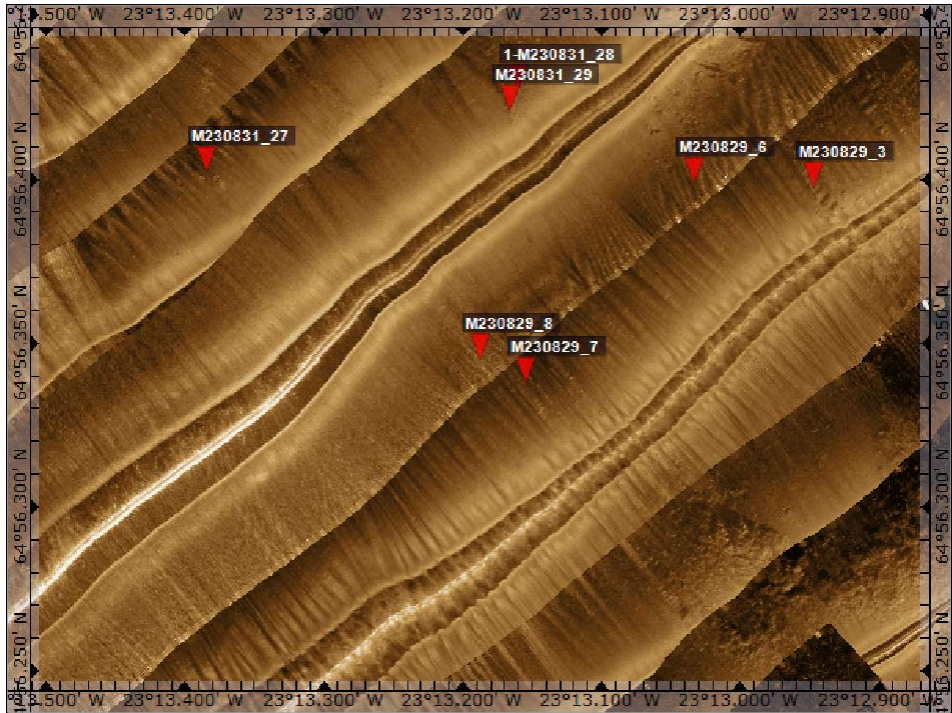


Name M230829\_7  
Position 64°56.337' N  
23°13.154' W  
Source Side Scan File S230828\_1.dvs  
Created 2023-08-29  
02:04



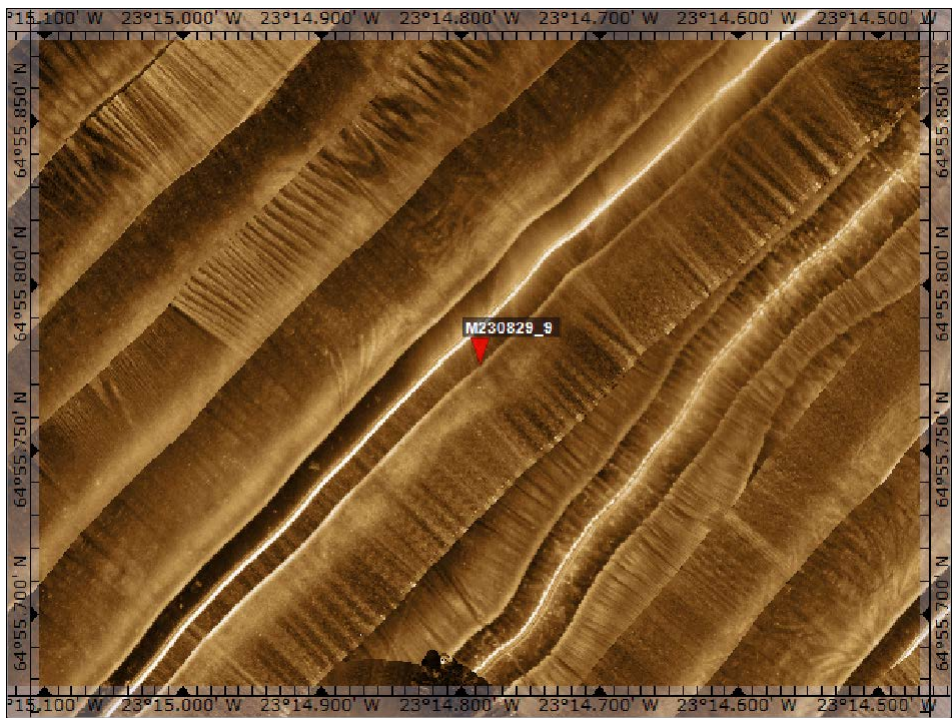


M230829\_8



**Name** M230829\_8  
**Position** 64°56.345' N  
23°13.188' W  
**Source** Side Scan File S230828\_1.dvs  
**Created** 2023-08-29 02:04

M230829\_9



**Name** M230829\_9  
**Position** 64°55.776' N  
23°14.787' W  
**Source** Side Scan File S230828\_1.dvs  
**Created** 2023-08-29 02:05

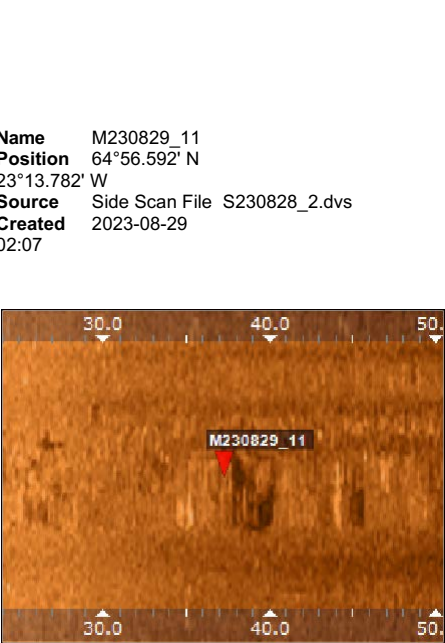
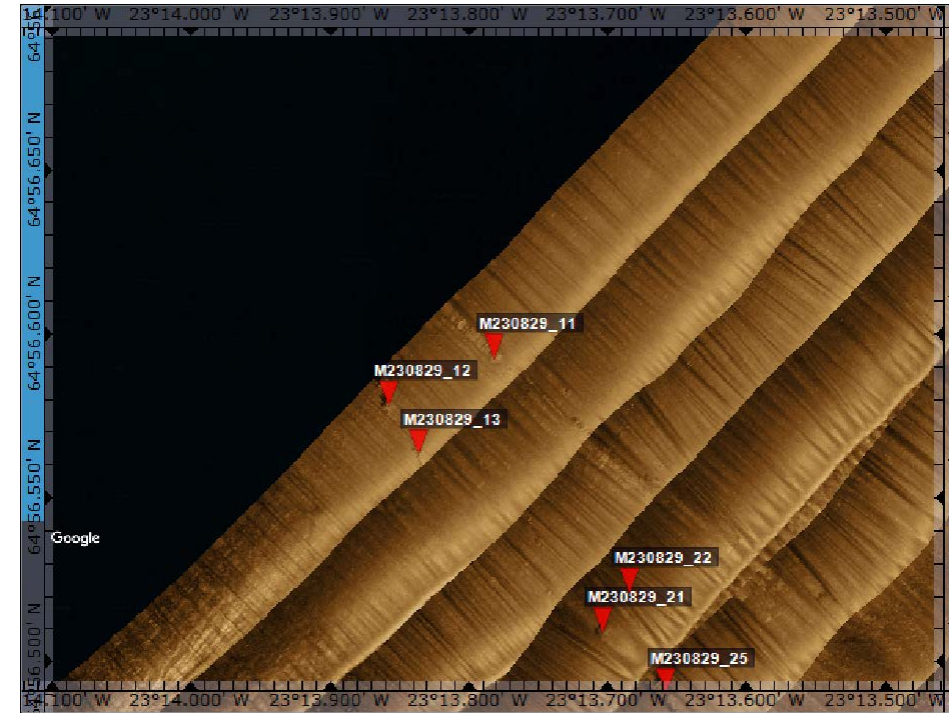


M230829\_10



**Name** M230829\_10  
**Position** 64°55.811' N  
23°15.502' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29  
02:06

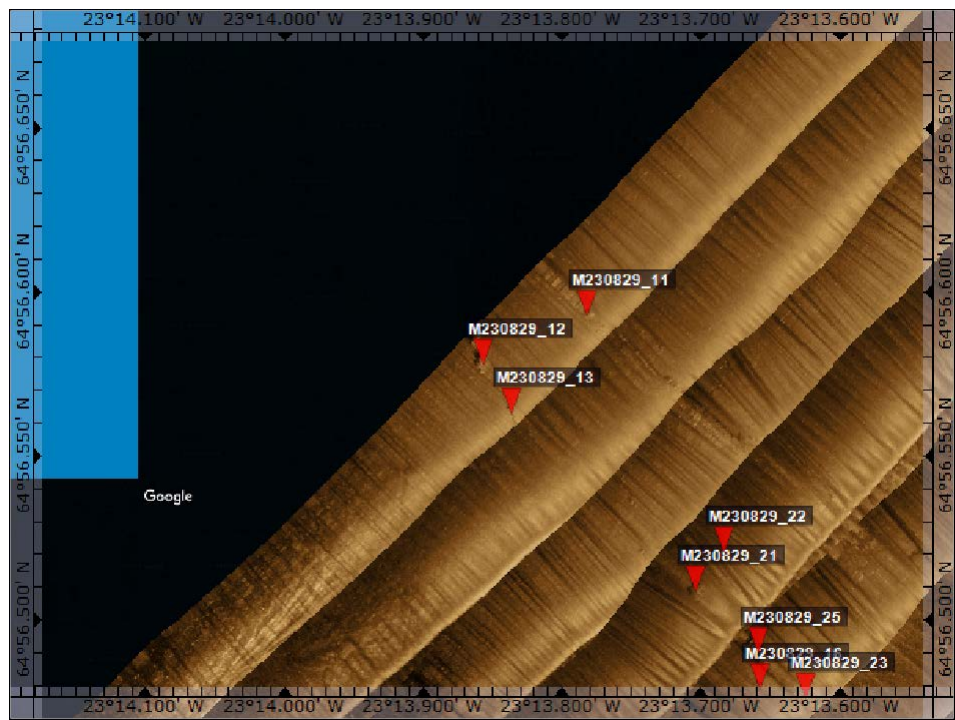
M230829\_11



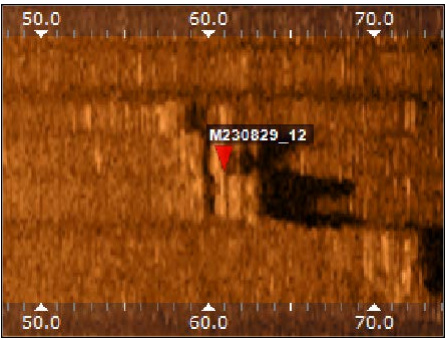
**Name** M230829\_11  
**Position** 64°56.592' N  
23°13.782' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29  
02:07



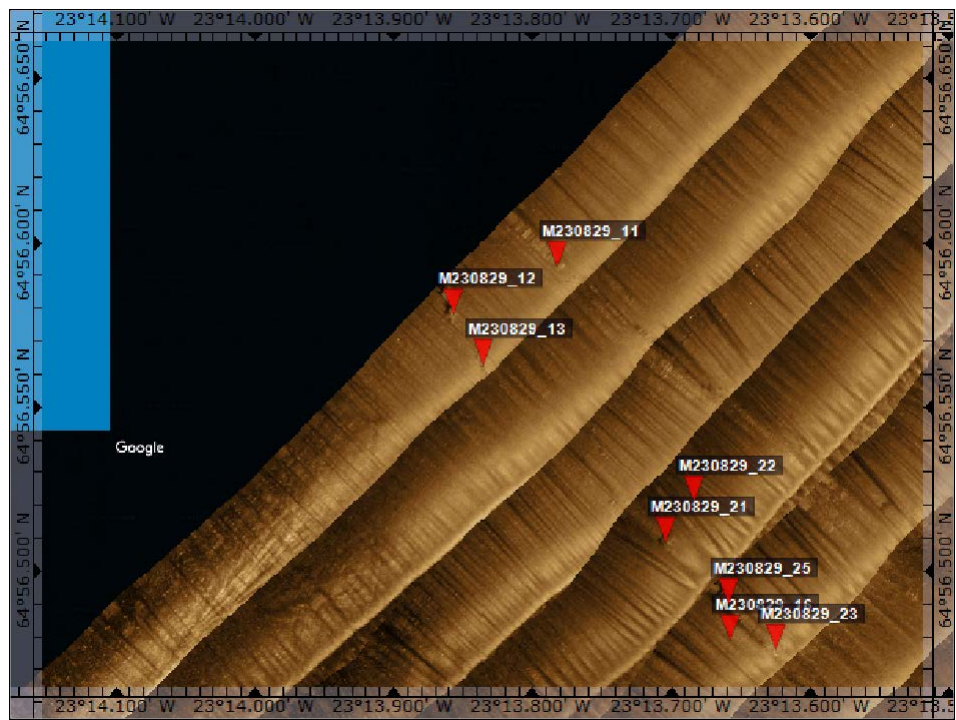
M230829\_12



**Name** M230829\_12  
**Position** 64°56.578' N  
23°13.857' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29  
02:07



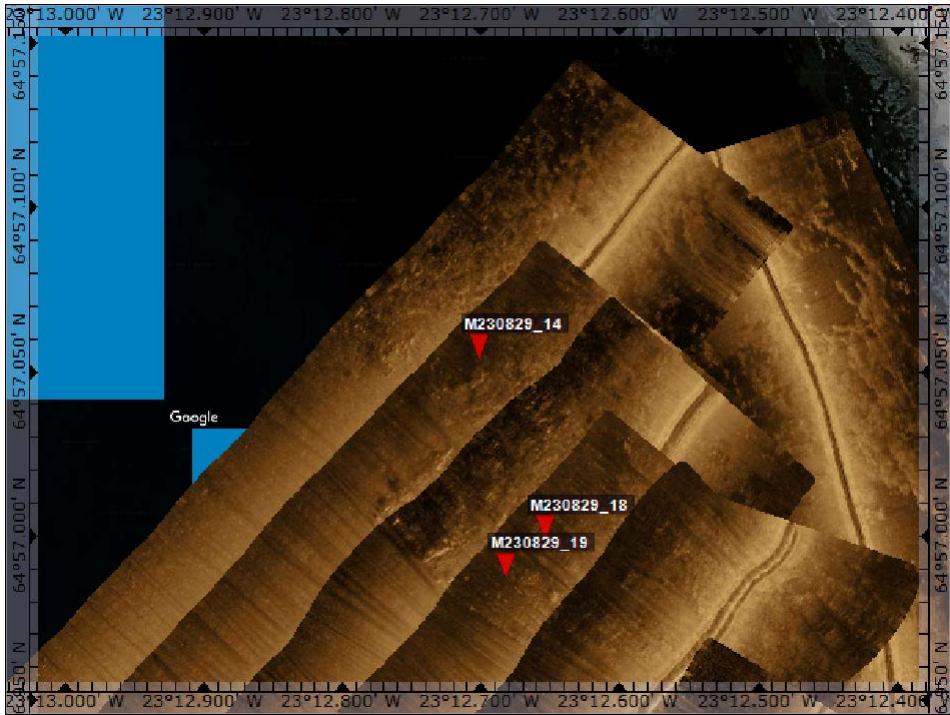
M230829\_13



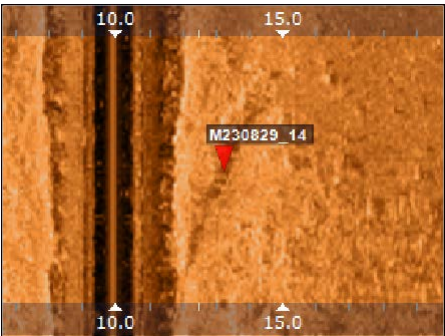
**Name** M230829\_13  
**Position** 64°56.563' N  
23°13.836' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29  
02:07



M230829\_14



**Name** M230829\_14  
**Position** 64°57.053' N  
23°12.702' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29 02:21



M230829\_15

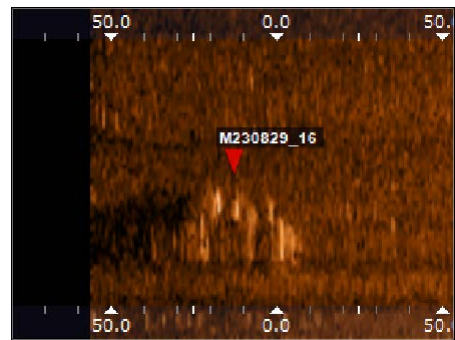


**Name** M230829\_15  
**Position** 64°56.889' N  
23°12.973' W  
**Source** Side Scan File S230828\_2.dvs  
**Created** 2023-08-29 02:22



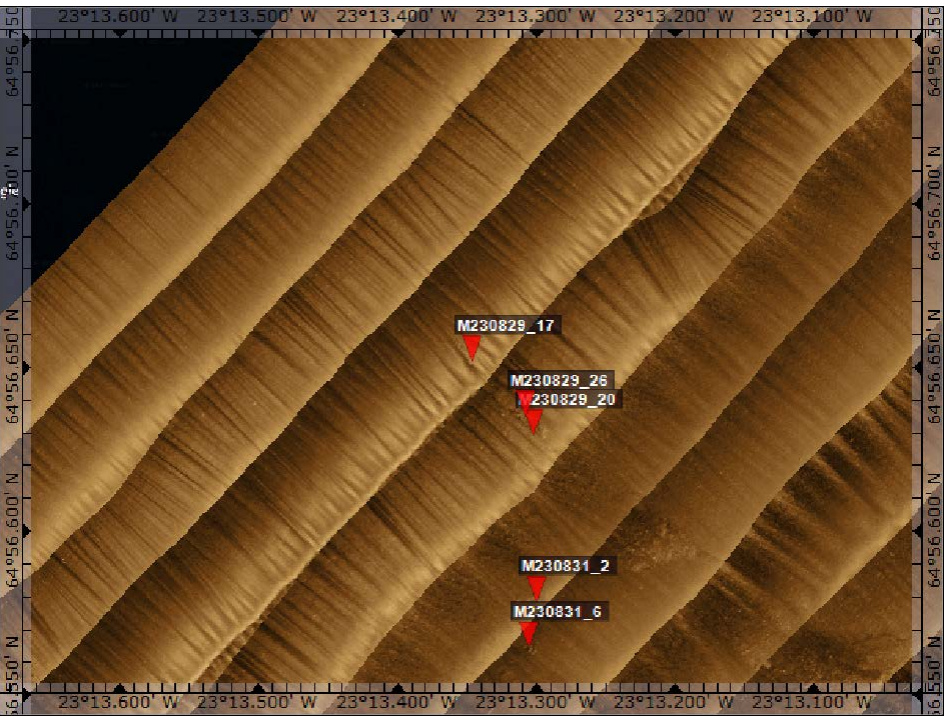


M230829\_16



**Name** M230829\_16  
**Position** 64°56.478' N  
23°13.657' W  
**Source** Side Scan File S230828\_4.dvs  
**Created** 2023-08-29  
22:47

M230829\_17

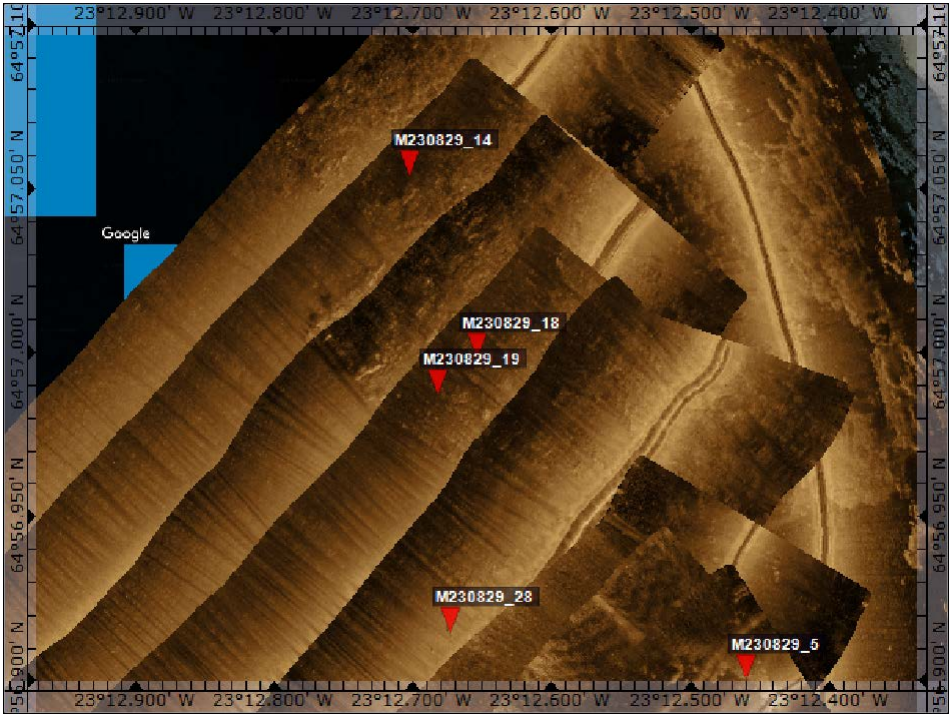


**Name** M230829\_17  
**Position** 64°56.652' N  
23°13.347' W  
**Source** Side Scan File S230828\_4.dvs  
**Created** 2023-08-29  
22:48

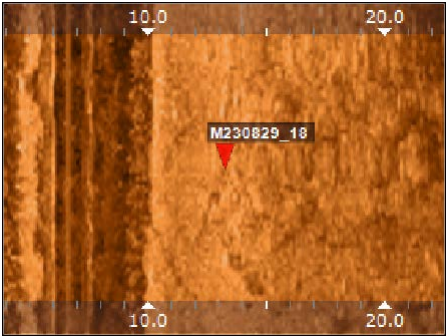




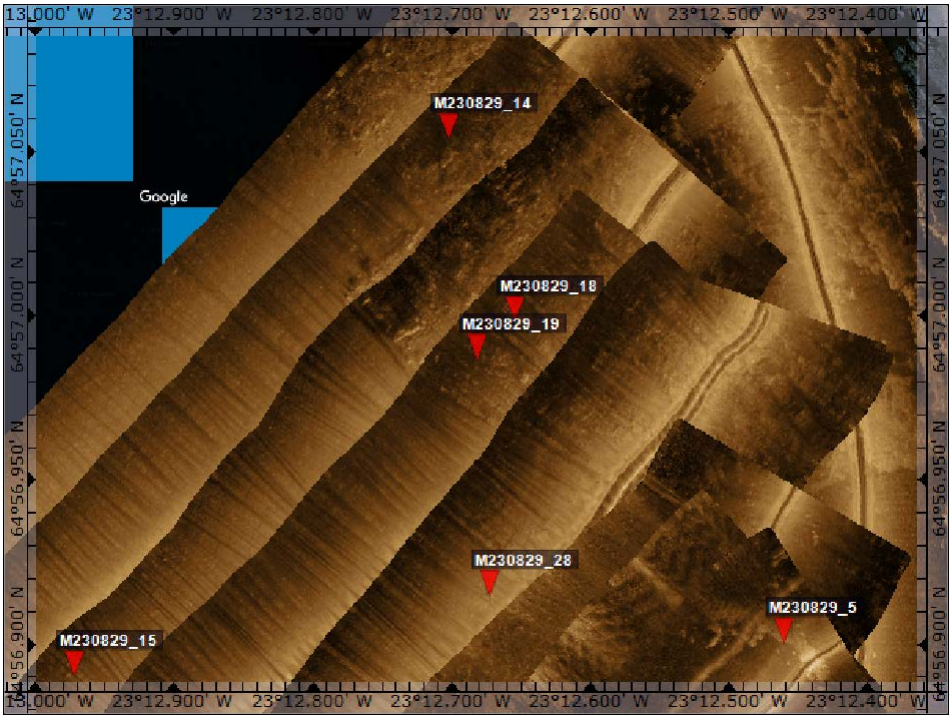
M230829\_18



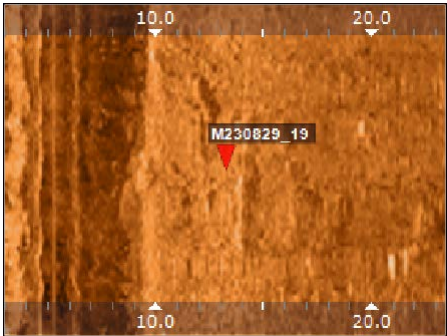
**Name** M230829\_18  
**Position** 64°56.998' N  
23°12.654' W  
**Source** Side Scan File S230828\_4.dvs  
**Created** 2023-08-29  
22:49



M230829\_19



**Name** M230829\_19  
**Position** 64°56.986' N  
23°12.682' W  
**Source** Side Scan File S230828\_4.dvs  
**Created** 2023-08-29  
22:49

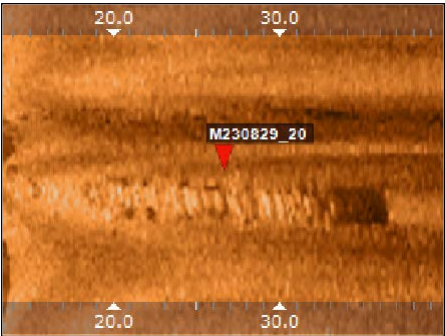




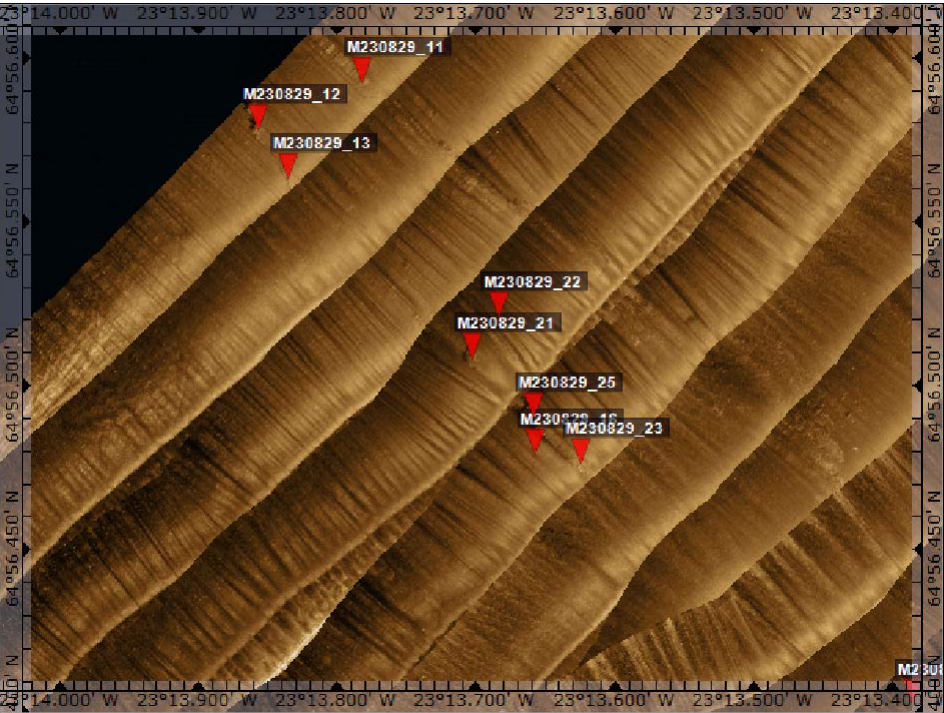
M230829\_20



**Name** M230829\_20  
**Position** 64°56.629' N  
23°13.302' W  
**Source** Side Scan File S230828\_6.dvs  
**Created** 2023-08-29  
22:51



M230829\_21

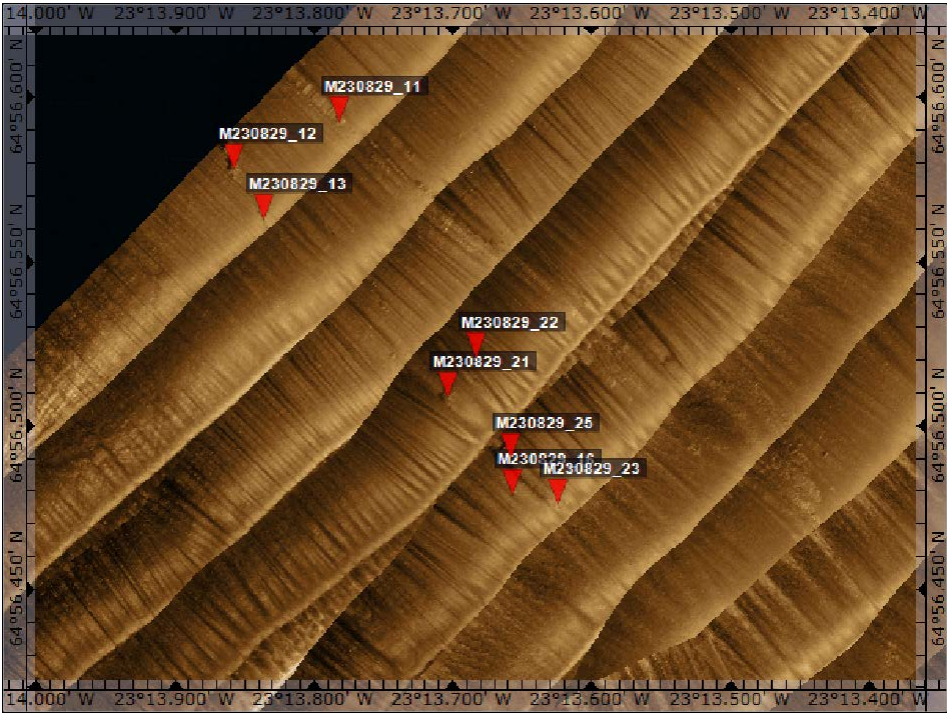


**Name** M230829\_21  
**Position** 64°56.508' N  
23°13.703' W  
**Source** Side Scan File S230828\_6.dvs  
**Created** 2023-08-29  
22:51





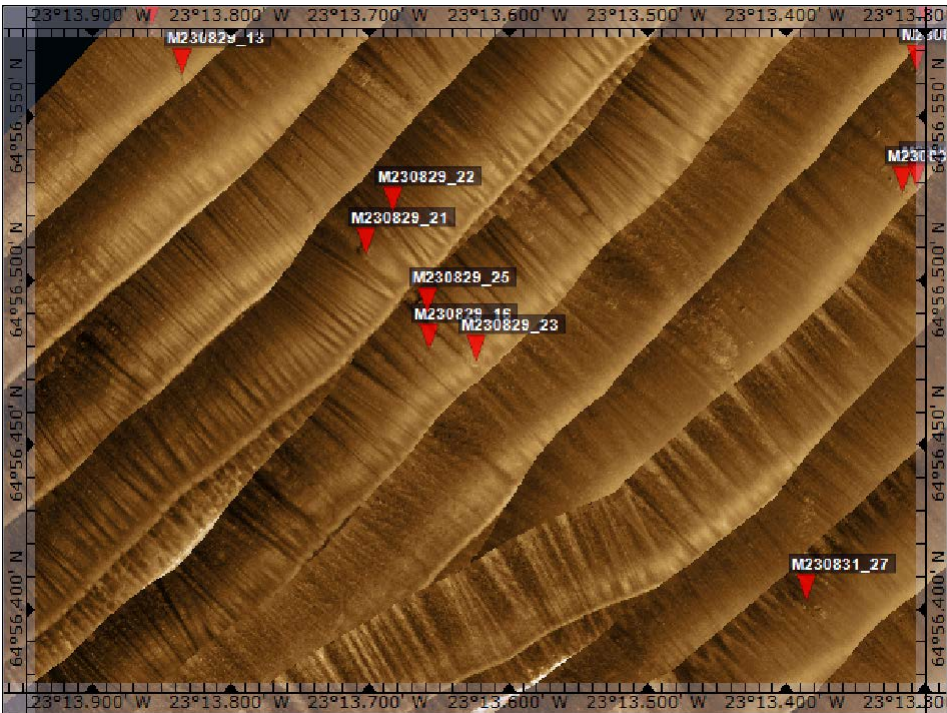
M230829\_22



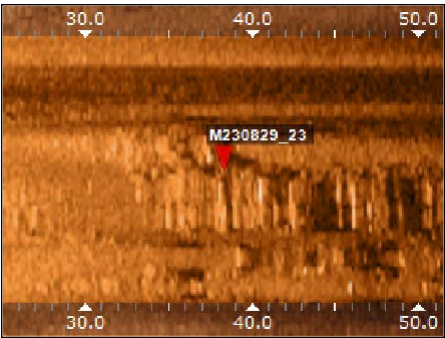
Name M230829\_22  
Position 64°56.520' N  
23°13.684' W  
Source Side Scan File S230828\_6.dvs  
Created 2023-08-29  
22:51



M230829\_23



Name M230829\_23  
Position 64°56.475' N  
23°13.624' W  
Source Side Scan File S230828\_6.dvs  
Created 2023-08-29  
22:52

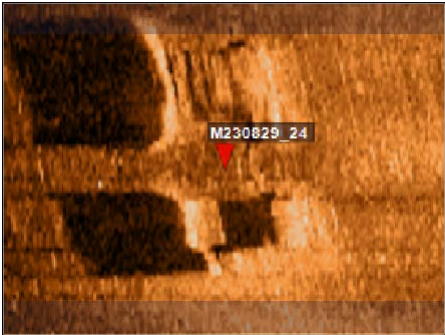




M230829\_24



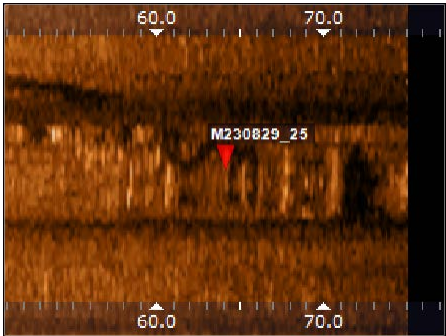
**Name** M230829\_24  
**Position** 64°55.724' N  
23°15.291' W  
**Source** Side Scan File S230828\_7.dvs  
**Created** 2023-08-29  
22:53



M230829\_25

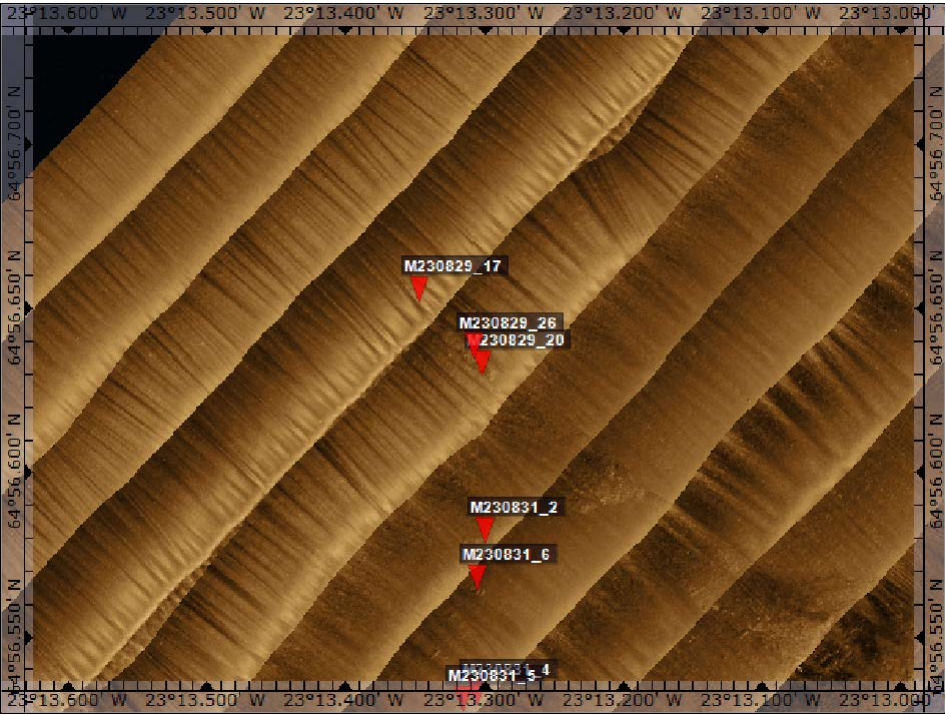


**Name** M230829\_25  
**Position** 64°56.489' N  
23°13.658' W  
**Source** Side Scan File S230828\_7.dvs  
**Created** 2023-08-29  
22:54

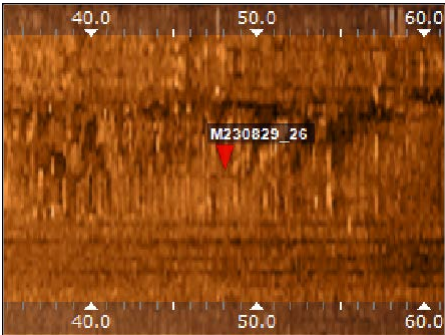




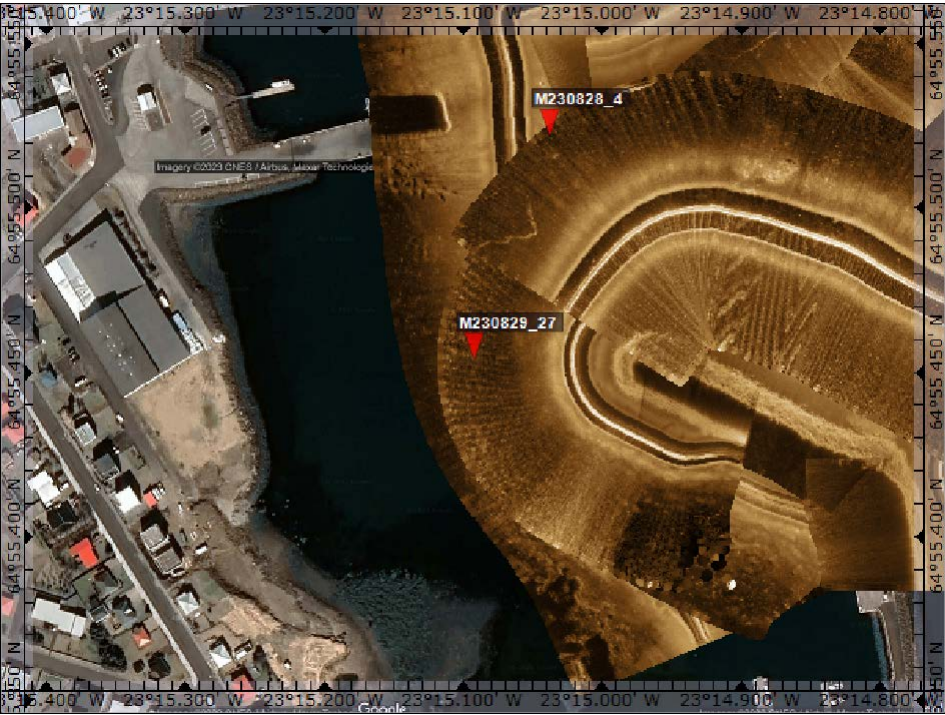
M230829\_26



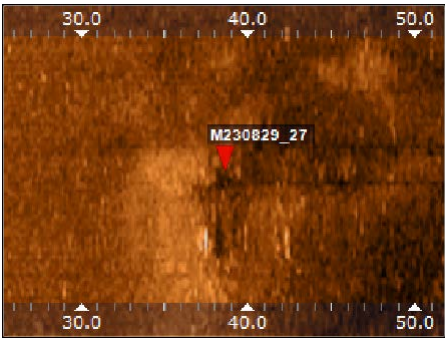
**Name** M230829\_26  
**Position** 64°56.634' N  
23°13.308' W  
**Source** Side Scan File S230828\_7.dvs  
**Created** 2023-08-29  
22:54



M230829\_27

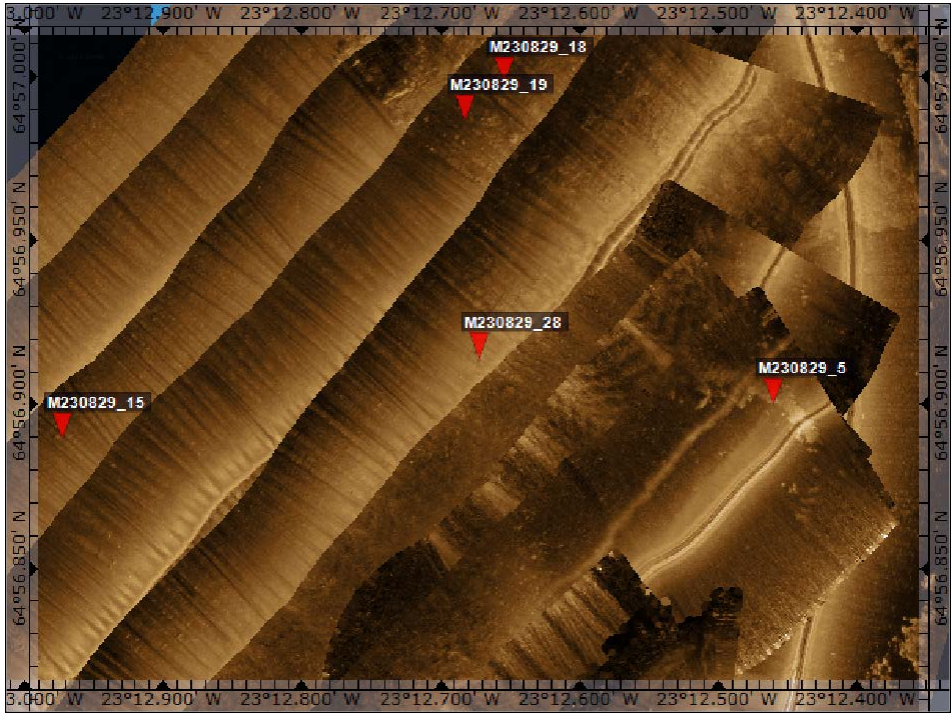


**Name** M230829\_27  
**Position** 64°55.454' N  
23°15.093' W  
**Source** Side Scan File S230828\_8.dvs  
**Created** 2023-08-29  
22:56

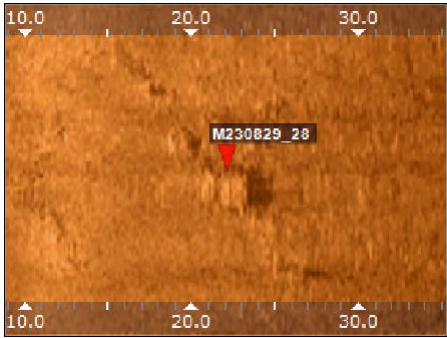




M230829\_28



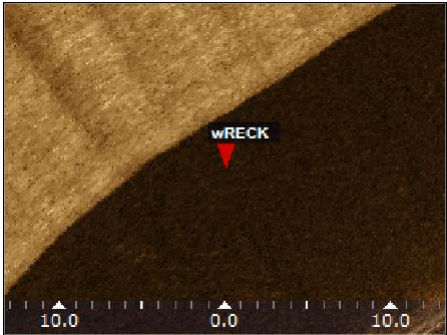
**Name** M230829\_28  
**Position** 64°56.914' N  
23°12.673' W  
**Source** Side Scan File S230828\_7.dvs  
**Created** 2023-08-29  
22:59



WRECK SITE Location



**Name** WRECK Site Location  
**Position** 64°55.983' N  
23°13.167' W  
**Source** Map Viewer  
**Created** 2023-08-30  
17:23

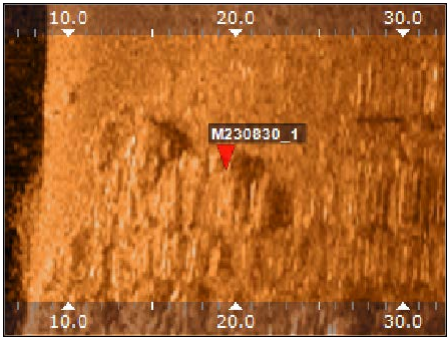




M230830\_1



**Name** M230830\_1  
**Position** 64°56.037' N  
23°12.905' W  
**Source** Side Scan File S230830\_19.dvs  
**Created** 2023-08-30  
18:21



M230830\_2

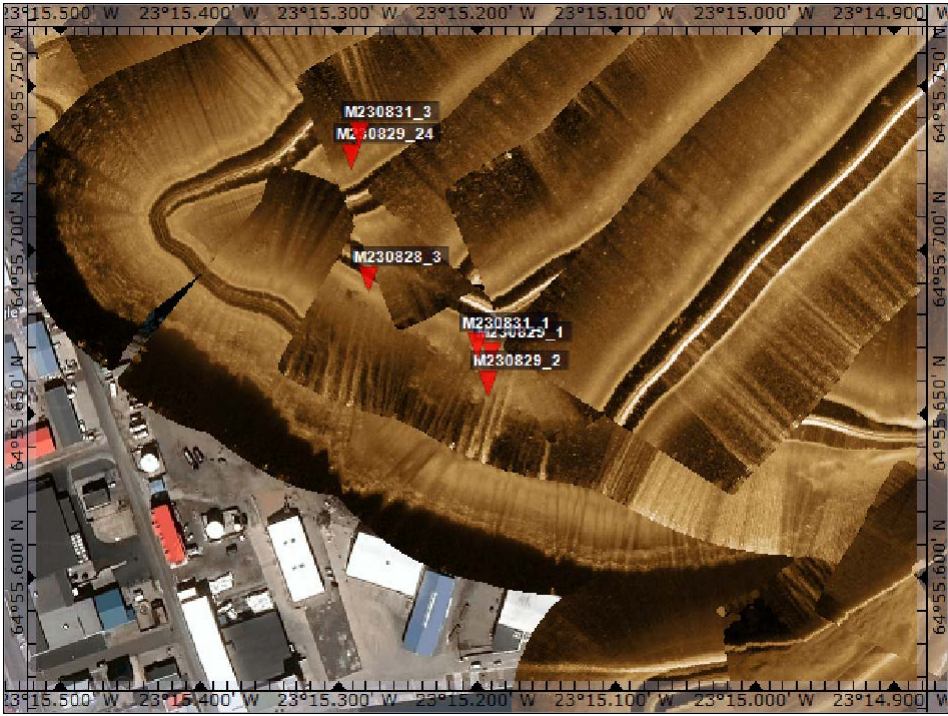


**Name** M230830\_2  
**Position** 64°56.008' N  
23°12.859' W  
**Source** Side Scan File S230830\_20.dvs  
**Created** 2023-08-30  
18:51

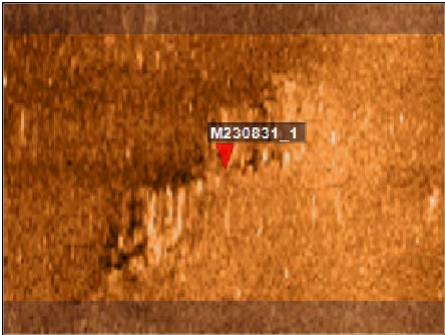




M230831\_1



**Name** M230831\_1  
**Position** 64°55.667' N  
23°15.201' W  
**Source** Side Scan File S230830\_1.dvs  
**Created** 2023-08-31  
00:21



M230831\_2

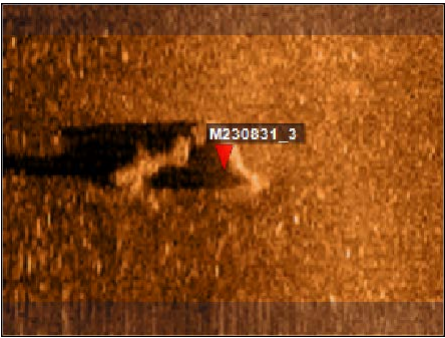


**Name** M230831\_2  
**Position** 64°56.578' N  
23°13.300' W  
**Source** Side Scan File S230830\_2.dvs  
**Created** 2023-08-31  
00:22



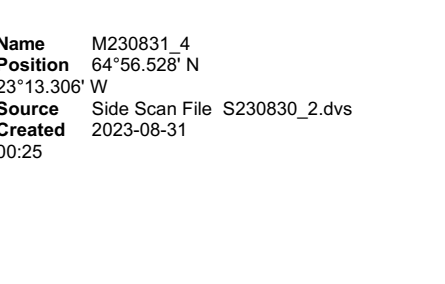
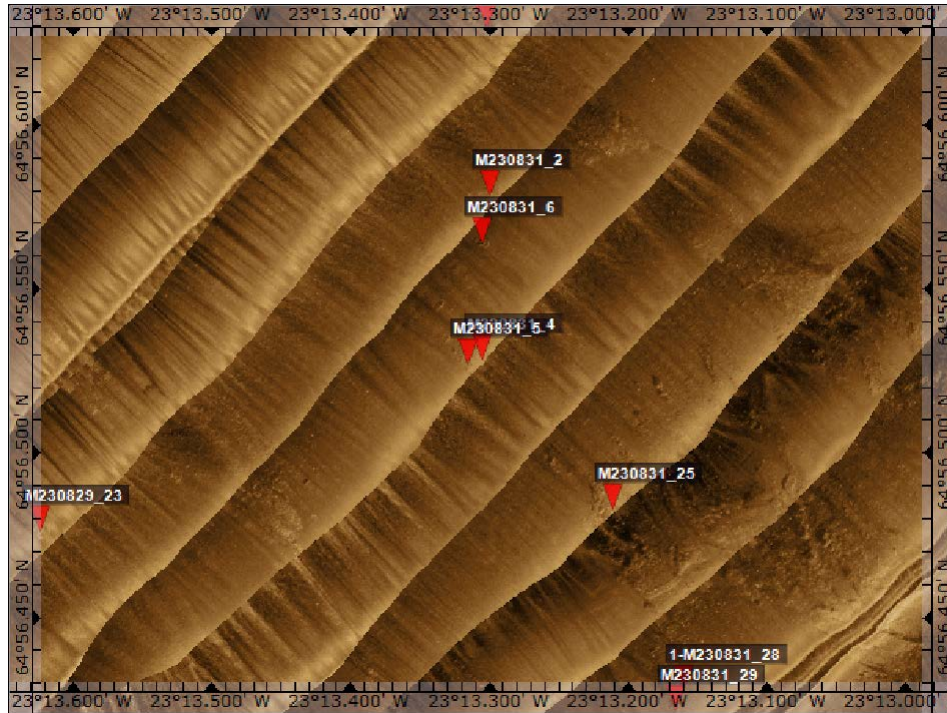


M230831\_3



**Name** M230831\_3  
**Position** 64°55.731' N  
23°15.286' W  
**Source** Side Scan File S230830\_2.dvs  
**Created** 2023-08-31  
00:23

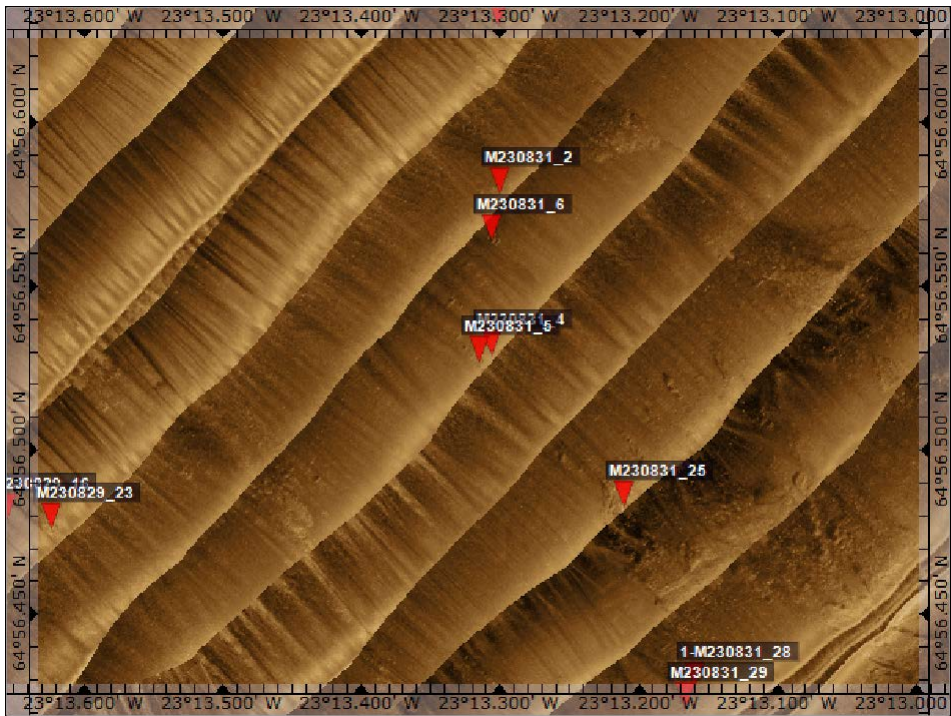
M230831\_4



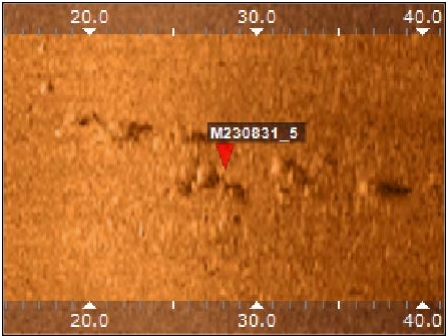
**Name** M230831\_4  
**Position** 64°56.528' N  
23°13.306' W  
**Source** Side Scan File S230830\_2.dvs  
**Created** 2023-08-31  
00:25



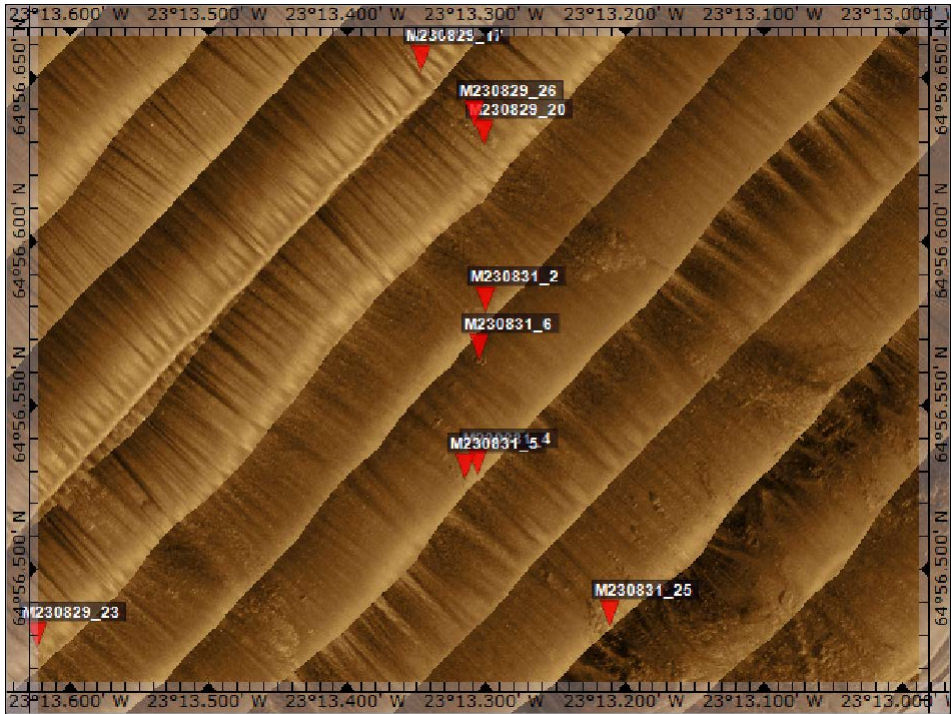
M230831\_5



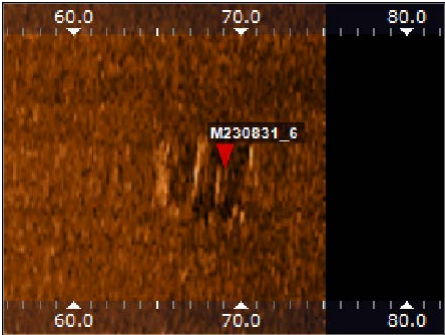
**Name** M230831\_5  
**Position** 64°56.527' N  
23°13.316' W  
**Source** Side Scan File S230830\_5.dvs  
**Created** 2023-08-31  
00:29



M230831\_6

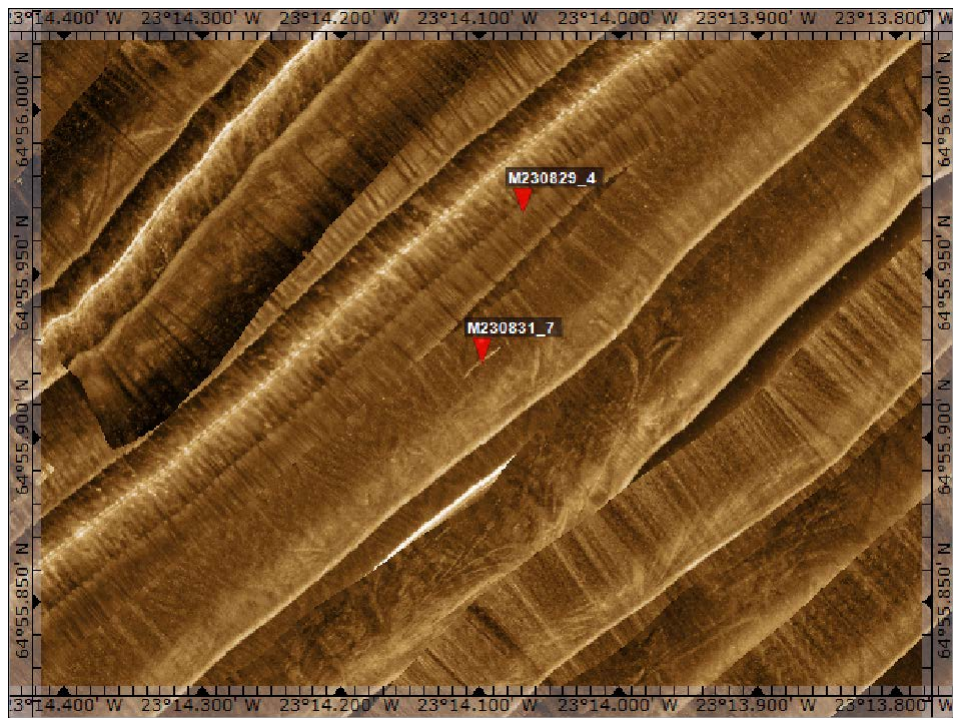


**Name** M230831\_6  
**Position** 64°56.564' N  
23°13.306' W  
**Source** Side Scan File S230830\_5.dvs  
**Created** 2023-08-31  
00:30



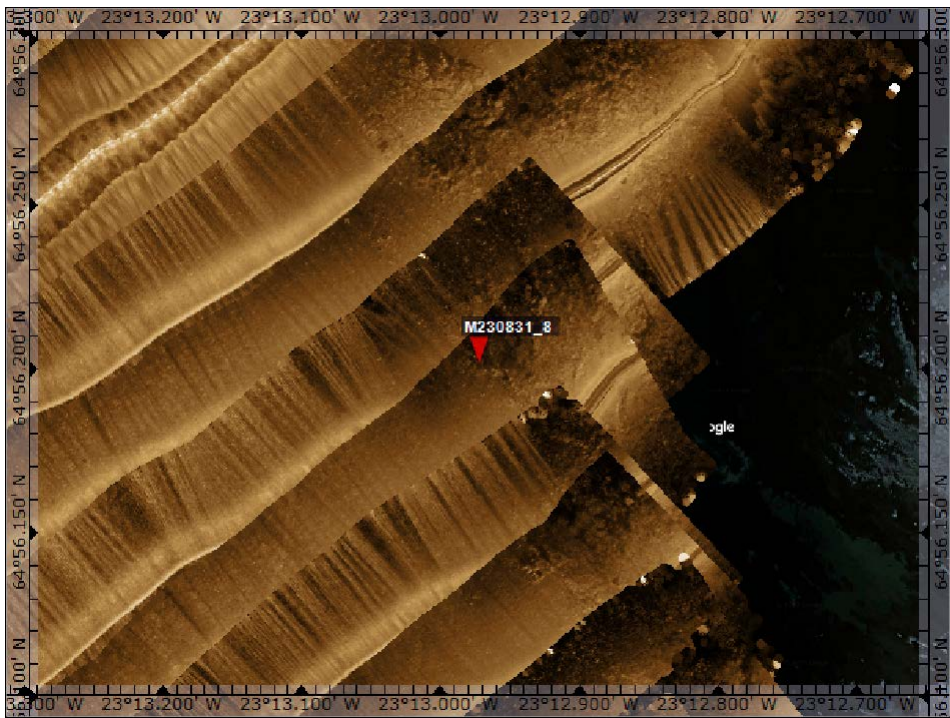


M230831\_7



**Name** M230831\_7  
**Position** 64°55.922' N  
23°14.099' W  
**Source** Side Scan File S230830\_9.dvs  
**Created** 2023-08-31  
00:34

M230831\_8

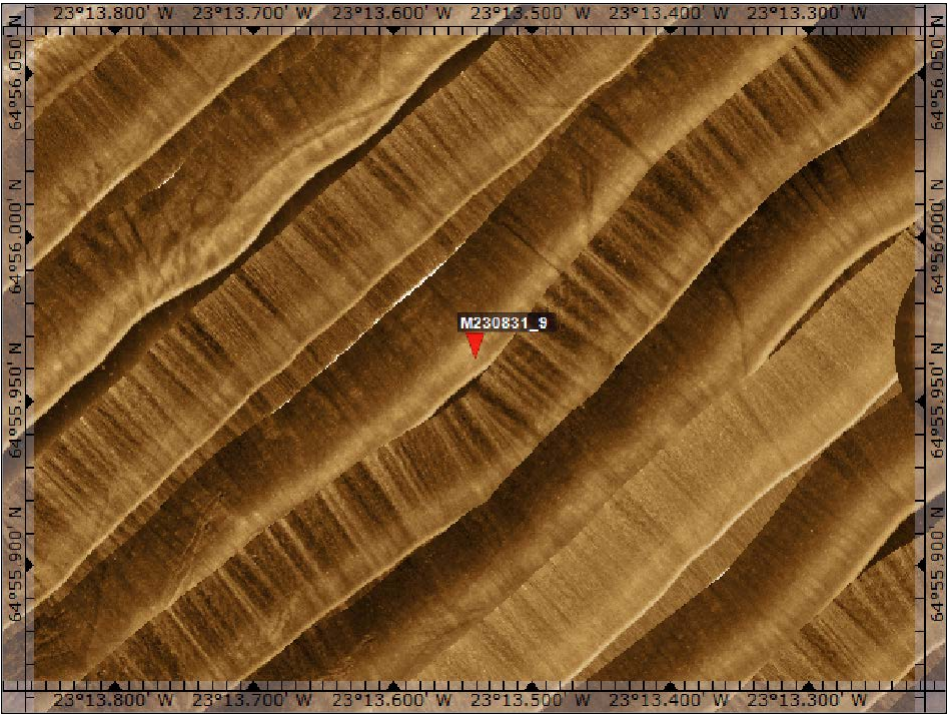


**Name** M230831\_8  
**Position** 64°56.202' N  
23°12.973' W  
**Source** Side Scan File S230830\_12.dvs  
**Created** 2023-08-31  
00:38

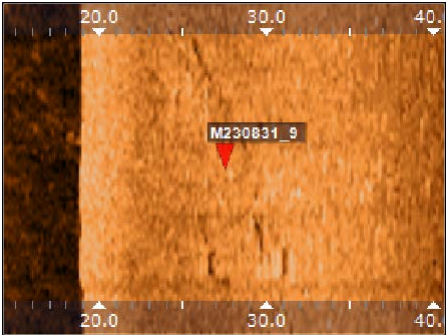




M230831\_9



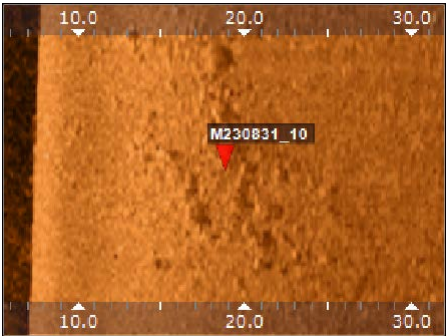
**Name** M230831\_9  
**Position** 64°55.963' N  
23°13.541' W  
**Source** Side Scan File S230830\_13.dvs  
**Created** 2023-08-31  
00:43



M230831\_10

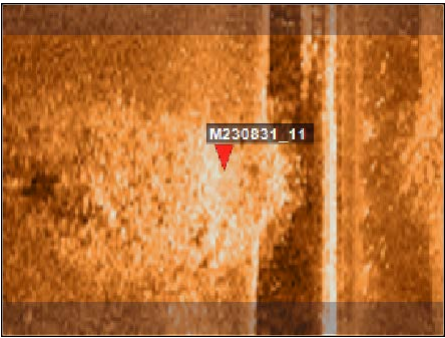


**Name** M230831\_10  
**Position** 64°55.452' N  
23°14.670' W  
**Source** Side Scan File S230830\_14.dvs  
**Created** 2023-08-31  
00:44



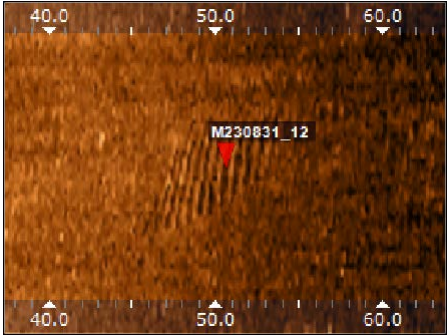
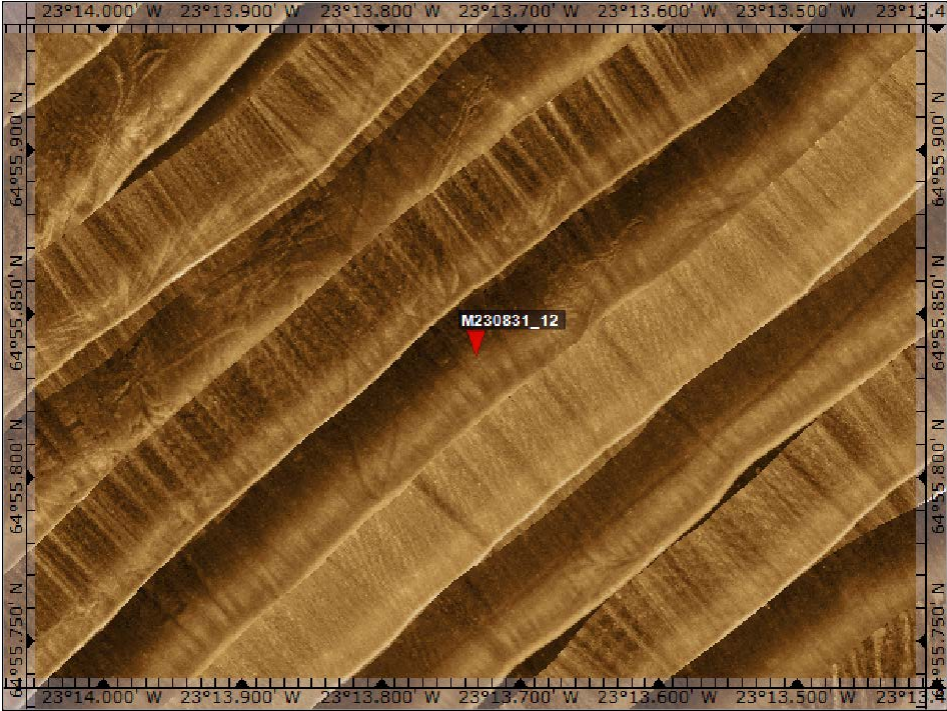


M230831\_11



**Name** M230831\_11  
**Position** 64°55.408' N  
23°14.687' W  
**Source** Side Scan File S230830\_15.dvs  
**Created** 2023-08-31  
00:46

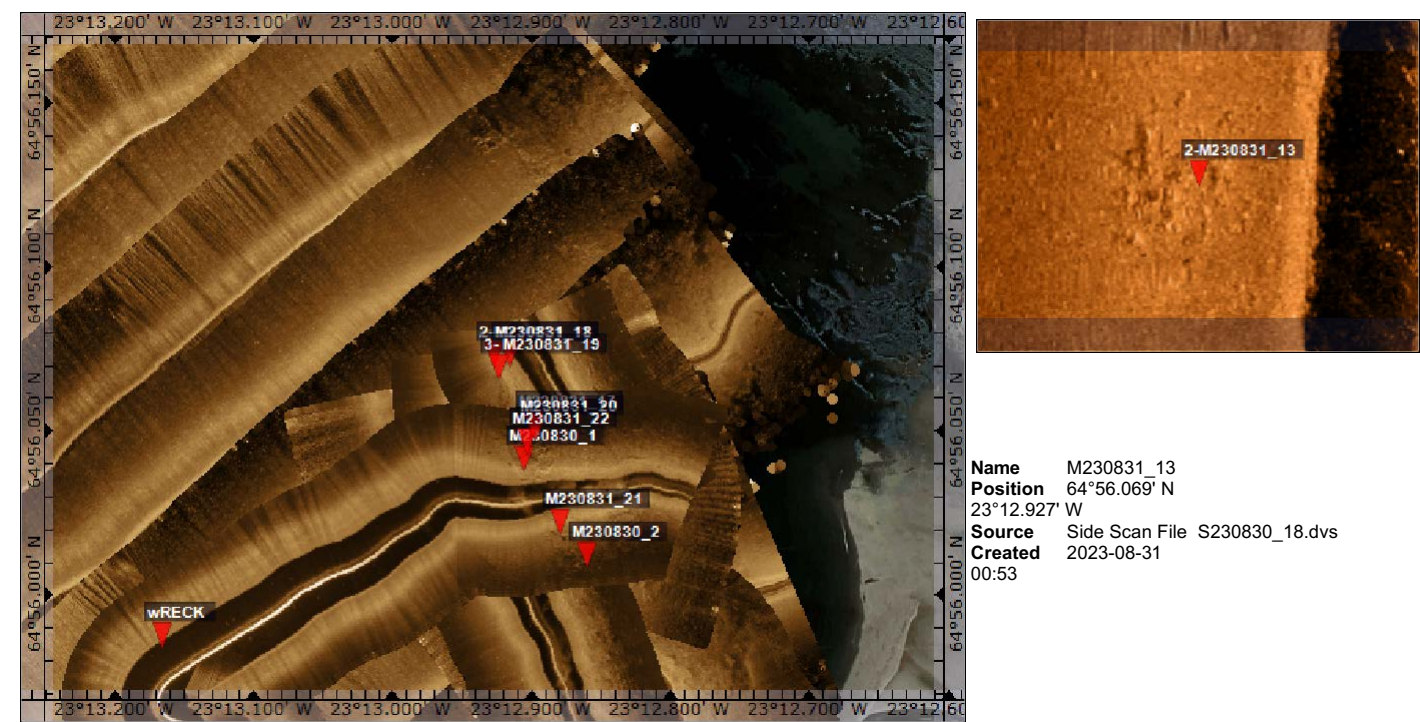
M230831\_12



**Name** M230831\_12  
**Position** 64°55.837' N  
23°13.732' W  
**Source** Side Scan File S230830\_15.dvs  
**Created** 2023-08-31  
00:48



M230831\_13

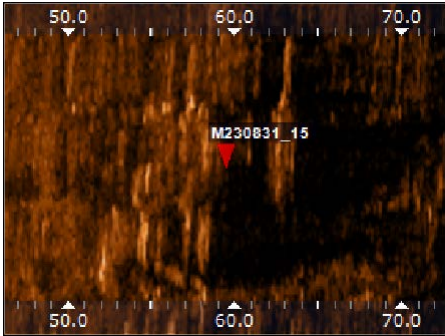


M230831\_14





M230831\_15

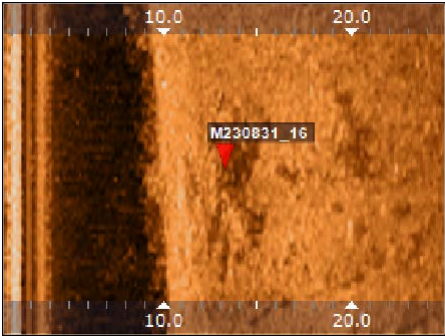


**Name** M230831\_15  
**Position** 64°55.359' N  
23°14.413' W  
**Source** Side Scan File S230830\_20.dvs  
**Created** 2023-08-31  
00:58

M230831\_16

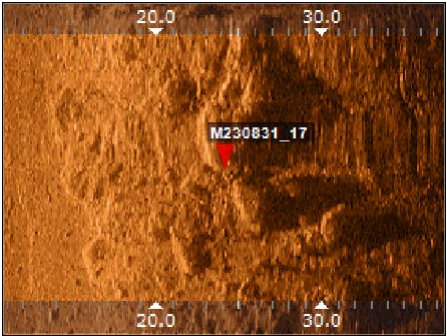


**Name** M230831\_16  
**Position** 64°55.915' N  
23°12.817' W  
**Source** Side Scan File S230830\_22.dvs  
**Created** 2023-08-31  
01:03





M230831\_17

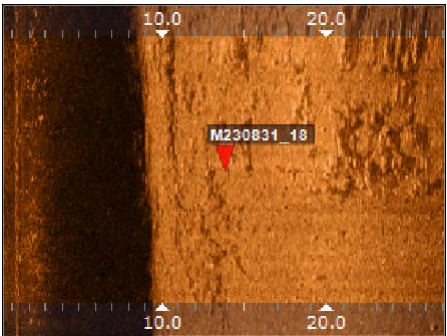


**Name** M230831\_17  
**Position** 64°56.048' N  
23°12.899' W  
**Source** Side Scan File S230830\_29.dvs  
**Created** 2023-08-31  
01:10

M230831\_18



**Name** M230831\_18  
**Position** 64°56.069' N  
23°12.915' W  
**Source** Side Scan File S230830\_30.dvs  
**Created** 2023-08-31  
01:11

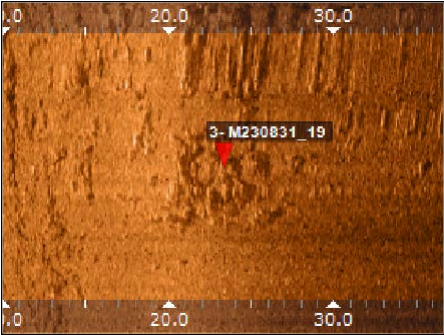




M230831\_19



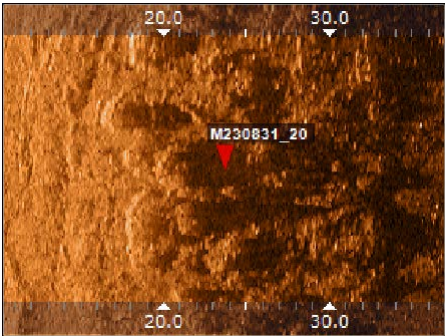
**Name** M230831\_19  
**Position** 64°56.065' N  
23°12.923' W  
**Source** Side Scan File S230830\_30.dvs  
**Created** 2023-08-31  
01:11



M230831\_20



**Name** M230831\_20  
**Position** 64°56.046' N  
23°12.897' W  
**Source** Side Scan File S230830\_30.dvs  
**Created** 2023-08-31  
01:11



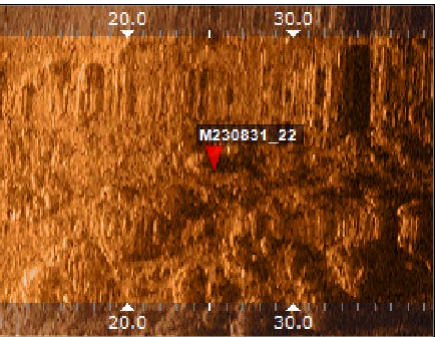


M230831\_21



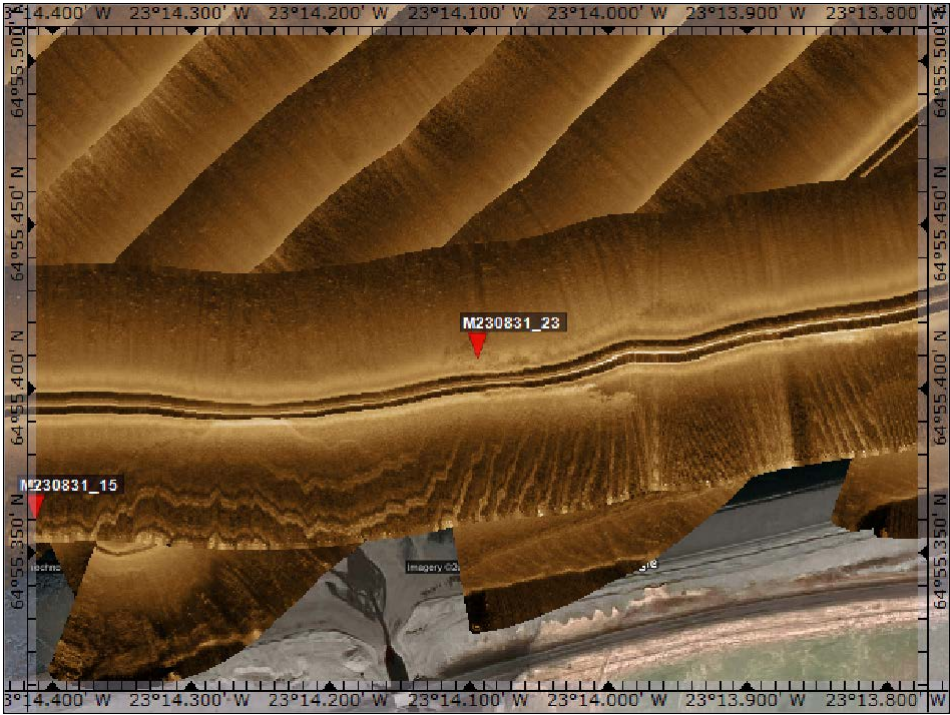
Name M230831\_21  
Position 64°56.018' N  
23°12.879' W  
Source Side Scan File S230830\_31.dvs  
Created 2023-08-31  
01:13

M230831\_22

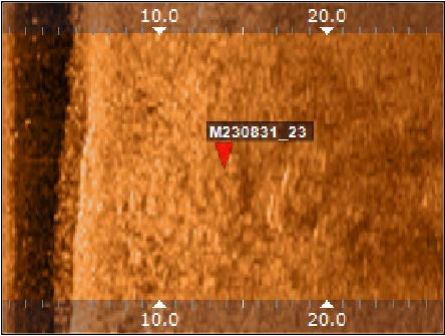


Name M230831\_22  
Position 64°56.042' N  
23°12.904' W  
Source Side Scan File S230830\_31.dvs  
Created 2023-08-31  
01:13

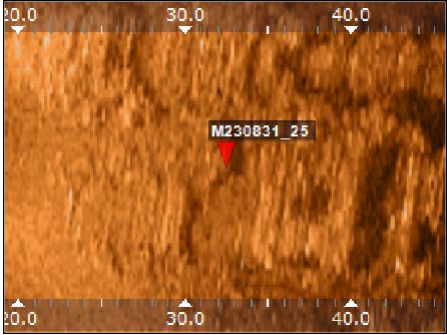
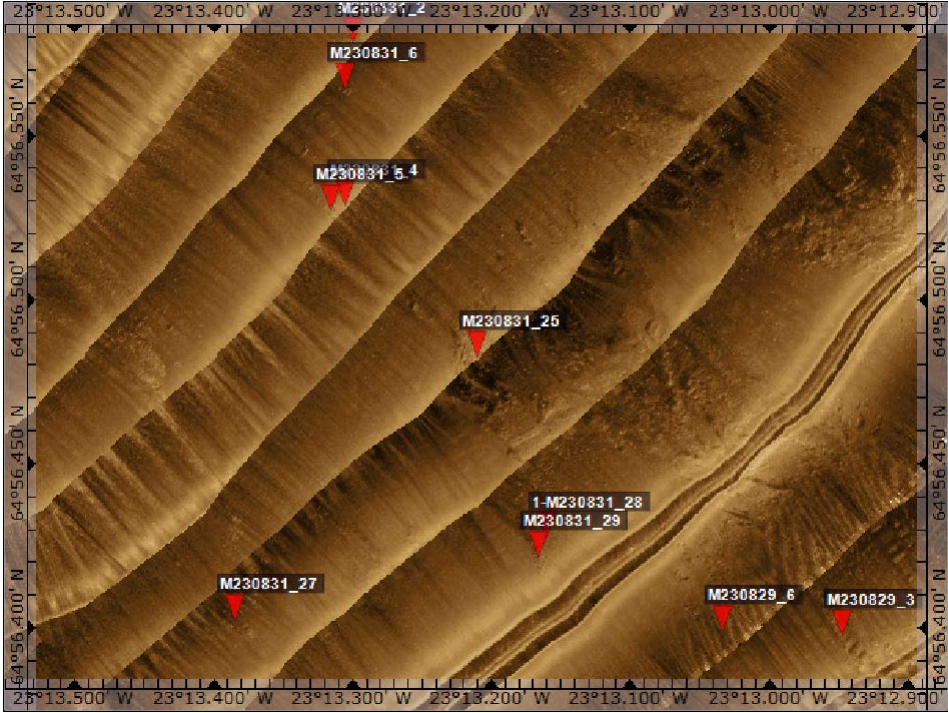




Name M230831\_23  
Position 64°55.409' N  
23°14.095' W  
Source Side Scan File S230830\_33.dvs  
Created 2023-08-31  
01:16



M230831\_25

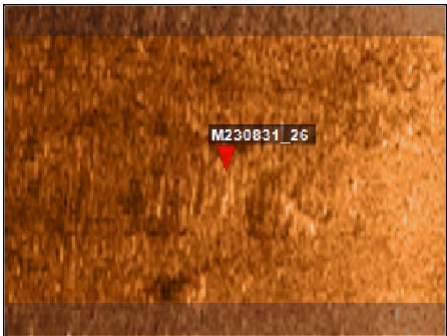


**Name** M230831\_25  
**Position** 64°56.482' N  
23°13.211' W  
**Source** Side Scan File S230831\_1.dvs  
**Created** 2023-08-31  
13:00

M230831\_26

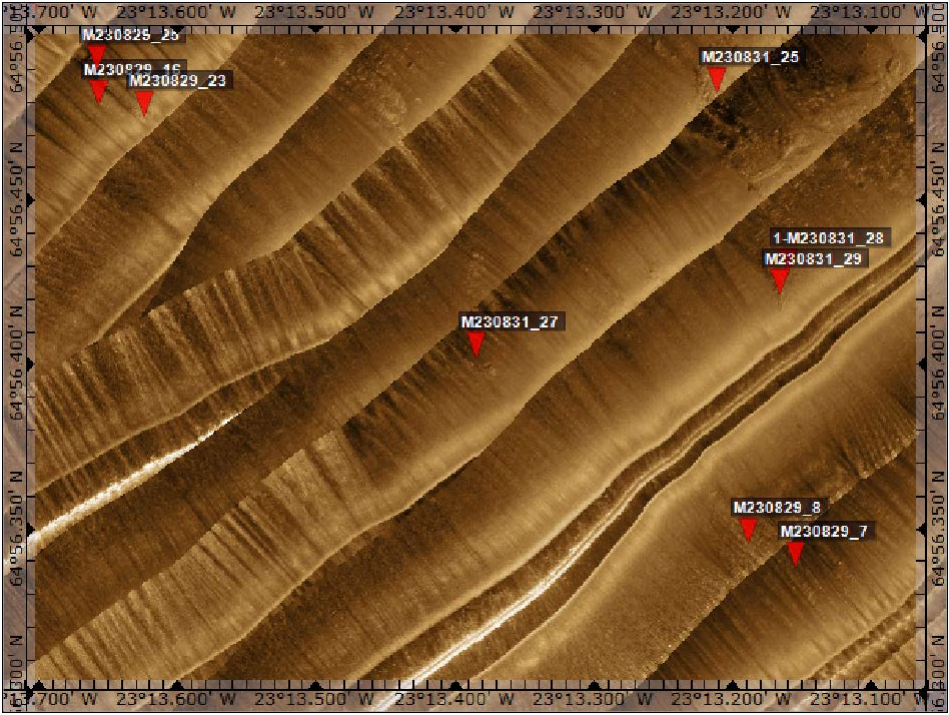


**Name** M230831\_26  
**Position** 64°56.736' N  
23°12.757' W  
**Source** Side Scan File S230831\_1.dvs  
**Created** 2023-08-31  
13:00

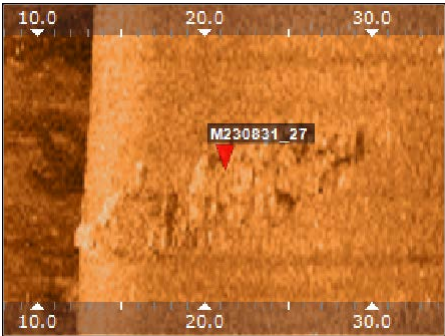




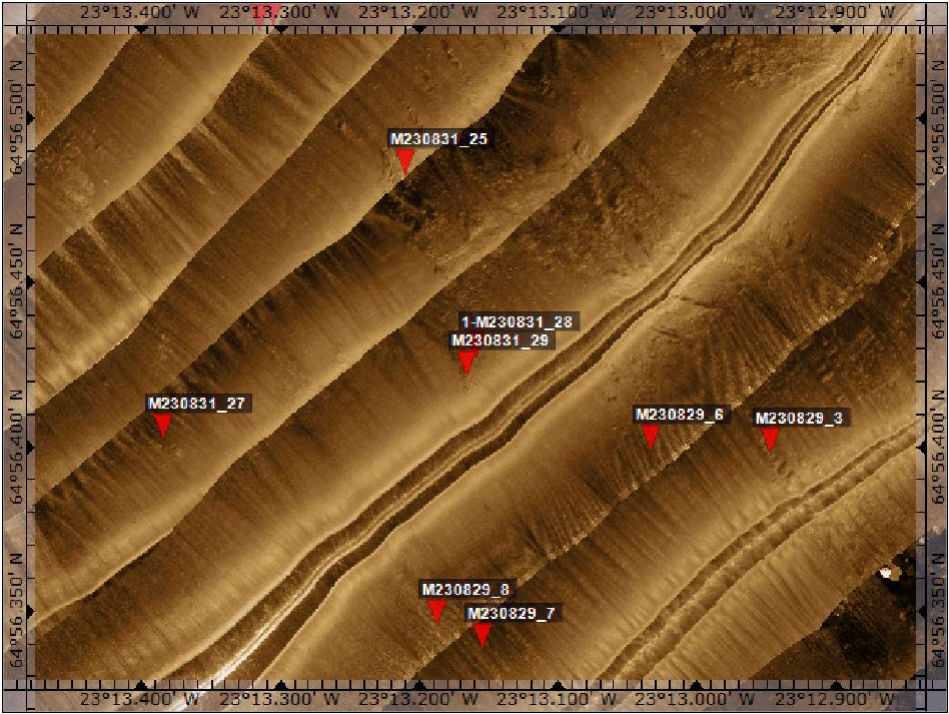
M230831\_27



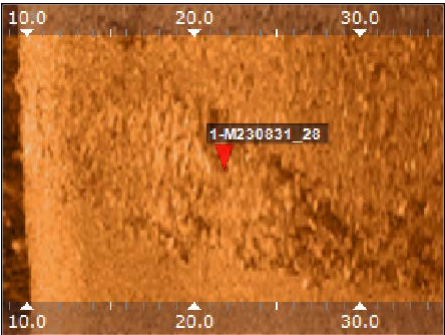
**Name** M230831\_27  
**Position** 64°56.402' N  
23°13.385' W  
**Source** Side Scan File S230831\_2.dvs  
**Created** 2023-08-31  
13:02



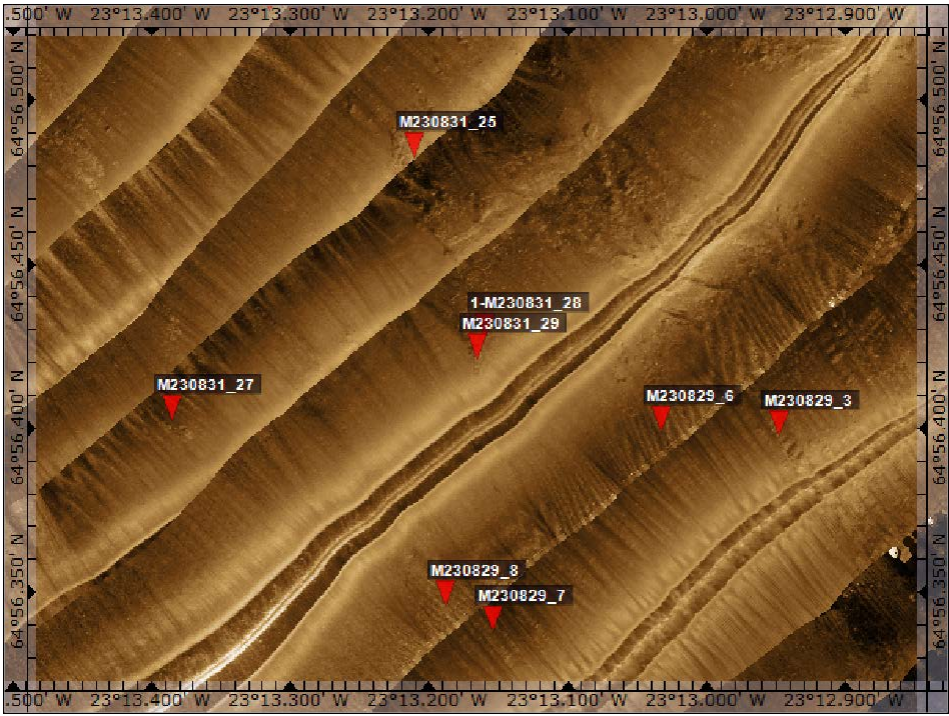
M230831\_28



**Name** M230831\_28  
**Position** 64°56.427' N  
23°13.160' W  
**Source** Side Scan File S230831\_3.dvs  
**Created** 2023-08-31  
13:03



M230831\_29



**Name** M230831\_29  
**Position** 64°56.421' N  
23°13.166' W  
**Source** Side Scan File S230831\_4.dvs  
**Created** 2023-08-31  
13:0

