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DGEC - Fécamp 2DUHRS and UXO Survey

UXO Factual Report - Accepted

Project Document Code	6168_2-RR-02-A

Revision	Date	Description of Revision	Author	Checked	Approved
2.0	18/02/2025	Accepted	ARE	EVA	AMO

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REVISION HISTORY

The table on this page should be used to explain the reason for the report revision and what has changed since the previous revision. It is the holder's responsibility to check that they hold the latest validated version.

Rev.	Date	Reason for amendments	Section changes from previous version
0.1	14/01/2025	Internal revision	Minor corrections
1.0	14/01/2025	For Client review	
2.0	18/02/2025	Client comments addressed, Accepted	Ref. '6168_2-RR-02_UXO Factual Report_Fecamp_Rev1.0_CS_DNV_20240129'

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Appendix A: ALARP box charts (within this document)
Appendix B: ALARP certificates

DEFINITIONS AND ABBREVIATIONS

Throughout this document the following terminology is used:

DGEC *Direction Générale de l'Energie et du Climat (DGEC) (Client)*
GEOxyz *GEOxyz (Contractor)*
Geomines *Geomines (Sub-contractor)*

The abbreviations and units listed in the table below are used within this report. Where abbreviations used in this document are not included in this table, it may be assumed that they are either equipment brand names or company names.

Acronym	Description	Acronym	Description
ALARP	As Low As Reasonably Practicable	QC	Quality Control
ASCII	American Standard Code for Information Interchange	QINSy	Quality Integrated Navigation System
DTM	Digital Terrain Model	QPS	Quality Positioning Services B.V.
EGN	Empirical Gain Normalisation	RGB	Red Green Blue
EPSG	European Petroleum Survey Group	RX	Receiver
FMGT	Fledermaus Geocoder Toolbox	Rev	Revision
GNSS	Global Navigation Satellite System	SHOM	Service Hydrographique et Oceanographique de la Marine
GOVI	Geo Ocean VI	SSS	Side Scan Sonar
GRS80	Geodetic Reference System 1980	SVS	Sound Velocity Sensor
HF	High Frequency	SW	Southwest
HSE	Health, Safety and Environment	SWL	Safe Working Limit
HiPAP	High precision acoustic positioning	THU	Total Horizontal Uncertainty
IMU	Inertial Measurement Unit	TVG	Time Varied Gain
INS	Inertial Navigation System	TVU	Total Vertical Uncertainty
LAT	Lowest Astronomical Tide	UHR	Ultra-High Resolution
LF	Low Frequency	UHRS	Ultra-High Resolution Seismic
MAG	Magnetometer	USBL	Ultra-Short Baseline
MBES	Multibeam Echosounder	UTC	Universal Time Coordinated
MRU	Motion Reference Unit	UTM	Universal Transverse Mercator
OR	Operation Report	UXO	Unexploded Ordnance
PBMA	Plus Basses Mers Astronomiques	WGS84	World Geodetic System 1984
PPS	Pulse per Second	ZDA	NMEA-0813 Date Time Message String (UTC, day, month, year, and local time zone offset)
Port	Portside	ZH	Zero Hydrographic

REFERENCE DOCUMENTATION

Client Reference Documents

Documentation provided by the Client for the project is listed below.

Document Code/Category	Title
2023-DGEC-07 CCAP	Administrative clauses
2023-DGEC-07-RC	Tendering rules
2023-DGEC-07 AE annexe 2	Commitment on deadlines
2023-DGEC-07 CCTP	Technical proposal
Scenarios_Fecamp	Offshore surveys (2 options)
DTS_BRGM	Desktop studies (geological)
DTS_SHOM	Desktop studies (bathymetry)
DTS_UXO	Desktop studies (UXO)

Company and Project Documents

Document Code/Category	Title
6168_2-PEP-01	Project Execution Plan
6168-PF-01	Processing Flow
6168_2-PDR-01	Project Document Register
6168_2-HSE-01	HSE Plan
6168_2-DDL-01	Data Deliverables List
6168_2-ERB-01	Emergency Response & Bridging Document
6168_2-PQP-01	Project Quality Plan
6168_2-PRA-01	Project Risk Assessment
6168_2-CM-01	Communication Matrix

1 INTRODUCTION

1.1 PROJECT OVERVIEW

As part of the development of offshore wind energy in France, the DGEC is responsible for the technical studies prior to the award of tenders for offshore wind farms. For each area identified as suitable for the development of wind farms, "de-risk studies" were carried out in order to analyse the seabed on the surface and sub-surface.

1.1.1 Areas of Study

Four maritime façades have been identified to cover the areas where the development of offshore wind power is envisaged (Figure 1-1). The purpose of the contract is to carry out geophysical and UXO de-risking studies for approximately seven to eight sites spread throughout the metropolitan territory. This territory has been divided into four maritime façades:

- Eastern Channel North Sea (MEMN)
- North Atlantic Western Channel (NAMO)
- South Atlantic (SA)
- Mediterranean (MED)

These sites are located in the continental shelf area, generally between 12 and 50 nautical miles from the coast.

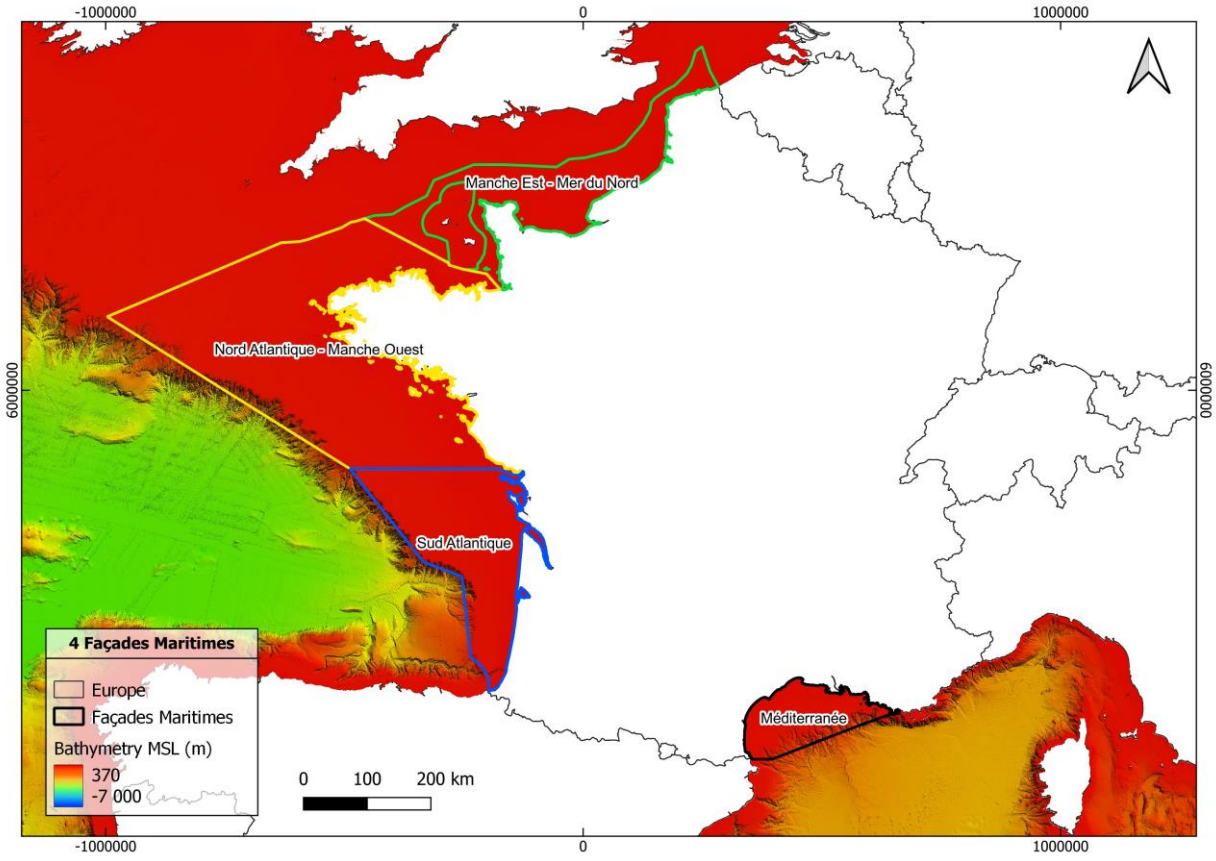


Figure 1-1: Project location overview - location of the four maritime facades

1.1.2 Objectives

The main objectives of the de-risk studies were to:

- Provide MBES bathymetry, and side-scan sonar imaging data that define the location of UXO boxes.
- Provide magnetometer data that will be used to issue ALARP certificates prior to the completion of geotechnical testing.

1.2 SCOPE OF WORK

The overall scope of work consists of geophysical and UXO surveys in the Fécamp zone as shown in Figure 1-2.

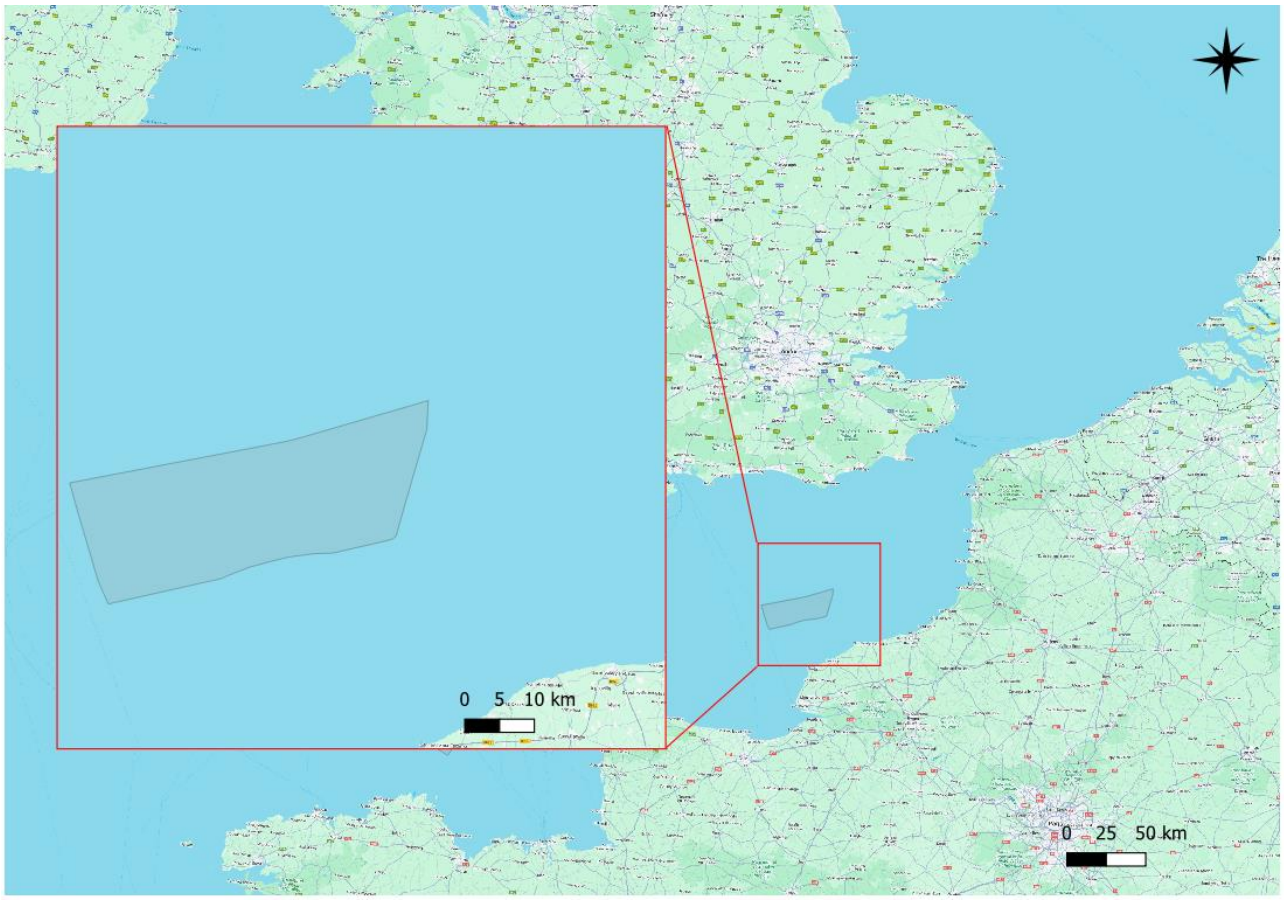


Figure 1-2: Scope of work area

This UXO survey comprised of the acquisition of magnetometer (MAG), multibeam bathymetry (MBES) and side scan sonar (SSS) sensor data. As far as possible, data from all sensors was acquired simultaneously, with line planning as per the client specifications.

As part of the UXO scope, ALARP certificates for the 30 m x 30 m boxes were issued via the UXO subcontractor GeoMines. The ALARP certificates contain as a minimum:

- A summary of the work carried out;
- A list of results with their classification, images and coordinates;
- Maps of the study area with all UXO-like observations and the avoidance radius;

- Where necessary, the radius around the observations must be provided.
- The signature of the Licensee's UXO specialist.

The process of issuing ALARP certificates goes as follows: After geophysical data analysis, the white zones, with risks as low as reasonably (ALARP) possible are sought. This is done by geospatial processing in GIS software. First, the areas that could not be considered as white areas are mapped, grouping the pUXO targets (sonar and MBES contacts) and potential saturated areas. Afterwards, the "avoidance areas" are mapped with an avoidance zone of safety buffer radius away from all the potential UXO (pUXO) anomalies or any saturated or excluded areas. This avoidance area is also applied from the edge of the dataset inwards the centre of the survey area. The free space between these avoidance zones and the detection surface or survey boundary defines the outline of the ALARP certificate and the possible working area. Some boxes have been moved from the original location to issue the ALARP certificates. The original and the updated locations, as well as the distance between them are shown in Table 1.

Table 1-1: Original and updated ALARP box's locations

Name	Status	X centroid	Y centroid	Distance Original-Updated (m)
FGL-OWF_GI#1	Original	283720.108	5547591.463	-
FGL-OWF_GI#2	Updated	307333.7	5553044.945	234
FGL-OWF_GI#3	Updated	299038.626	5548072.875	20
FGL-OWF_GI#4	Updated	303476.266	5549105.298	31.5
FGL-OWF_GI#5	Updated	274854.381	5539389.022	11
FGL-OWF_GI#6	Updated	310390.498	5558394.366	91
FGL-OWF_GI#7	Updated	308489.157	5547193.696	12
FGL-OWF_GI#8	Updated	295305.314	5544120.77	40.5
FGL-OWF_GI#9	Updated	274002.512	5536130.644	64.5
FGL-OWF_GI#10	Original	278428.385	5537142.507	-
FGL-OWF_GI#11	Updated	285732.984	5538830.588	4
FGL-OWF_GI#12	Original	268454.1	5547132.026	-
FGL-OWF_GI#13	Updated	269494.93	5542745.918	30
FGL-OWF_GI#14	Updated	270070.814	5539849.304	65.5
FGL-OWF_GI#15	Updated	276099.758	5547355.985	13.5
FGL-OWF_GI#16	Updated	279047.112	5548044.779	30.5
FGL-OWF_GI#17	Original	287819.971	555075.233	-
FGL-OWF_GI#18	Original	292490.785	5549581.613	-
FGL-OWF_GI#19	Updated	296194.674	5553583.246	35
FGL-OWF_GI#20	Updated	298018.605	5552442.347	5
FGL-OWF_GI#21	Updated	302185.826	5554943.282	100
FGL-OWF_GI#22	Original	307582	5557741.306	-
FGL-OWF_GI#23	Original	277071.029	5542981.049	-
FGL-OWF_GI#24	Original	289102.38	5544226.705	-

1.3 SCOPE OF DOCUMENT

Table 1-2 lists all the reports delivered as part of this survey, with this report highlighted in **bold**.

Table 1-2: Project reports

Document Number	Title
6168_2-OR-01	Operations Report - GOVI
6168_2-MCR-01	Mobilisation & Calibration Report - GOVI
6168_2-RR-01	UHRS Factual Report
6168_2-RR-02	**UXO Factual Report (This Report)**

2 GEODETIC PARAMETERS AND TRANSFORMATIONS

2.1 HORIZONTAL DATUM

The geodetic datum and mapping coordinate system used for this project is WGS84 UTM Zone 31N. All coordinates used are referenced to the geodetic datum and grid parameters listed in Table 2-1 and Table 2-2 below.

Table 2-1: Datum parameters

Parameter	Details
Geodetic Datum	World Geodetic System 1984 (WGS84)
EPSG Coordinate Reference System	4258
Spheroid	GRS80
EPSG Ellipsoid Code	7019
Semi-Major Axis	6378137.000
Semi-Minor Axis	6356752.31424
Flattening	1/298.257223563
Eccentricity Squared	0.00669428002290

Table 2-2: Projection parameters

Parameter	Details
EPSG Coordinate Reference Code	32631
Projection	UTM
Zone	31N
Central Meridian	3° East
Latitude of Origin	0°
False Easting	500000.00 m
False Northing	0.00 m
Scale Factor at Central Meridian	0.9996
Units	Metres

2.2 VERTICAL REFERENCE

The vertical datum for the project is the Zéro Hydrographique (ZH) defined by the surface Lowest Astronomical Tide (LAT). Reduction was made via the SHOM Bathyelli (PBMA “Plus Basses Mers Astronomiques” in French) v2.1 model.

2.3 TIME AND LOG KEEPING

UTC (Universal Time Coordinated) has been used for record keeping during the project (including the Daily Progress Reports, unless stated otherwise). The vessel maintained local time for operations.

Data time-tagging and synchronization used UTC. All data recorded in the online navigation software was time stamped where appropriate using the time string and the pulse-per-second (PPS) from the GNSS.

2.4 SURVEY UNITS

The following survey units were used during the project and throughout this report;

- Linear units are expressed in international metres (m)
- Angular units are expressed in degrees (°)

3 RESOURCES

3.1 VESSELS

The specifications of the GOVI are summarised in Table 3-1.

Table 3-1: Survey vessel specifications

Geo Ocean VI	Specifications	
	Length	53.8 m
	Width	13.0 m
	Maximum draught	4.8 m
	Cruising speed	5 knots
	Main propulsion	2x Hybrid propulsion package on Berg CP propellers
	Endurance	24 h day operations (28 days)
	Accommodation	30
	Positioning	Station Keeping/Autopilot
	A-Frame	A-frame (4.5 x 8.0 m) SWL 15 tonnes
	Crane	2.4 tonnes @ 8 m

3.2 EQUIPMENT

The equipment used for the survey is summarised in Table 3-2.

Table 3-2: Survey equipment specifications

Equipment	Manufacturer	Model / Type
GNSS	2x Trimble	BX992 (1 x XP2 and 1 x G4 corrections)
Primary INS / MRU Secondary INS/MRU	iXblue SBG	Hydrins Apogee-I-B Surface IMU
MBES (Hull-mounted)	Kongsberg	EM2040 RX (Port & Stbd) EM2040 TX(Centre) EM2040 PU (Master) EM2040 PU (Slave)
Sound velocity	Valeport	Swift 500 Mini SVS (USBL pool mounted) Mini SVS+P (towed equip) Mini SVS+P (towed equip)
Winches	Emce	EMCE UMB-305 (Stbd)
USBL	Kongsberg	HiPAP - 352P
Magnetometer	Geometrics	G-882
2 x TVG Frame	N/A	TVG – dual mag frame
Side Scan Sonar	Edgetech	Edgetech 4205

3.3 SOFTWARE

The software that was used for data acquisition and processing is outlined in Table 3-3 below.

Table 3-3: Project software list

Equipment / Data Type	Acquisition	Processing
Navigation, MBES, GNSS	QPS QINSy	n/a
MBES	QPS QINSy	Qimera / FMGT QPS BeamworX AutoClean QGIS
Side Scan Sonar	Discovery	SonarWiz V7.10.02
Magnetometer	QPS QINSy	Oasis Montaj 2023.2

4 OPERATIONAL SUMMARY

The survey vessel Geo Ocean VI (GOVI) was utilised to complete the MBES/SSS/MAG acquisition during the UXO survey. A summary of the survey operations is outlined in Table 4-1.

Table 4-1: Overview of survey operations

Vessel	Dates	Activity
Geo Ocean VI	05/11/2024 – 05/12/2024	MBES/SSS/MAG UXO survey, transit etc.

5 DATA PROCESSING

5.1 MULTIBEAM ECHOSOUNDER

5.1.1 Data acquisition and settings

The primary settings used for the project are outlined in Table 5-1. The number of lines acquired per trackplot were 86.

Table 5-1: MBES acquisition parameters

Item	Setting
Survey speed	~4 knots
Steered node	No
Beam Spacing	Equi-distant
Soundings-per-ping	1024 per head
Swath Opening Angles	10 m = 135-140°
System Frequency	400 kHz
Coverage	Full coverage bathymetry with 30% data overlap
Back Scatter Data Required	Yes (logged but not processed)
Water Column Data to be Recorded	No
Line Spacing	See line plan

The MBES project specifications are listed in Table 5-2.

Table 5-2: MBES specifications

Item	Specification
Minimum data density	30 HC/m² until 50 m of water depth 15 HC/m² between 50 – 150 m of water depth 9 HC/m² between 150 – 200 m of water depth
Bin size	0.2 m for <25 m of water depth 0.5 m for 25 m – 50 m of water depth 1 m for 50 m – 200 m of water depth
Grid	0.5 m cell size
Gridded standard deviation	≤0.20 m per 1 m² bin
Coverage	100 % with 30 % overlap between adjacent survey lines
TVU	0.8 m
THU	2 m
Backscatter	Recorded not processed

5.1.2 Overview of the methodology

Bathymetric data was recorded in QINSy as raw QPD files. The data was initially checked offline into the QPS processing software Qimera for quality, coverage, and density requirements. Data processing was carried out using Qimera and AutoClean. First, a rough cleaning was applied in Qimera to remove major spikes and noise.

In addition, any SVP/refraction and GNSS drop out issues were fixed. Afterwards, FAU files were exported to continue processing with AutoClean. Bathymetric data was cleaned on a line-by-line basis and/or by using area-based cleaning tools in the processing software. A combination of basic filters applied to the entire data set and then individual QPDs manually cleaned by deleting any further outliers visible within the data.

Figure 5-1 outlines the general MBES processing workflow.

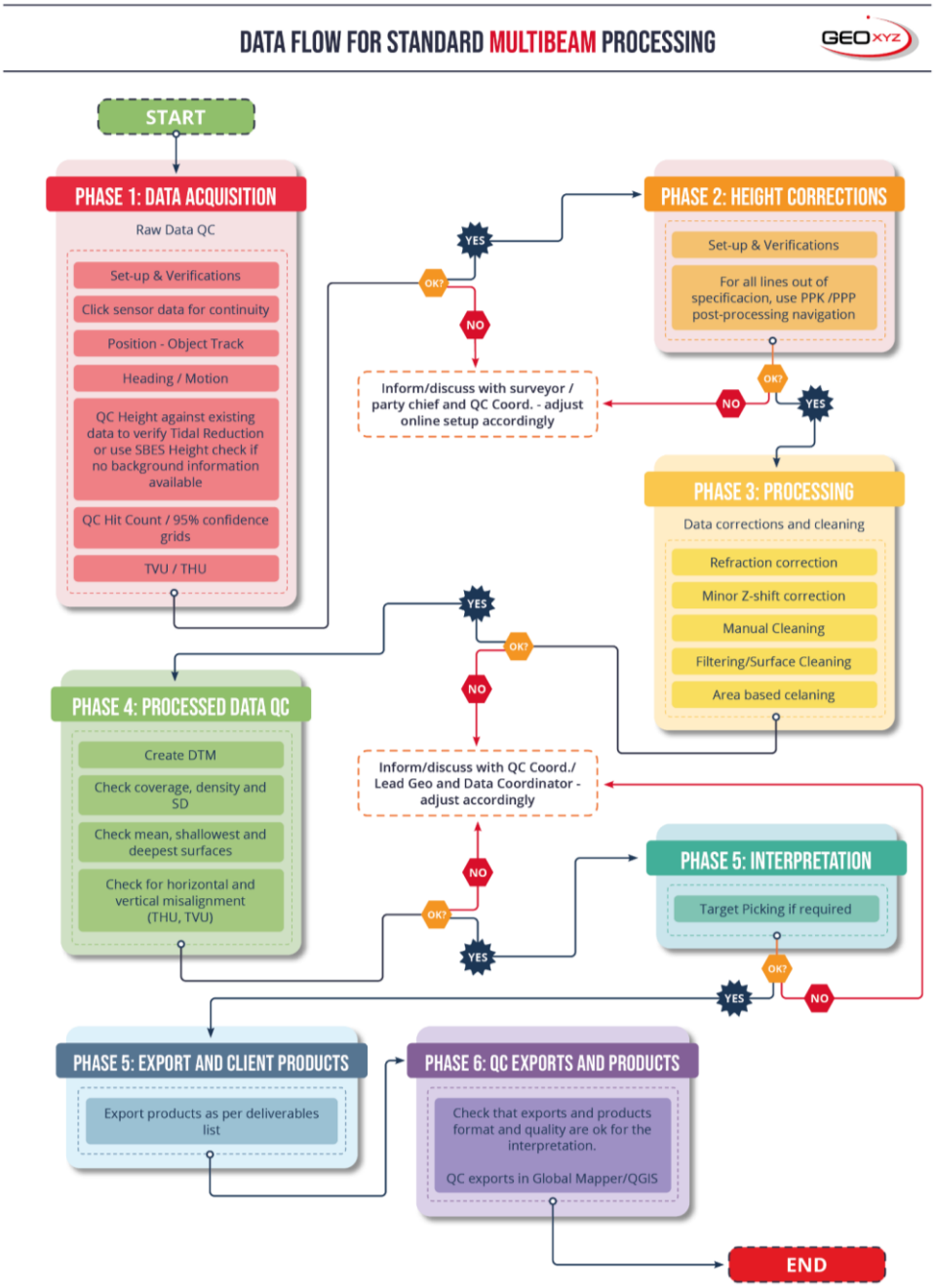


Figure 5-1: MBES processing workflow

5.1.3 Data quality assessment

The multibeam echosounder data was of high quality with very little acoustic noise. Features of 0.5 metres or more were clearly seen within the MBES data (Figure 5-2). Seabed morphology was well defined in the processed Digital Terrain Models (DTMs).

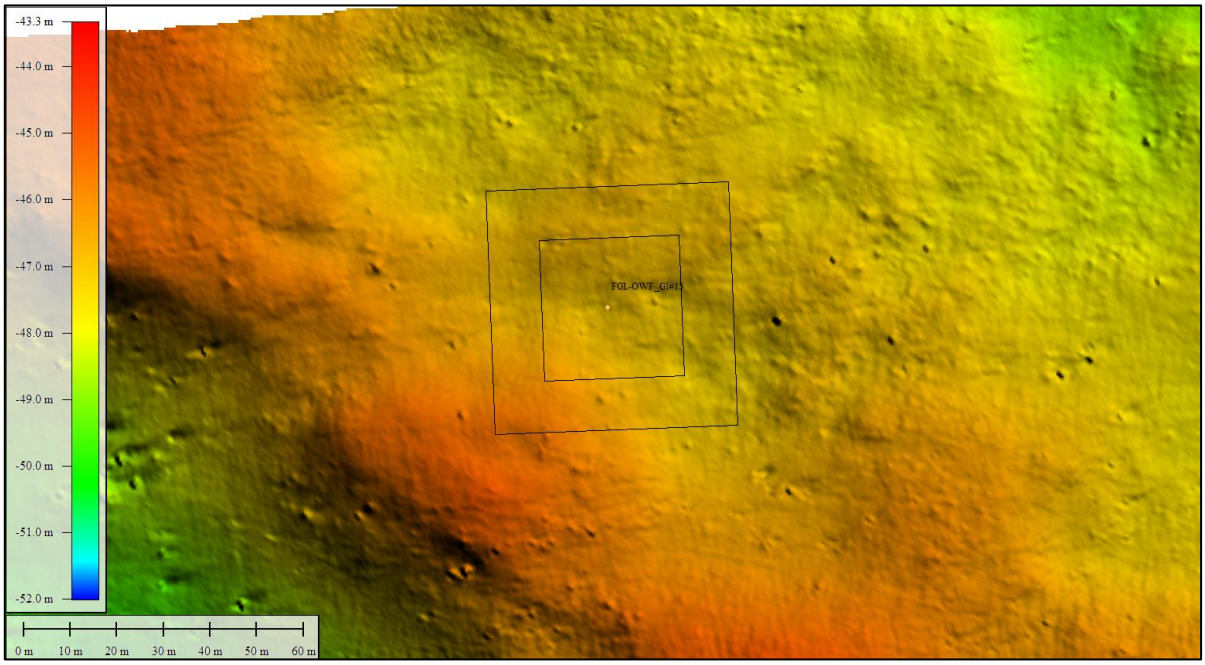


Figure 5-2: DGEC Fécamp Bathymetric Data over FGL-OWF_GI#15

The water depth within the survey area varied from a minimum of 30 m below LAT and a maximum of 58 m below LAT which correlates to the previous MBES data. The deepest depths occurred in the SW region of the survey area. An example of the number of hits per meter over one of the survey boxes is illustrated in Figure 5-3.

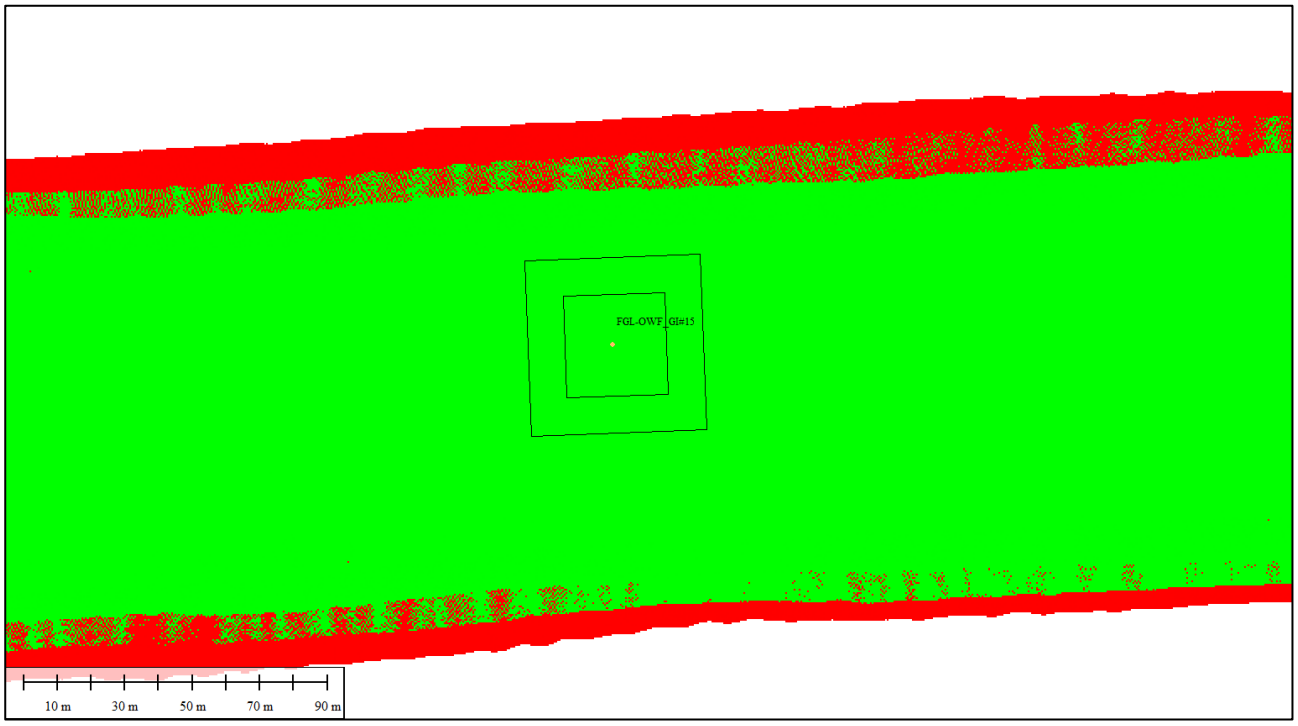


Figure 5-3: FGL-OWF_GI15 MBES data hit count 1 m per square (green: 30 > hits per bin)

The THU (Total Horizontal Uncertainty) and TVU (Total Vertical Uncertainty) values calculated for each box are presented in Table 5-3. These values have been calculated according to the IHO S44 Special Order threshold. TVU has been calculated according to this formula:

$$TVU_{max}(d) = \sqrt{a^2 + (b \times d)^2}$$

Where **a**, represents that portion of the uncertainty that does not vary with the depth (0.25 m for Special Order); **b**, is a coefficient which represents that portion of the uncertainty that varies with the depth (0.0075 for Special Order) and **d**, is the depth. THU is, according to the IHO Special order, a fix value of 2 metres.

Table 5-3: THU and TVU values

Fecámp UXO box	IHO TVU calculated	IHO THU calculated	TVU in block	THU in block
FGL-OWF_GI#01	0.58	2	0.11-0.12	0.39-0.46
FGL-OWF_GI#02	0.57	2	0.11-0.12	0.4-0.53
FGL-OWF_GI#03	0.57	2	0.11-0.12	0.35-0.43
FGL-OWF_GI#04	0.56	2	0.1-0.11	0.33-0.42
FGL-OWF_GI#05	0.6	2	0.11-0.12	0.46-0.53
FGL-OWF_GI#06	0.57	2	0.11-0.11	0.37-0.42
FGL-OWF_GI#07	0.56	2	0.11-0.11	0.36-0.39
FGL-OWF_GI#08	0.56	2	0.11-0.12	0.39-0.45
FGL-OWF_GI#09	0.61	2	0.11-0.11	0.43-0.47
FGL-OWF_GI#10	0.61	2	0.11-0.12	0.47-0.52
FGL-OWF_GI#11	0.57	2	0.11-0.12	0.43-0.5
FGL-OWF_GI#12	0.63	2	0.11-0.12	0.52-0.58

Fecámp UXO box	IHO TVU calculated	IHO THU calculated	TVU in block	THU in block
FGL-OWF_GI#13	0.6	2	0.11-0.11	0.47-0.5
FGL-OWF_GI#14	0.61	2	0.11-0.12	0.44-0.48
FGL-OWF_GI#15	0.61	2	0.11-0.13	0.47-0.56
FGL-OWF_GI#16	0.58	2	0.11-0.12	0.38-0.45
FGL-OWF_GI#17	0.58	2	0.11-0.12	0.41-0.5
FGL-OWF_GI#18	0.59	2	0.11-0.11	0.43-0.46
FGL-OWF_GI#19	0.57	2	0.11-0.11	0.37-0.41
FGL-OWF_GI#20	0.57	2	0.11-0.12	0.4-0.48
FGL-OWF_GI#21	0.57	2	0.11-0.11	0.4-0.44
FGL-OWF_GI#22	0.59	2	0.11-0.11	0.4-0.45
FGL-OWF_GI#23	0.61	2	0.11-0.12	0.45-0.52
FGL-OWF_GI#24	0.57	2	0.11-0.11	0.36-0.4

5.1.4 MBES deliverables

The MBES deliverables created as a result of the project are outlined in Table 5-4.

Table 5-4: Overview of the MBES deliverables

Deliverable	Format
RAW bathymetric data	QPD or bwxraw
Despiked, motion and tidal corrected point cloud	ASCII
Bathymetric average values gridded surface	ASCII, RGB TIF, Encoded TIF or FLT
Bathymetric density (Hit Count) values gridded surface	ASCII, RGB TIF, Encoded TIF or FLT
Bathymetric slope values gridded surface	RGB TIF, Encoded TIF or FLT
Bathymetric Contour Lines	SHP
MB Targetlist	ASCII, SHP

5.2 SIDE SCAN SONAR

5.2.1 Data acquisition and settings

For side scan sonar data acquisition, the acquisition parameters are listed in Table 5-5. The number of lines acquired per trackplot were 101.

Table 5-5: SSS acquisition parameters

Item	Setting
Survey speed	~4 knots
Steered node	Yes
Frequency	Dual frequency with the high frequency of at least 600 kHz
Range	50 m range for both LF and HF
Mode	HDM
Flying Altitude	5-10 % of range

Item	Setting
Time Stamp	ZDA from Qinsy
Navigation	USBL position / fixed layback
Heading	Internal compass / bearing to tow point / determined from positioning verification
Nadir Filler	No
Data Format	JSF / XTF
Line Spacing	See line plan.

5.2.2 Overview of the methodology

Side scan sonar data (.JSF files) was recorded using Edgetech Discover. An acquisition log was kept of all settings and other observations. Quality Control (QC) was performed offline where the dataset is checked for overall quality, coverage, artefacts, and positioning.

The HF and LF SSS data were processed using the Chesapeake SonarWiz software following the workflow outlined in Figure 5-4.

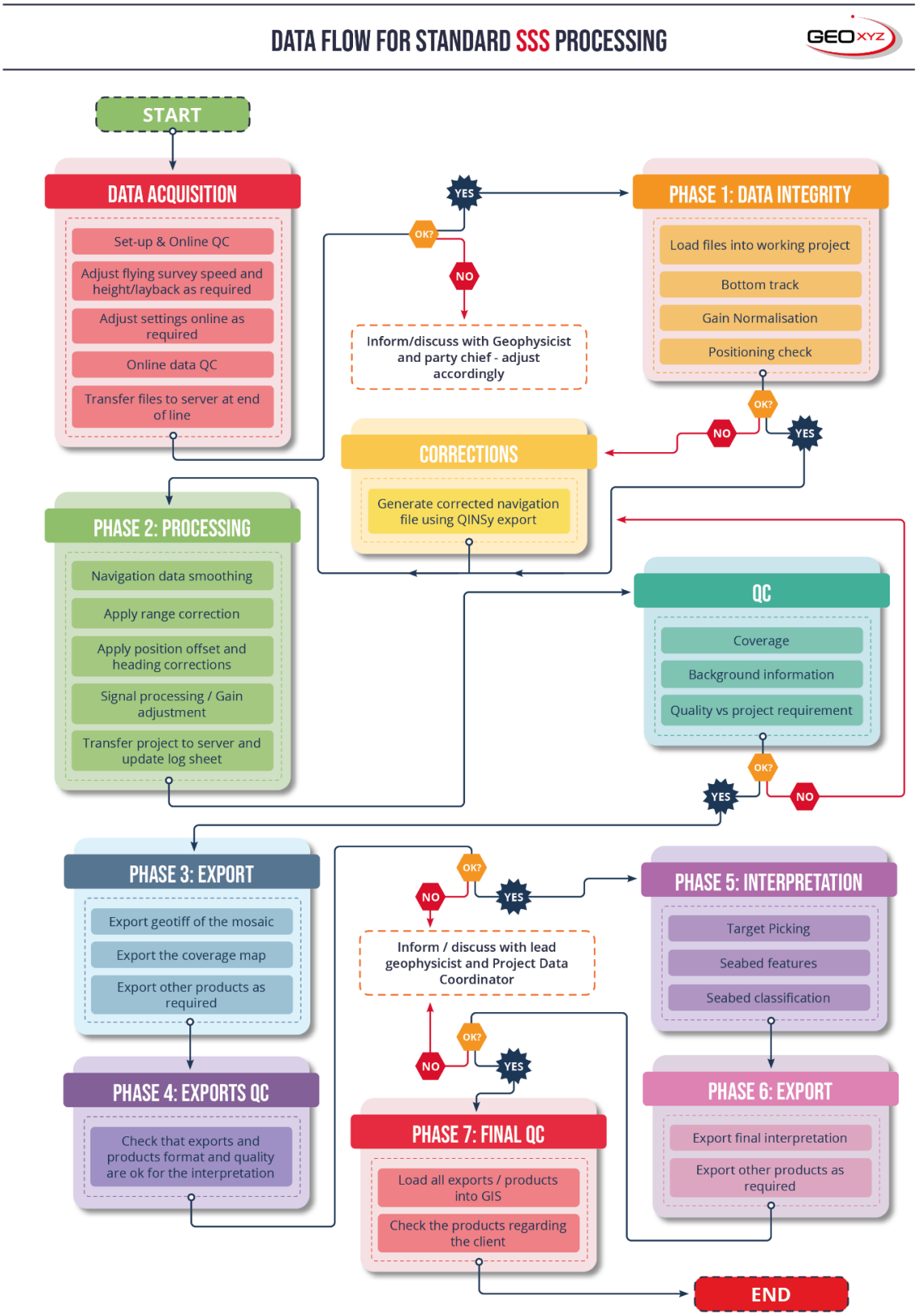


Figure 5-4: SSS processing workflow

Navigation data from the QINSy logfile was injected into the sonar files using Nav Injector Pro, the heading used was a calculated bearing-to-towpoint from QINSy and the X and Y co-ordinates were Kalman filtered to

provide the most accurate positioning of the SSS fish. The SSS data were then loaded into SonarWiz, the seabed was bottom-tracked, minor heading corrections were applied to the navigation where needed and any spikes smoothed out using Zedit. The Empirical Gain Normalisation (EGN) was applied to normalise the signal return along the record, in order to clarify changes in the acoustic reflectivity of the seabed and the presence of any morphological features. A de-stripe filter was applied, whenever necessary, to create a well-balanced sonar image.

5.2.3 Data quality assessment

The side scan sonar data was of a good quality and targets that were over 0.3 m in dimensions could be clearly identified. Once rotations were made on the SSS data, the positioning of features matched that seen on the MBES data.

5.2.4 SSS deliverables

The SSS deliverables created as a result of the project are outlined in Table 5-6.

Table 5-6: Overview of the SSS deliverables

Deliverable	Format
Raw SSS data	JSF, HF XTF
Processed SSS data	HF XTF
SSS mosaic	RGB TIF
SSS Targetlist	ASCII, Excel
Seabed Features, Lines, Polygons	SHP
Seabed Sediments Primary	SHP

5.3 MAGNETOMETER

5.3.1 Data acquisition and settings

Magnetometer data was acquired following specifications listed in Table 5-7 below.

The original line plan for the run-in/run-out length of the UXO surveys was 52 m, but it was extended 100 m each side to acquire more data in case the original boxes contained any pUXO and box relocation was requested. This involved increasing the line lengths to 250 m to provide an adequate alternative clearance area. Number of MAG lines acquired were 330.

To calibrate MAG data, surrogate item of 25 kg ferrous magnetic object was used. This type of item has been selected, as according to previous studies, the smallest possible UXO threat would be 26 kg in size, so this allows for threat this size to be discovered.

Table 5-7: Magnetometer system settings

General parameters	
System type	TVG frame & 2 x Geometrics G882 (soft towed) x 2
Survey speed	4.2 knots
Positioning	HiPAP 351 USBL
Magnetometer altitude	4 m

General parameters	
Frequency	10 Hz

The MAG project specifications are listed in Table 5-8.

Table 5-8: Magnetometer specifications

Item	Specification
Minimum sampling rate	10 Hz
Max towing altitude	4 m
Operating range	20 000 to 100 000 Nanoteslas (nT)
Counter sensitivity	<0.004 nT/pHz rms
Gaps	<5 m length by 3 m in width

5.3.2 Overview of the methodology

The processing and target selection involved several steps:

- Manual or filter-based removal of spikes in MAG data.
- Smooth navigation using a median filter of 50 values, with manual removal of spikes if necessary.
- Calculation of the background field using a set of standard NL-filters: starting from 30 fiducials width and a tolerance of 0.5 nT to a window width of 2 fiducials and a tolerance of 0.0375 nT.
- Residual calculation by subtracting the background.
- Refining anomalies on the profiles.
- Selection of all targets above the 3 nT peak-to-peak threshold.
- Target characteristics determined by the minimum to maximum on the residual signal, zero crossing for in-line width, and type based on residual (negative monopole, positive monopole, dipole).

To minimize geological influences, the geological background value was considered and removed where possible within the limited window used for total field value background calculation. The workflow specified that a non-linear filter that should eliminate most large-scale geological effects. Short-wave geological signals (<40m) were significantly reduced from the target list based on the magnetic target threshold. Larger (suspected) geological targets were included in the list, referencing 'potential geology' in the comment section.

The quality of the magnetic data was influenced by weather conditions, with higher swells contributing to increased noise. Efforts were made to keep this noise below 2 nT. Lines displaying excessive noise were flagged for rejection and a potential re-run.

Figure 5-5 outlines the magnetometer processing workflow.

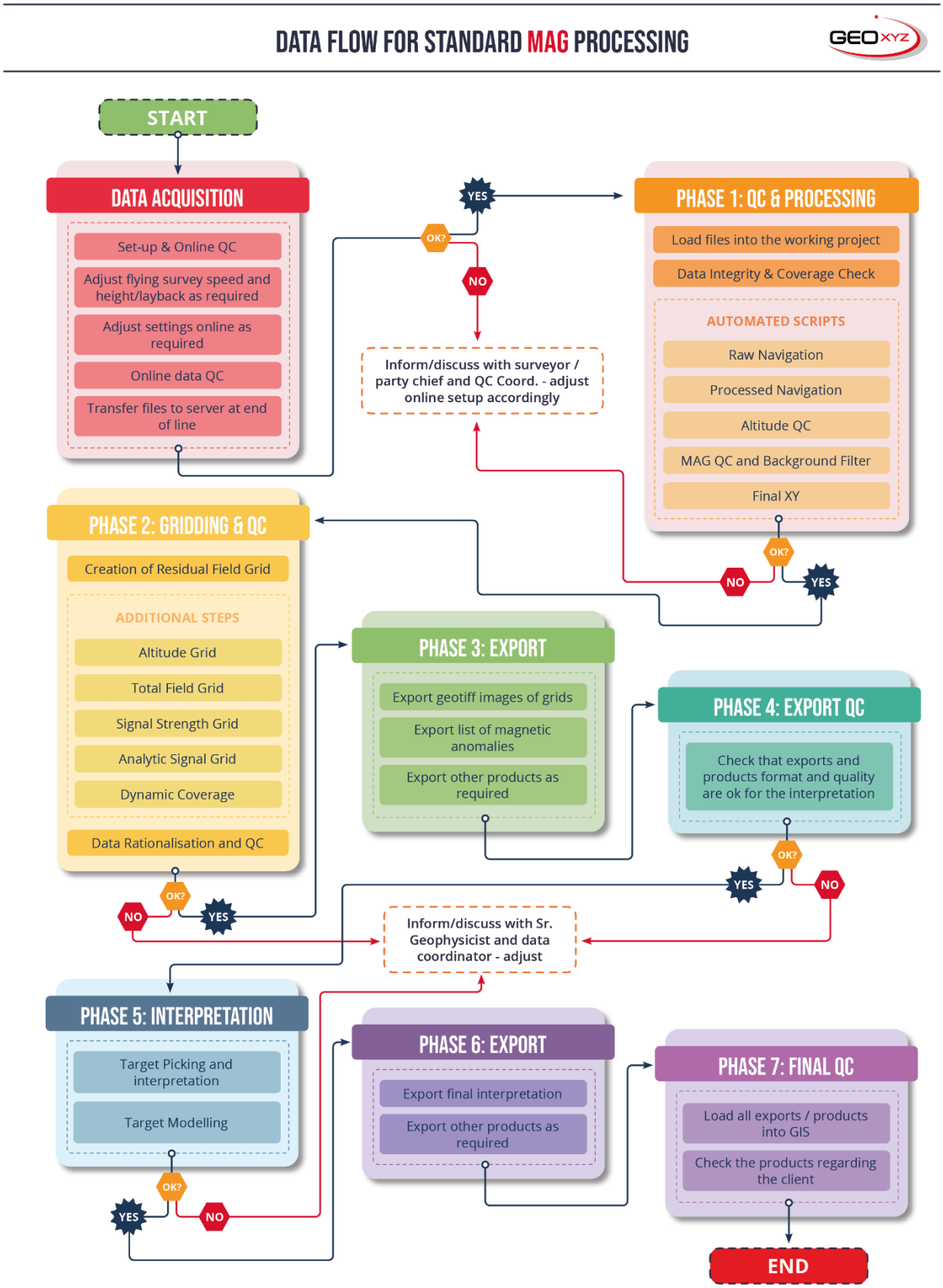


Figure 5-5: MAG processing workflow

5.3.3 Data quality assessment

Magnetometer data was of good quality, with clear correlation between adjacent lines. Signal quality was generally good throughout, though there were some signal drops on the starboard TVG at times (these lines would be removed if the signal was too low). The survey altitude for the magnetometer was determined by the side scan sonar, averaging 3.7 m across all lines. 6Alpha has prepared a DTS on historic UXO sources of contamination which are linked to the WW-II era with a likelihood of finding WWII mines and artillery projectiles. Given the site's location approximately 23 km from the shore, very few of the recorded gun batteries would have possessed a maximum firing range capable of reaching the Study Site. Of those coastal artillery emplacements situated in the vicinity of the Study Site, only the 12.8 cm artillery guns had sufficient range to prospectively reach the Site and the 17 cm where coastal batteries with this type of guns are installed.

5.3.4 MAG deliverables

The MAG deliverables created as a result of the project are outlined in Table 5-9.

Table 5-9: Overview of the MAG deliverables

Deliverable	Format
RAW magnetometric data	ASCII
Processed magnetometric data	ASCII
Altitude Grid	ENCODED TIF OR FLT, RGB TIF
Signal Strength Grid	ENCODED TIF OR FLT, RGB TIF
Total Field Grid	ENCODED TIF OR FLT, RGB TIF
Residual Signal Grid	ENCODED TIF OR FLT, RGB TIF
Analytic Signal Grid	ENCODED TIF OR FLT, RGB TIF
MAG Targetlist	ASCII, SHP, Excel

6 RESULTS

6.1 OVERVIEW

The results of the survey per ALARP geotechnical box have been presented in APPENDIX A. Each of the charts in the appendix contains a bathymetric overview with targets, seabed sediment classification, HF side scan mosaic with features and targets, residual MAG grid and the location of the shown ALARP geotechnical box.

There were no MAG targets within the surveyed boxes, however there were in total 55 SSS targets and 21 MBES targets.

ALARP certificates were issued for this survey and can be found attached to this report (APPENDIX B).

6.2 BATHYMETRY

The bathymetric data was acquired in a 50-centimetre resolution and has been shown in the top-left chartlet of the charts found in APPENDIX A.

Within each of the survey boxes, the bathymetry ranges vary within a few metres.

The deepest point of the surveyed boxes is located in the FGL-OWF_GI#12, lying at a depth of -53.01 m LAT. The shallowest point is located in the FGL-OWF_GI#17, lying at a depth of -32.642 m LAT.

6.3 SEABED SEDIMENTS AND MORPHOLOGY

In terms of sedimentation, gravel and rocky sediments were present. Gravel sediments were observed on 20 surveyed boxes, while the remaining four of them have rocky sediments. Top-right chartlet in APPENDIX A shows the sedimentation classification of each surveyed box.

In total, 45 seabed features were noted: 38 trawl marks, one anchor scar/plough mark, one low density boulder field, two medium density boulder fields, two mega ripples and one ridge. Their number and distribution are shown in Table 6-1, while their exact location is shown in on the lower-left chartlet in APPENDIX A.

Table 6-1: Number and distribution of seabed features

Fecámp UXO box	Number of linear seabed features		Number of polygonal seabed features			
	Trawl scars	Anchor scar/Plough mark	Low density boulder field	Medium density boulder field	Mega ripples	Ridge
FGL-OWF_GI#01	2	1	0	0	0	0
FGL-OWF_GI#02	0	0	0	0	0	0
FGL-OWF_GI#03	2	0	0	0	0	0
FGL-OWF_GI#04	3	0	0	0	0	0
FGL-OWF_GI#05	5	0	0	0	0	0
FGL-OWF_GI#06	0	0	0	1	0	0
FGL-OWF_GI#07	1	0	0	0	0	0
FGL-OWF_GI#08	1	0	0	0	0	0

Fecámp UXO box	Number of linear seabed features		Number of polygonal seabed features			
	Trawl scars	Anchor scar/Plough mark	Low density boulder field	Medium density boulder field	Mega ripples	Ridge
FGL-OWF_GI#09	0	0	0	0	0	0
FGL-OWF_GI#10	3	0	0	0	0	0
FGL-OWF_GI#11	1	0	0	0	0	0
FGL-OWF_GI#12	0	0	1	0	0	0
FGL-OWF_GI#13	1	0	0	0	0	0
FGL-OWF_GI#14	0	0	0	0	0	0
FGL-OWF_GI#15	1	0	0	1	0	0
FGL-OWF_GI#16	2	0	0	0	0	0
FGL-OWF_GI#17	2	0	0	0	0	0
FGL-OWF_GI#18	8	0	0	0	0	0
FGL-OWF_GI#19	0	0	0	0	0	0
FGL-OWF_GI#20	2	0	0	0	0	0
FGL-OWF_GI#21	1	0	0	0	0	0
FGL-OWF_GI#22	0	0	0	0	2	0
FGL-OWF_GI#23	0	0	1	0	0	0
FGL-OWF_GI#24	3	0	0	0	0	0

6.4 CONTACTS AND DEBRIS

There were no MAG targets within the surveyed boxes, however there were in total 55 SSS targets and 21 MBES targets.

Their number and distribution are shown in Table 6-2, while their exact location is shown in on the upper-left and lower-left chartlet in APPENDIX A.

Table 6-2: Number and distribution of SSS and MBES targets

Fecámp UXO box	Number of SSS targets			Number of MBES targets
	Boulder	Possible boulder	Mound	Boulder
FGL-OWF_GI#01	0	0	0	0
FGL-OWF_GI#02	0	0	0	0
FGL-OWF_GI#03	0	0	0	0
FGL-OWF_GI#04	0	0	0	0
FGL-OWF_GI#05	0	0	0	0
FGL-OWF_GI#06	20	0	0	11
FGL-OWF_GI#07	0	0	0	0
FGL-OWF_GI#08	0	0	0	0

Fecámp UXO box	Number of SSS targets			Number of MBES targets
	Boulder	Possible boulder	Mound	Boulder
FGL-OWF_GI#09	1	0	0	0
FGL-OWF_GI#10	0	0	0	0
FGL-OWF_GI#11	0	0	0	0
FGL-OWF_GI#12	4	1	0	2
FGL-OWF_GI#13	1	0	0	1
FGL-OWF_GI#14	0	0	0	1
FGL-OWF_GI#15	10	13	1	5
FGL-OWF_GI#16	0	0	0	0
FGL-OWF_GI#17	1	1	0	0
FGL-OWF_GI#18	0	0	0	0
FGL-OWF_GI#19	0	0	0	0
FGL-OWF_GI#20	0	0	0	1
FGL-OWF_GI#21	0	0	0	0
FGL-OWF_GI#22	2	0	0	0
FGL-OWF_GI#23	0	0	0	0
FGL-OWF_GI#24	0	0	0	0

7 CONCLUSION

A UXO survey was conducted for twenty-four 30 x 30-metre survey boxes within the Fécamp area. The survey comprised the acquisition of multibeam bathymetry (MBES), side scan sonar (SSS) and magnetometer (MAG) data. The survey vessel Geo Ocean VI (GOVI) was utilised for the acquisition. The survey was conducted between 05/11/2024 and 05/12/2024. ALARP certificates were issued on 09/12/2024.

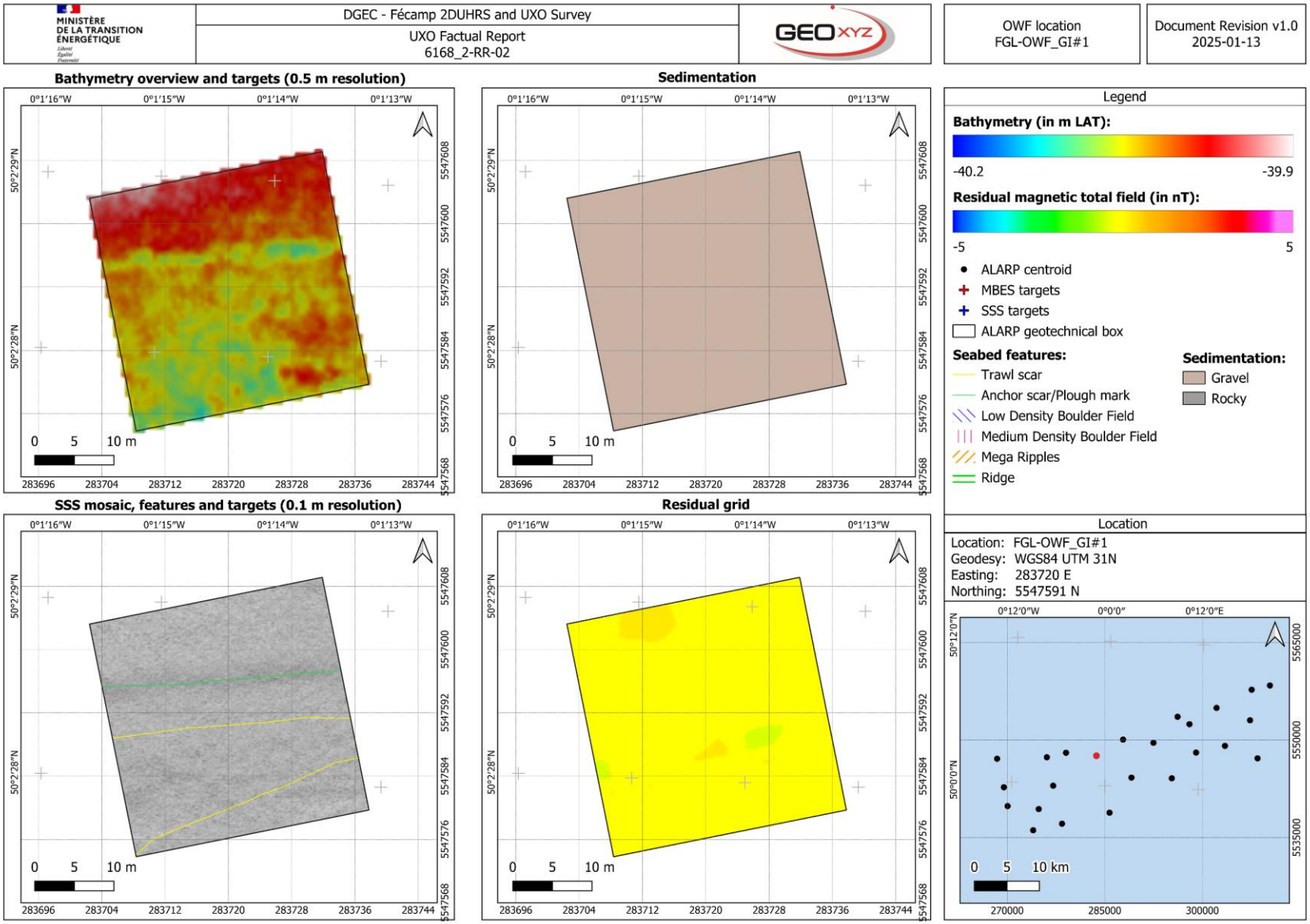
The bathymetry within each of the survey boxes vary within a few metres. The deepest point of the surveyed boxes is located in the FGL-OWF_GI#12, lying at a depth of -53.01 m LAT. The shallowest point is located in the FGL-OWF_GI#17, lying at a depth of -32.642 m LAT.

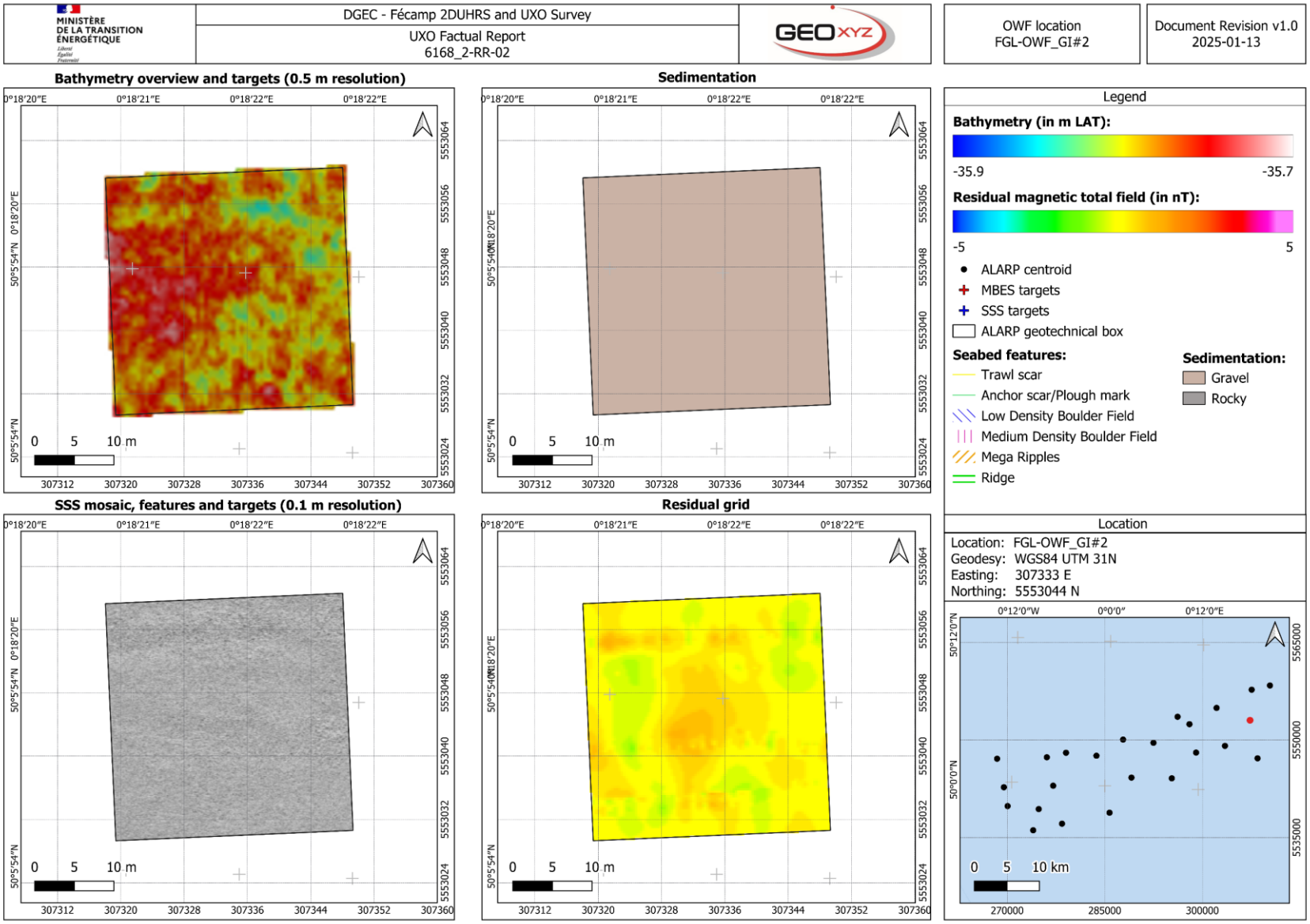
Gravel and rocky sediments were the only type of sedimentation present. Gravel sediments were observed on 20 surveyed boxes, while the remaining four of them have rocky sediments.

In total, 45 seabed features were noted: 38 trawl marks, one anchor scar/plough mark, one low density boulder field, two medium density boulder fields, two mega ripples and one ridge.

There were no MAG targets within the surveyed boxes, however there were in total 55 SSS targets and 21 MBES targets.

APPENDIX A. FÉCAMP UXO BOX CHARTS


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#1
Document Revision v1.0
2025-01-13
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-40.2
-39.9
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#1
Geodesy: WGS84 UTM 31N
Easting: 283720 E
Northing: 5547591 N
0 5 10 m
0 5 10 km


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
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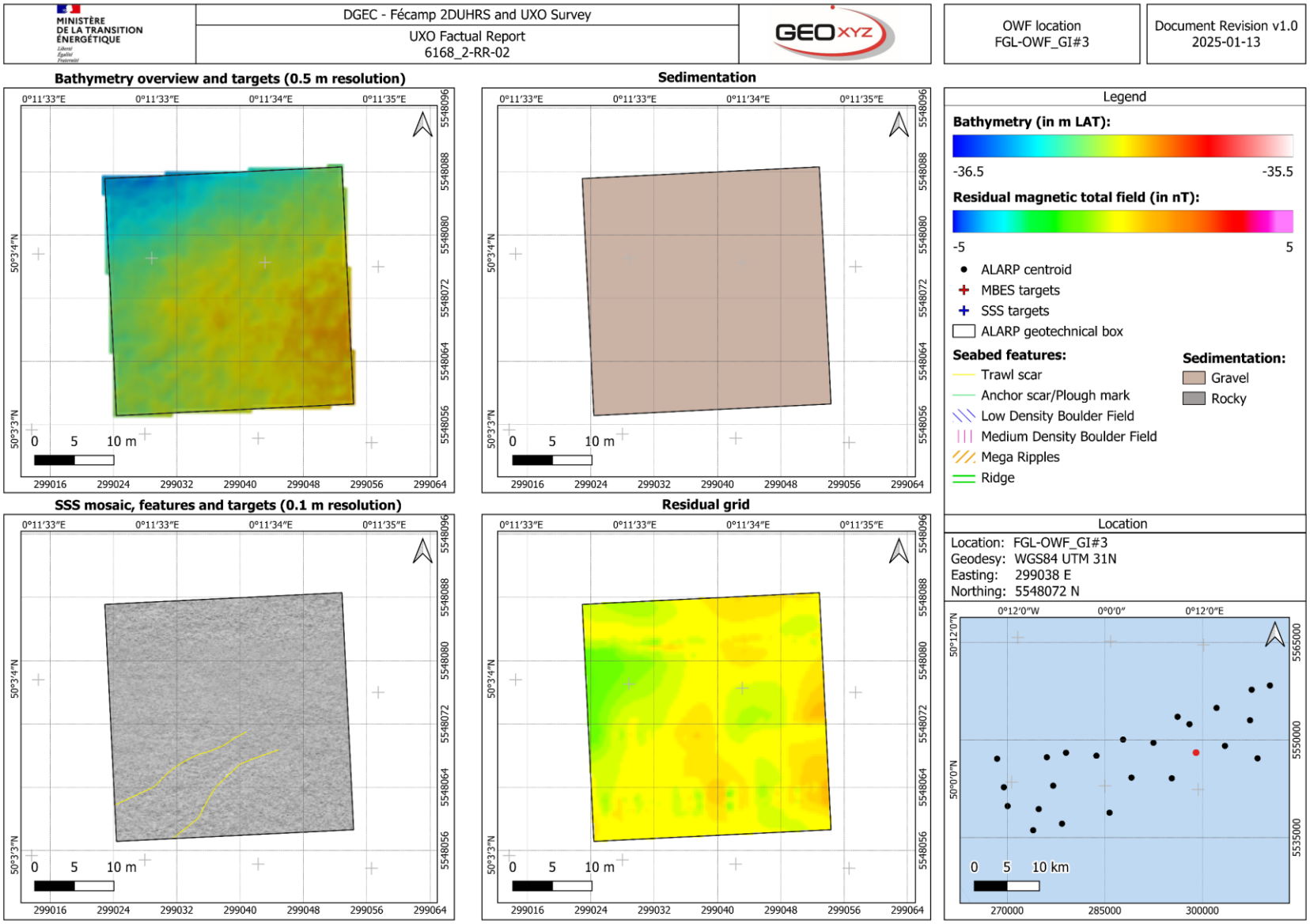
Document Revision v1.0
2025-01-13
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-35.9
-35.7
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#2
Geodesy: WGS84 UTM 31N
Easting: 307333 E
Northing: 5553044 N
0 5 10 m
0 5 10 km


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
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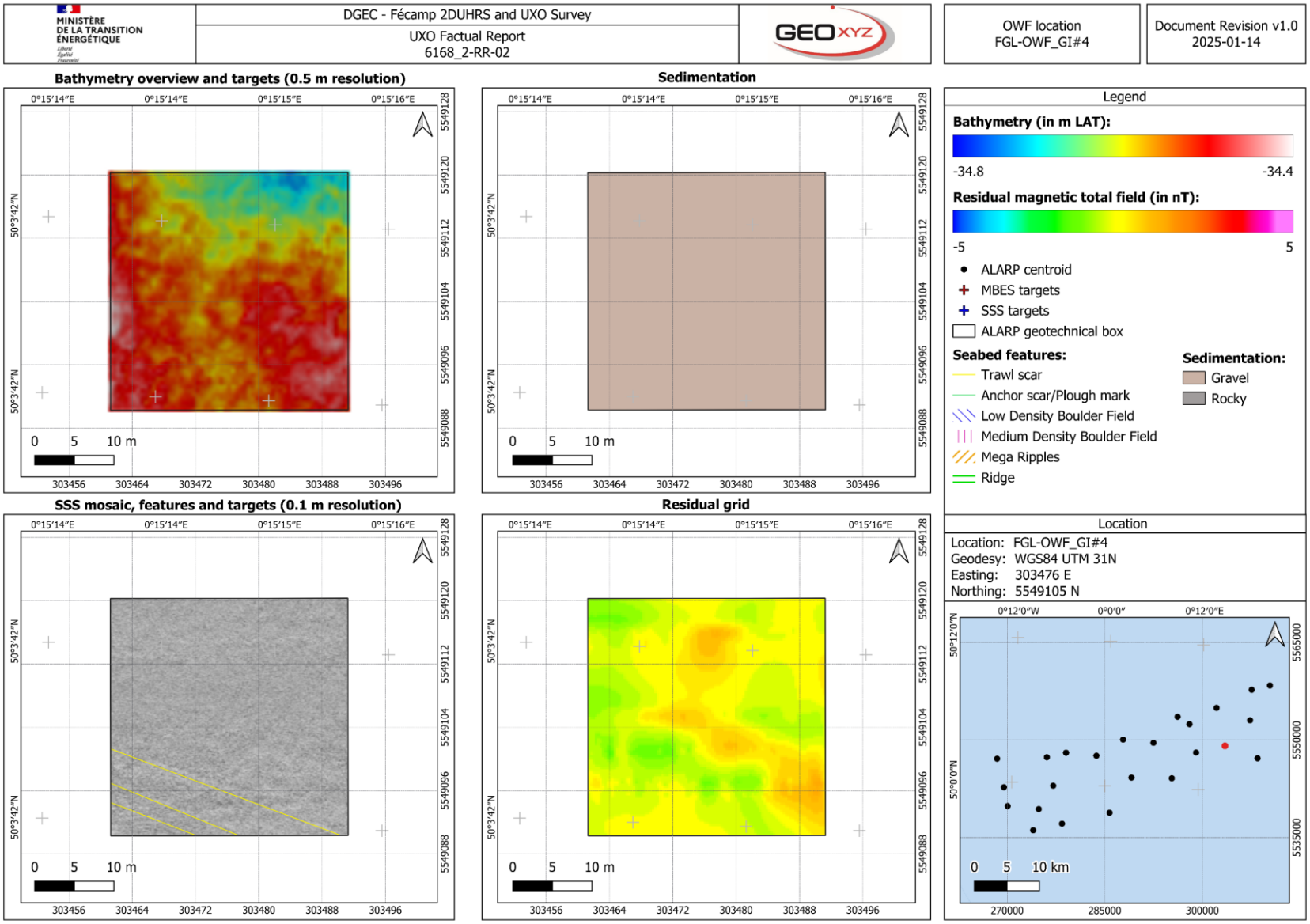
FGL-OWF_GI#3
Document Revision v1.0
2025-01-13
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-36.5
-35.5
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#3
Geodesy: WGS84 UTM 31N
Easting: 299038 E
Northing: 5548072 N
0 5 10 m
0 5 10 km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Document Revision v1.0
2025-01-14
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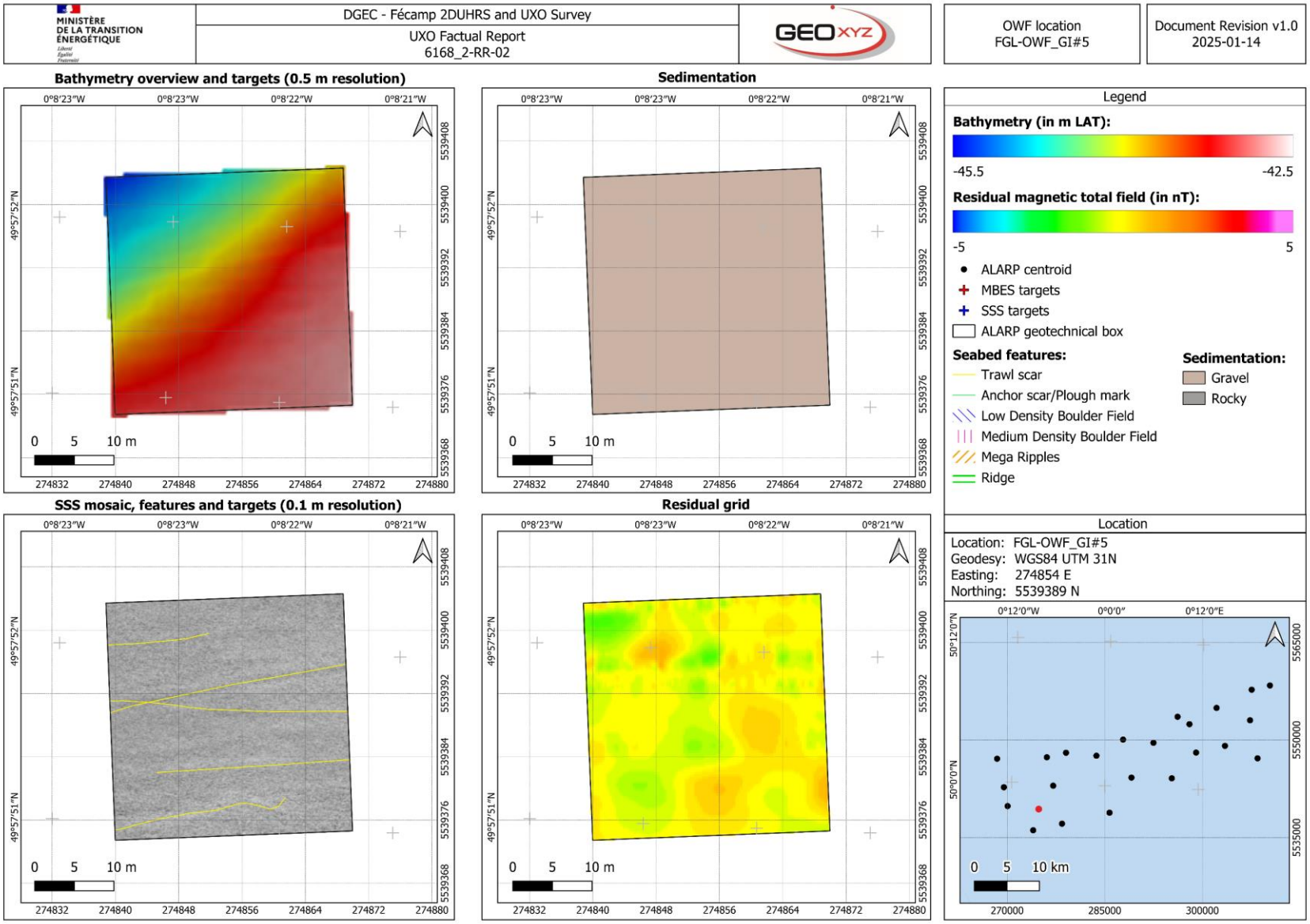
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-34.8
-34.4
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#4
Geodesy: WGS84 UTM 31N
Easting: 303476 E
Northing: 5549105 N
0 5 10 m
0 5 10 km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DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
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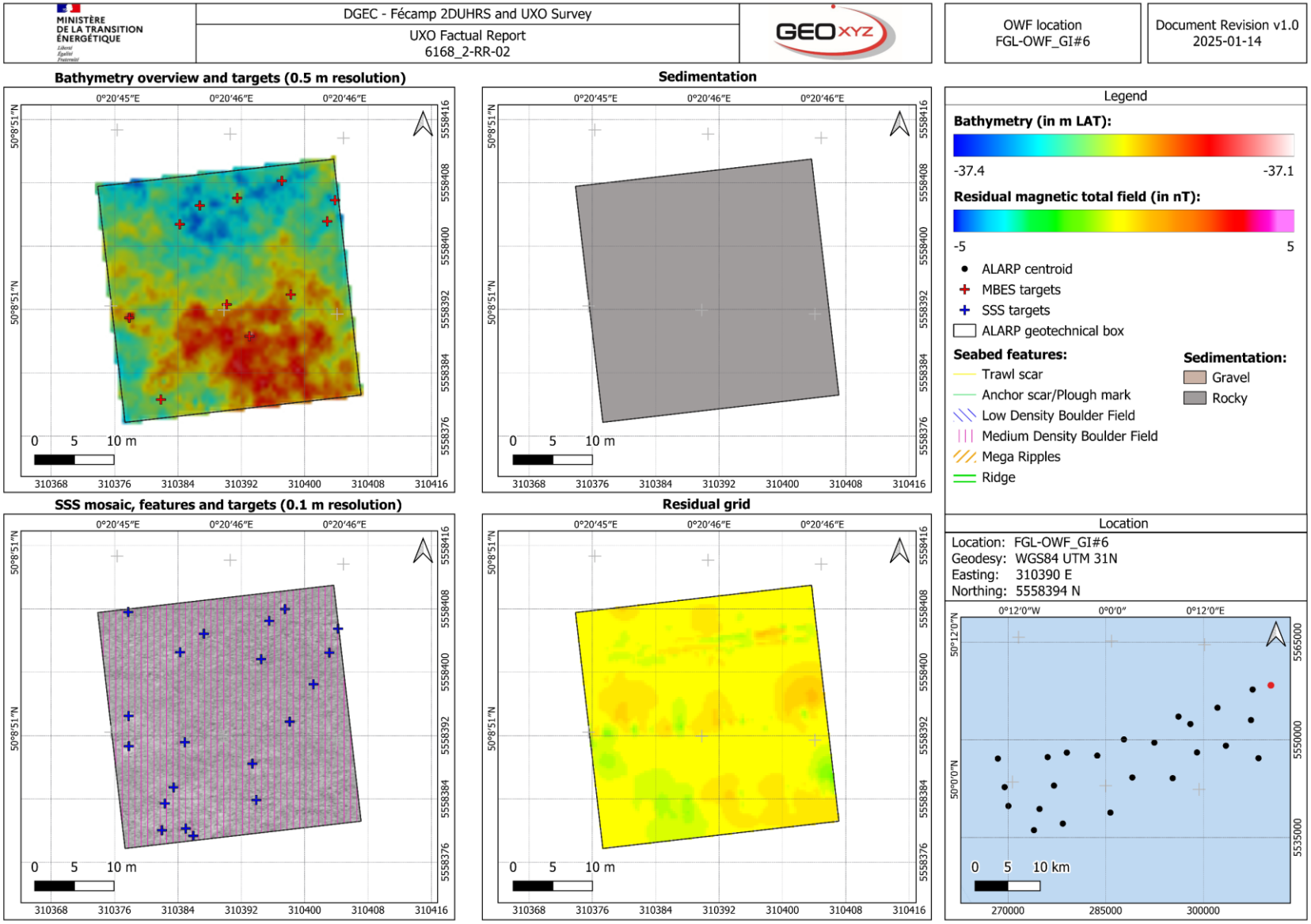
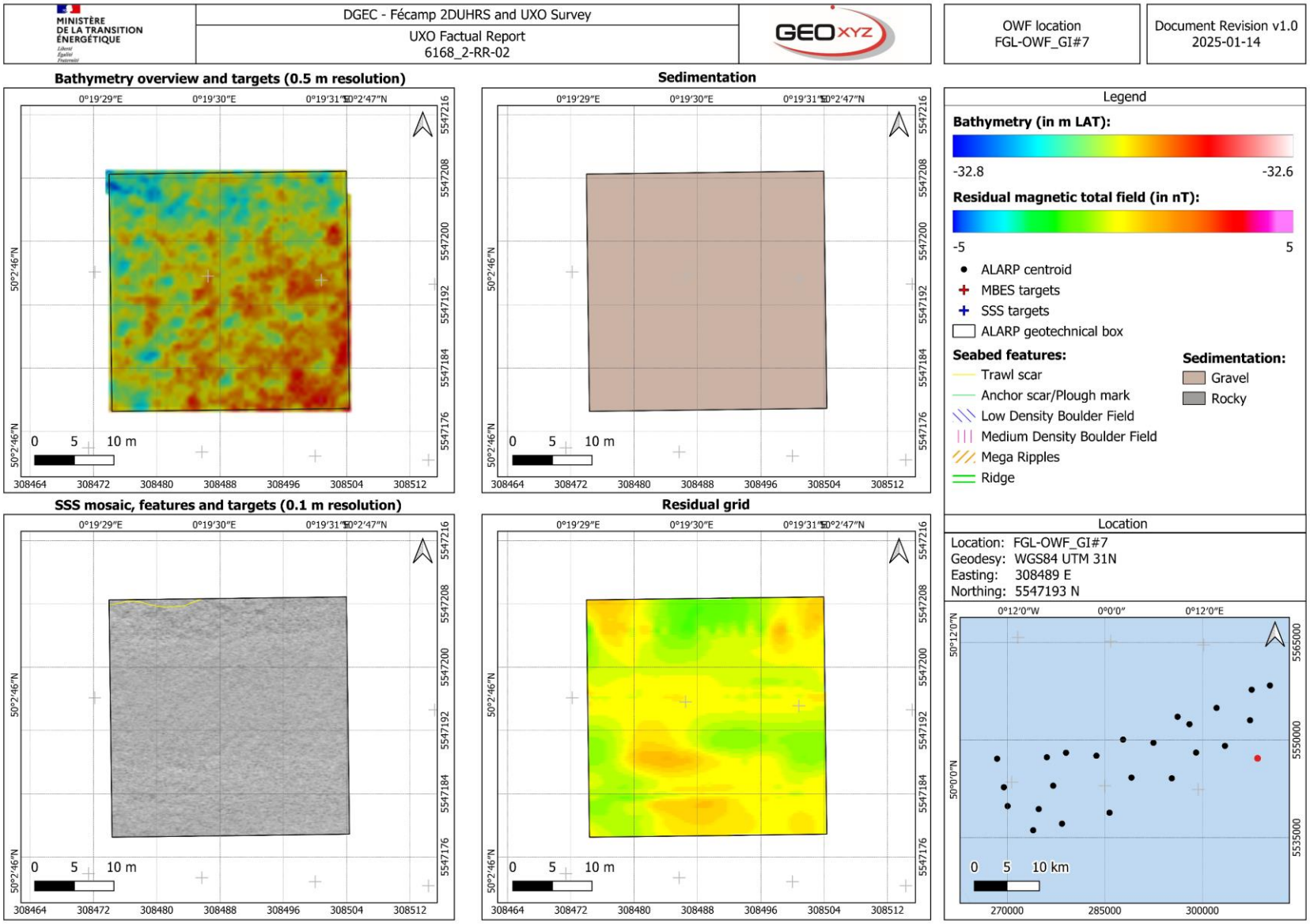
OWF location
FGL-OWF_GI#5
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°8'23"W
0°8'22"W
0°8'21"W
49°57'52"N
49°57'51"N
5539408
5539400
5539392
5539384
5539376
5539368
274832
274840
274848
274856
274864
274872
274880
0 5 10 m
Legend
Bathymetry (in m LAT):
-45.5
-42.5
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#5
Geodesy: WGS84 UTM 31N
Easting: 274854 E
Northing: 5539389 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#6
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°20'45"E
0°20'46"E
50°8'51"N
0 5 10 m
310368 310376 310384 310392 310400 310408 310416
5558416 5558408 5558400 5558392 5558384 5558376
Legend
Bathymetry (in m LAT):
-37.4
-37.1
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#6
Geodesy: WGS84 UTM 31N
Easting: 310390 E
Northing: 5558394 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
0 5 10 km
270000 285000 300000
5565000 5550000 5535000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
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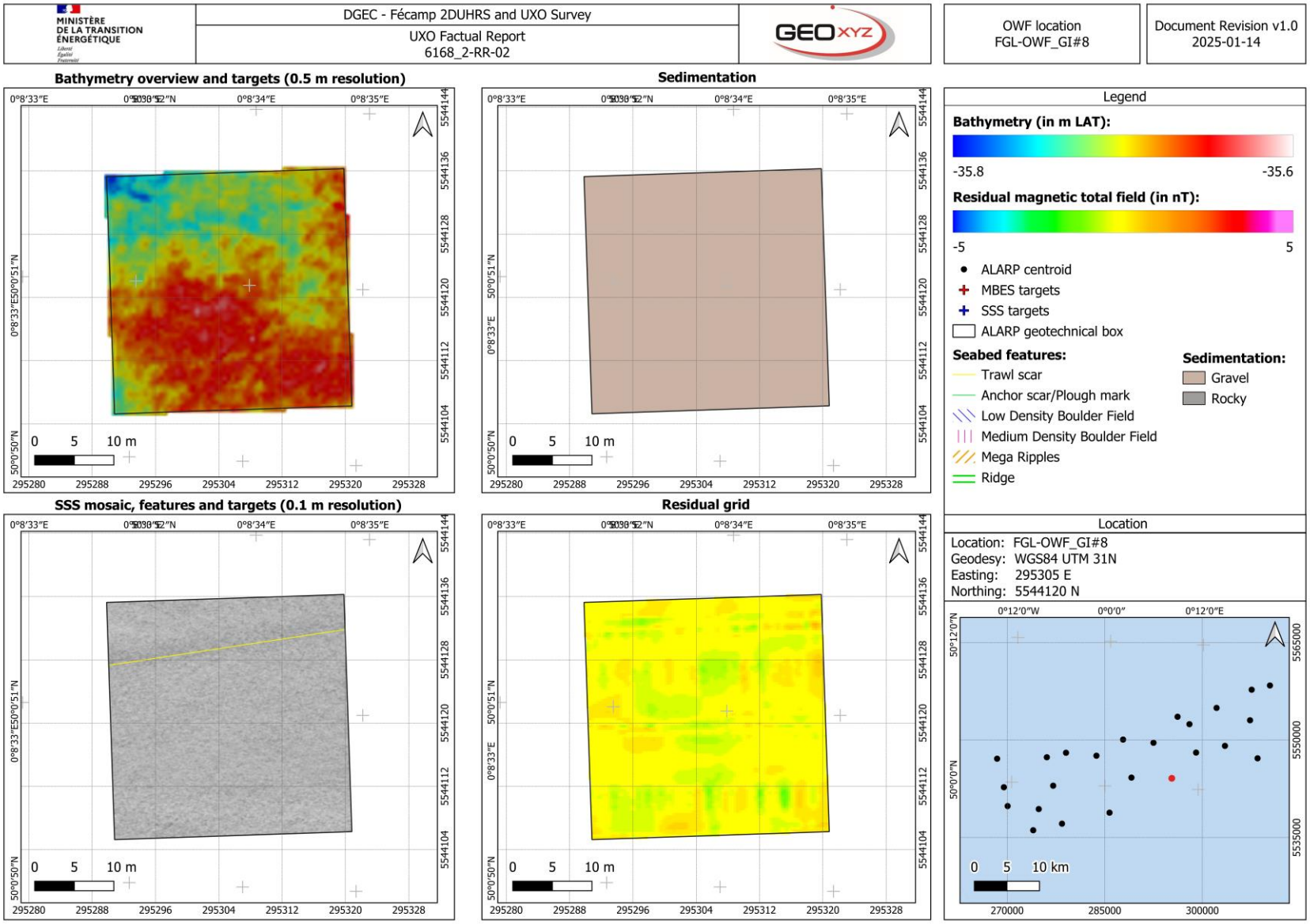
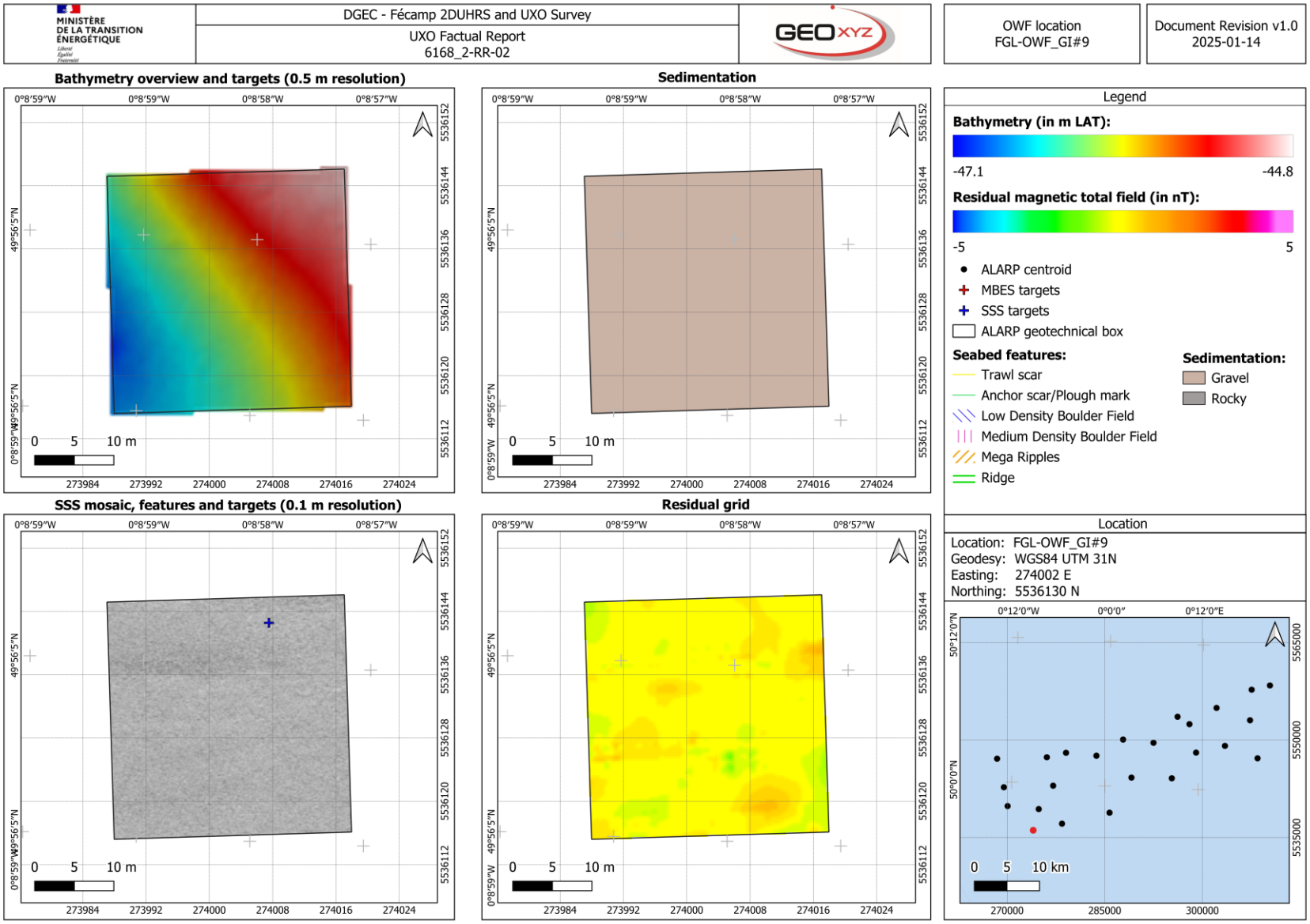
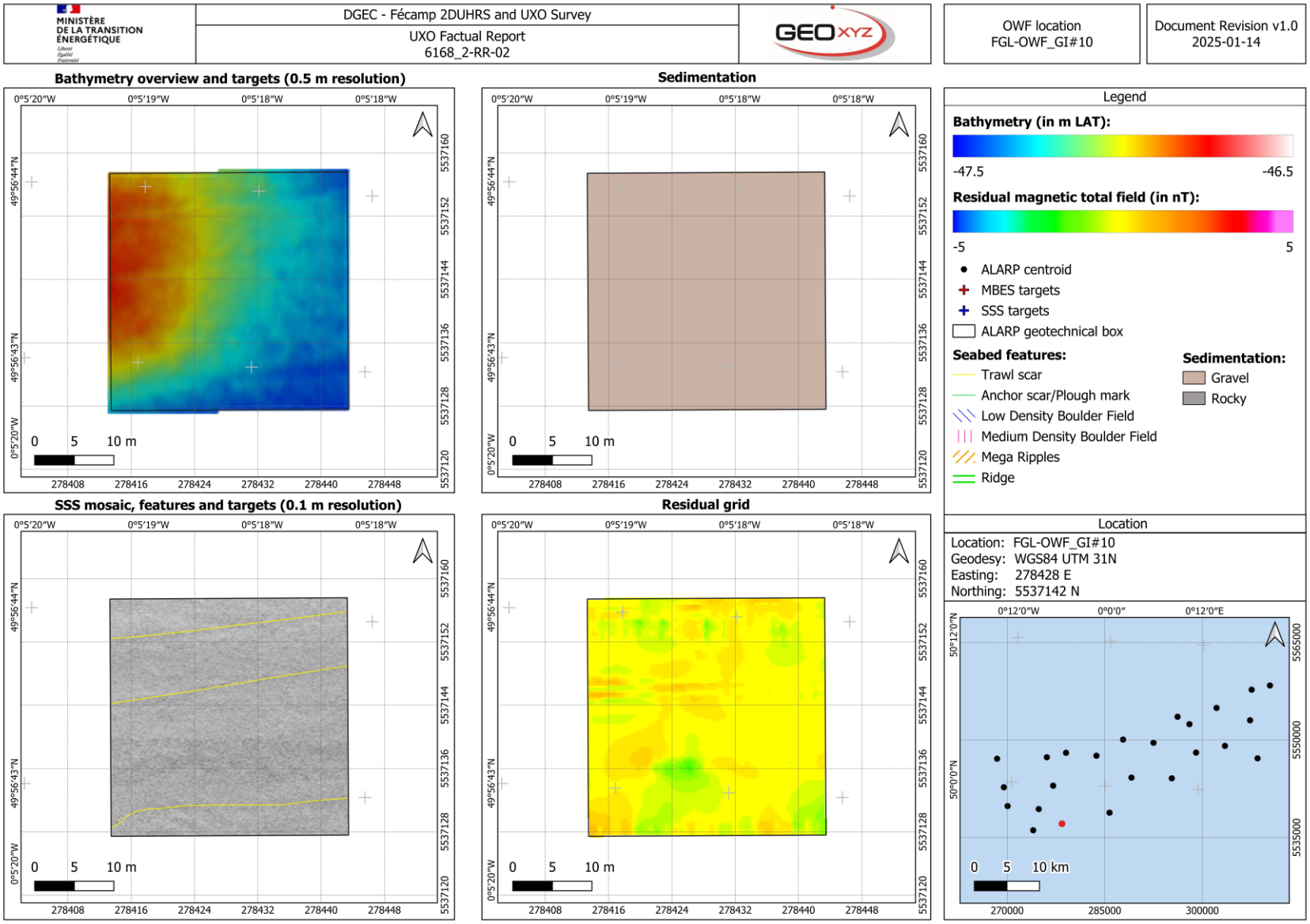
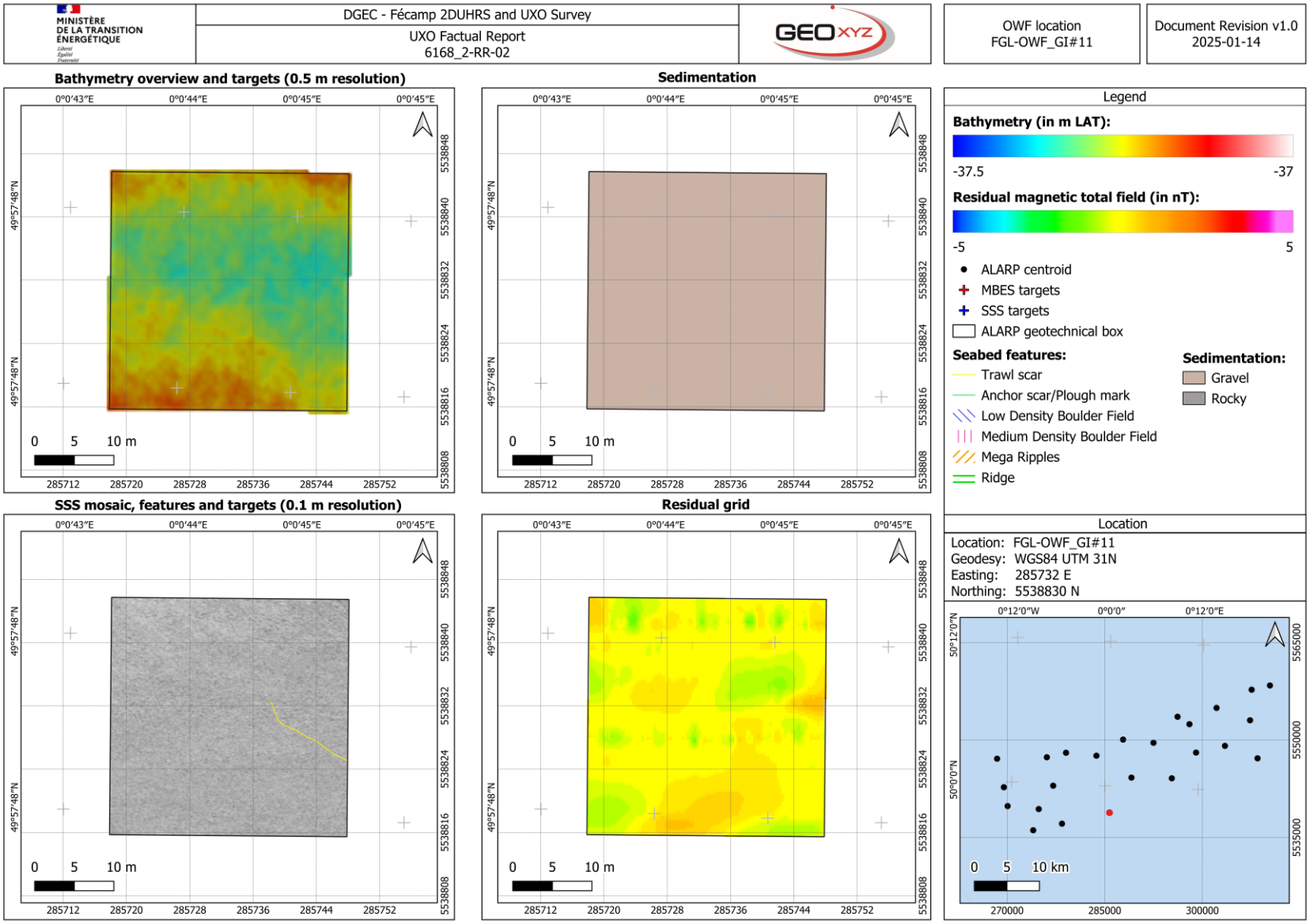
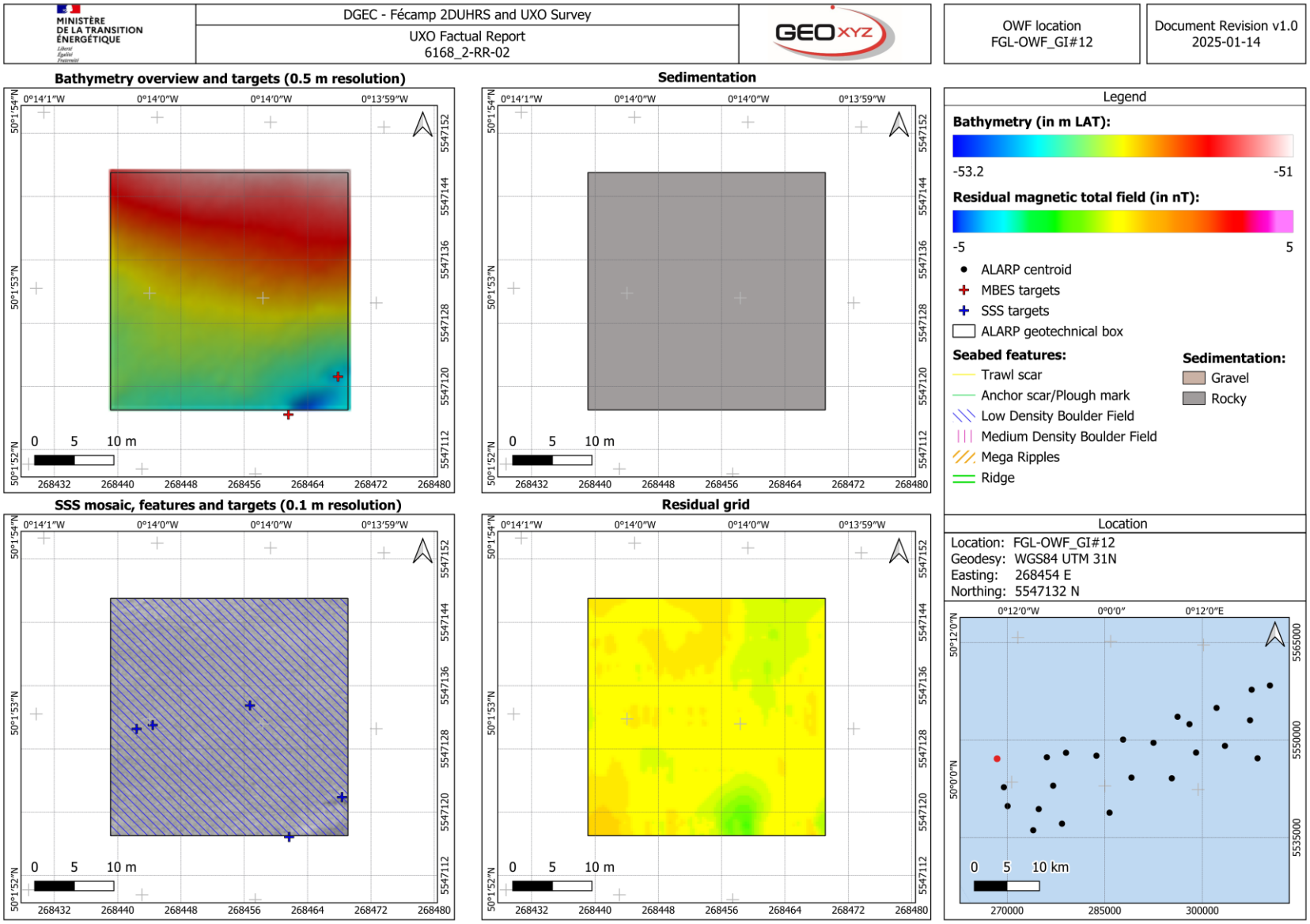
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-32.8
-32.6
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#7
Geodesy: WGS84 UTM 31N
Easting: 308489 E
Northing: 5547193 N
0 5 10 m
0 5 10 km

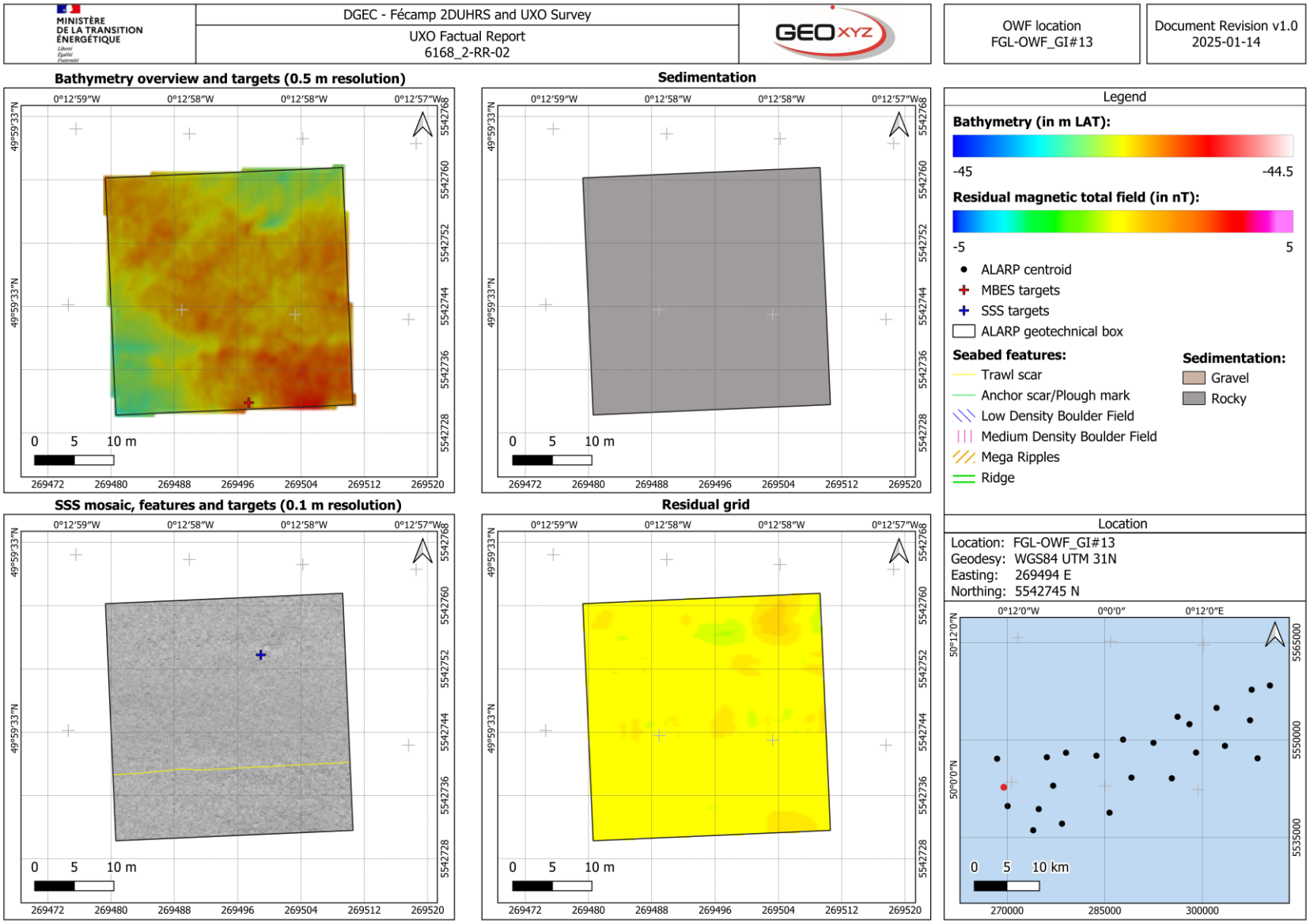

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#8
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-35.8
-35.6
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#8
Geodesy: WGS84 UTM 31N
Easting: 295305 E
Northing: 5544120 N
0 5 10 m
0 5 10 km

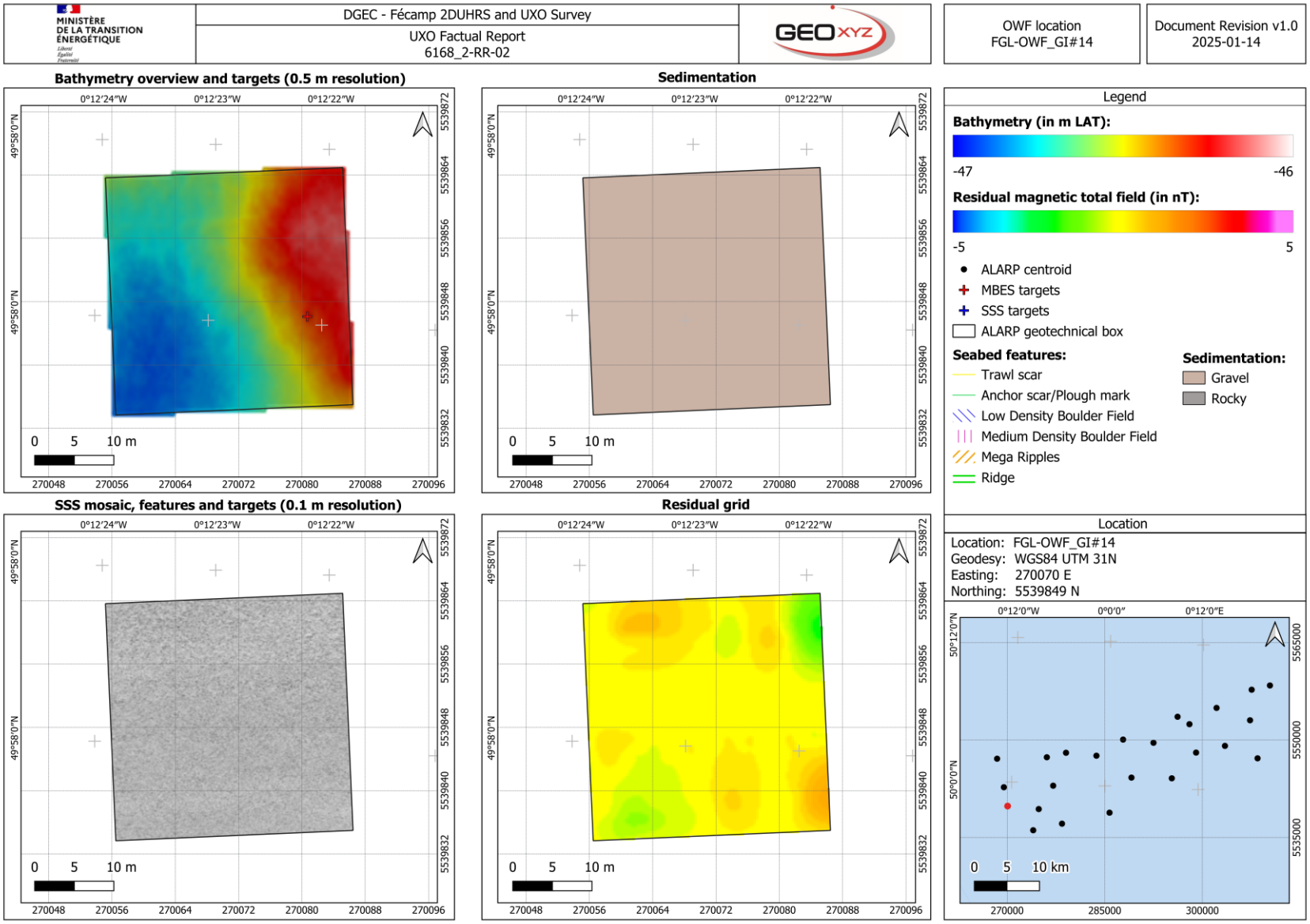

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#9
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-47.1
-44.8
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#9
Geodesy: WGS84 UTM 31N
Easting: 274002 E
Northing: 5536130 N
0 5 10 m
0 5 10 km

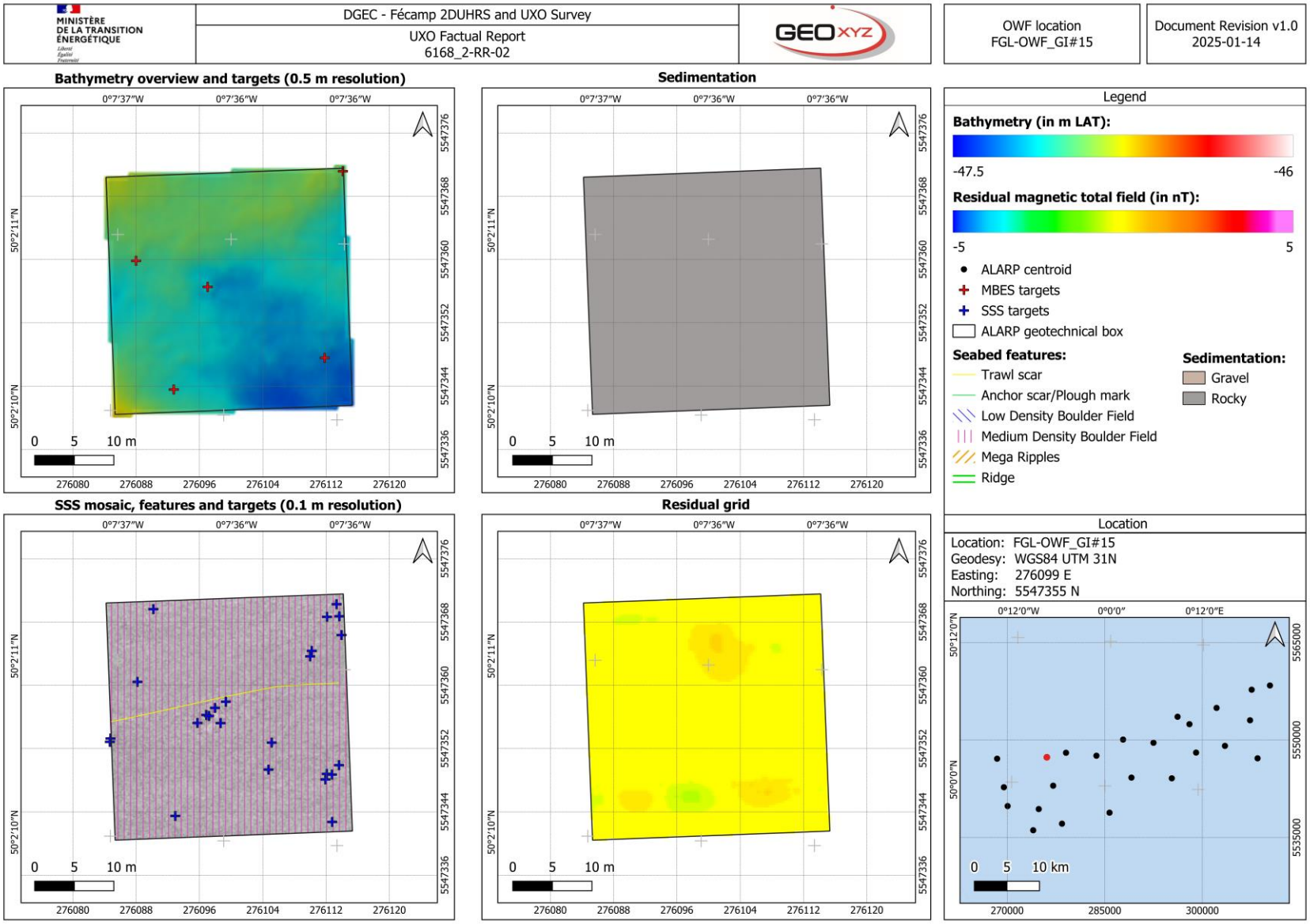

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#10
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-47.5
-46.5
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#10
Geodesy: WGS84 UTM 31N
Easting: 278428 E
Northing: 5537142 N
0°5'20"W
0°5'19"W
0°5'18"W
49°56'44"N
49°56'43"N
5537160
5537152
5537144
5537136
5537128
5537120
278408
278416
278424
278432
278440
278448
0 5 10 m
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000

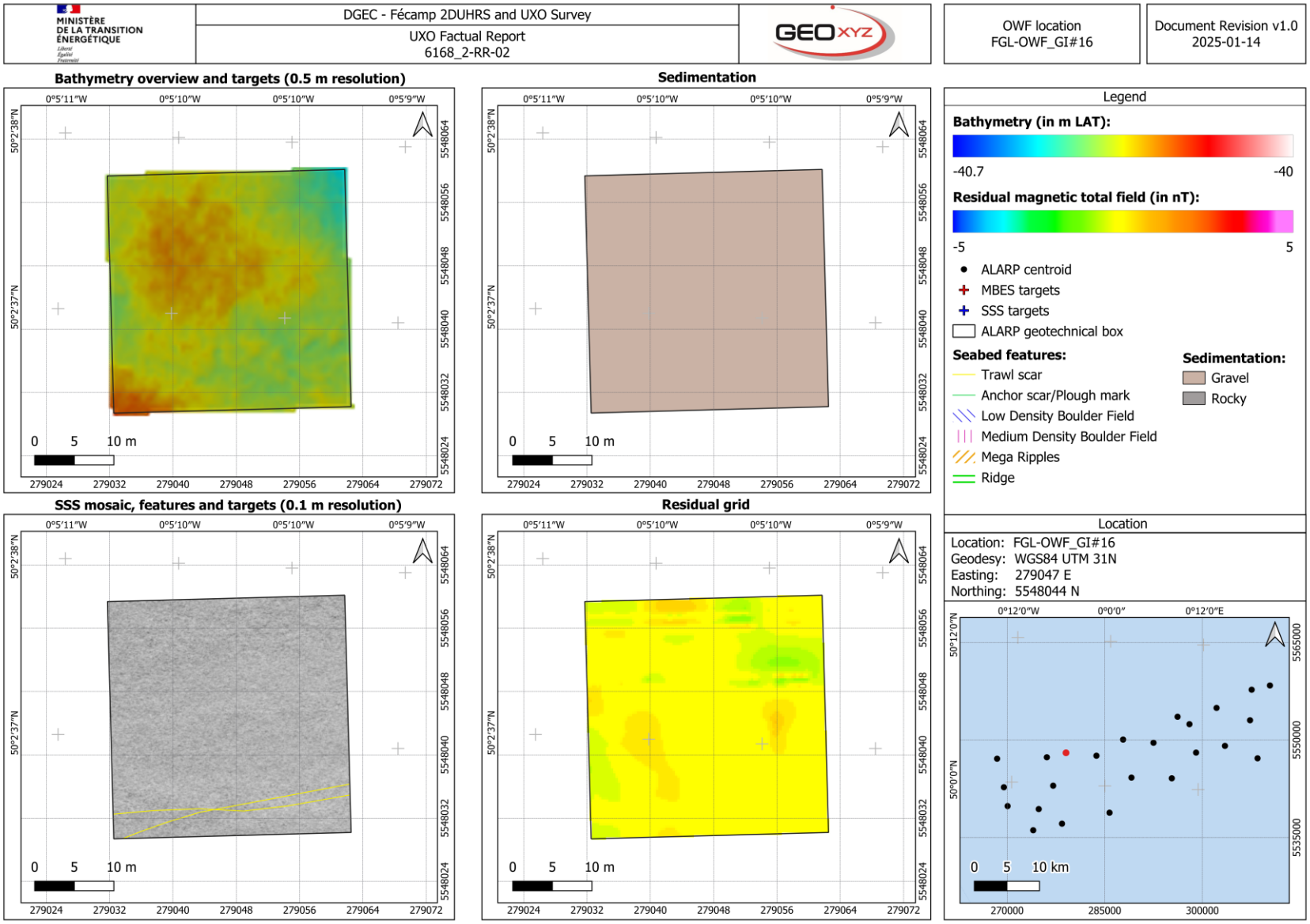

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#11
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°0'43"E
0°0'44"E
0°0'45"E
49°57'48"N
5538848
5538840
5538832
5538824
5538816
5538808
285712
285720
285728
285736
285744
285752
0 5 10 m
Legend
Bathymetry (in m LAT):
-37.5
-37
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#11
Geodesy: WGS84 UTM 31N
Easting: 285732 E
Northing: 5538830 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000

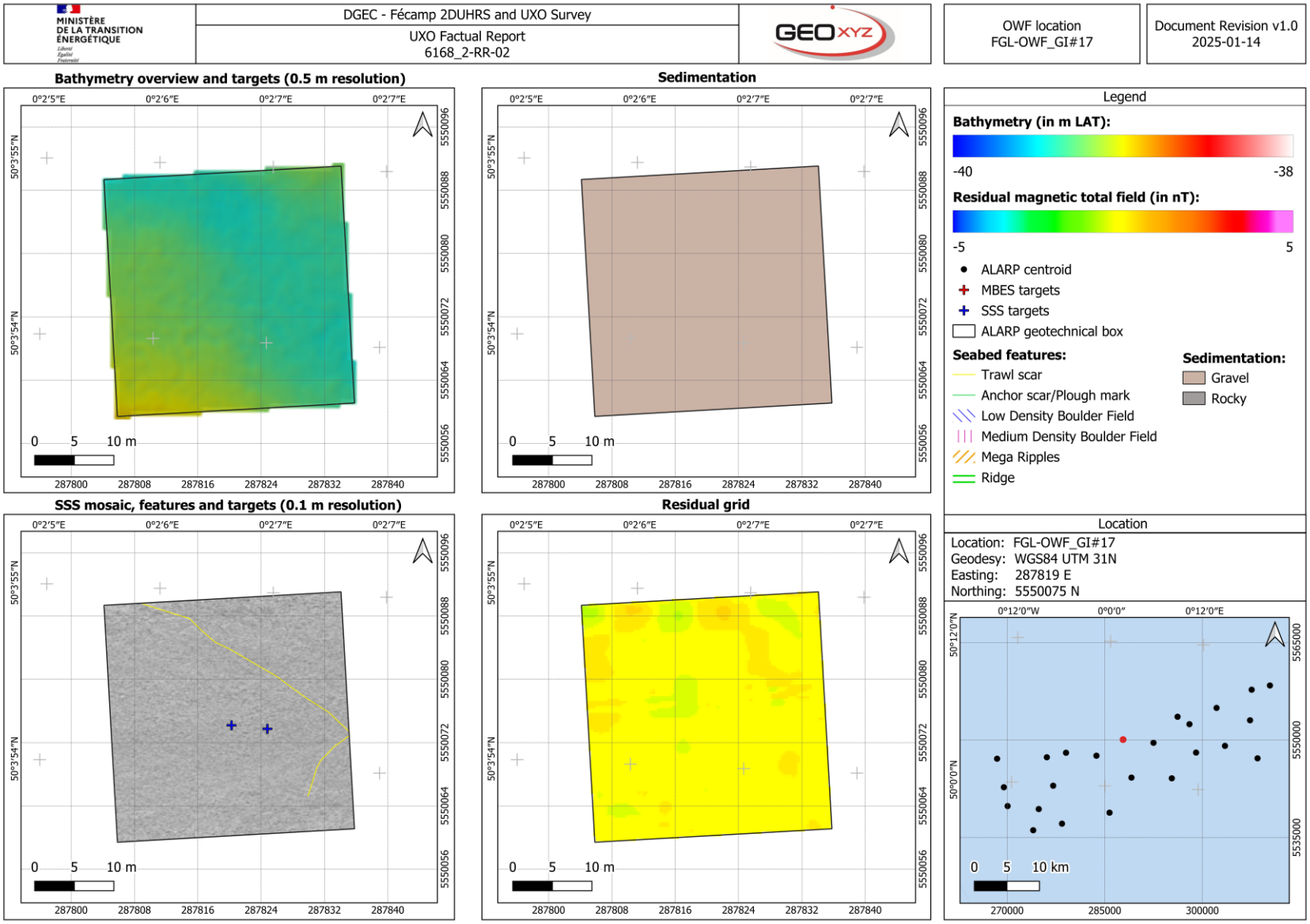

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#12
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-53.2
-51
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#12
Geodesy: WGS84 UTM 31N
Easting: 268454 E
Northing: 5547132 N
0 5 10 m
0 5 10 km

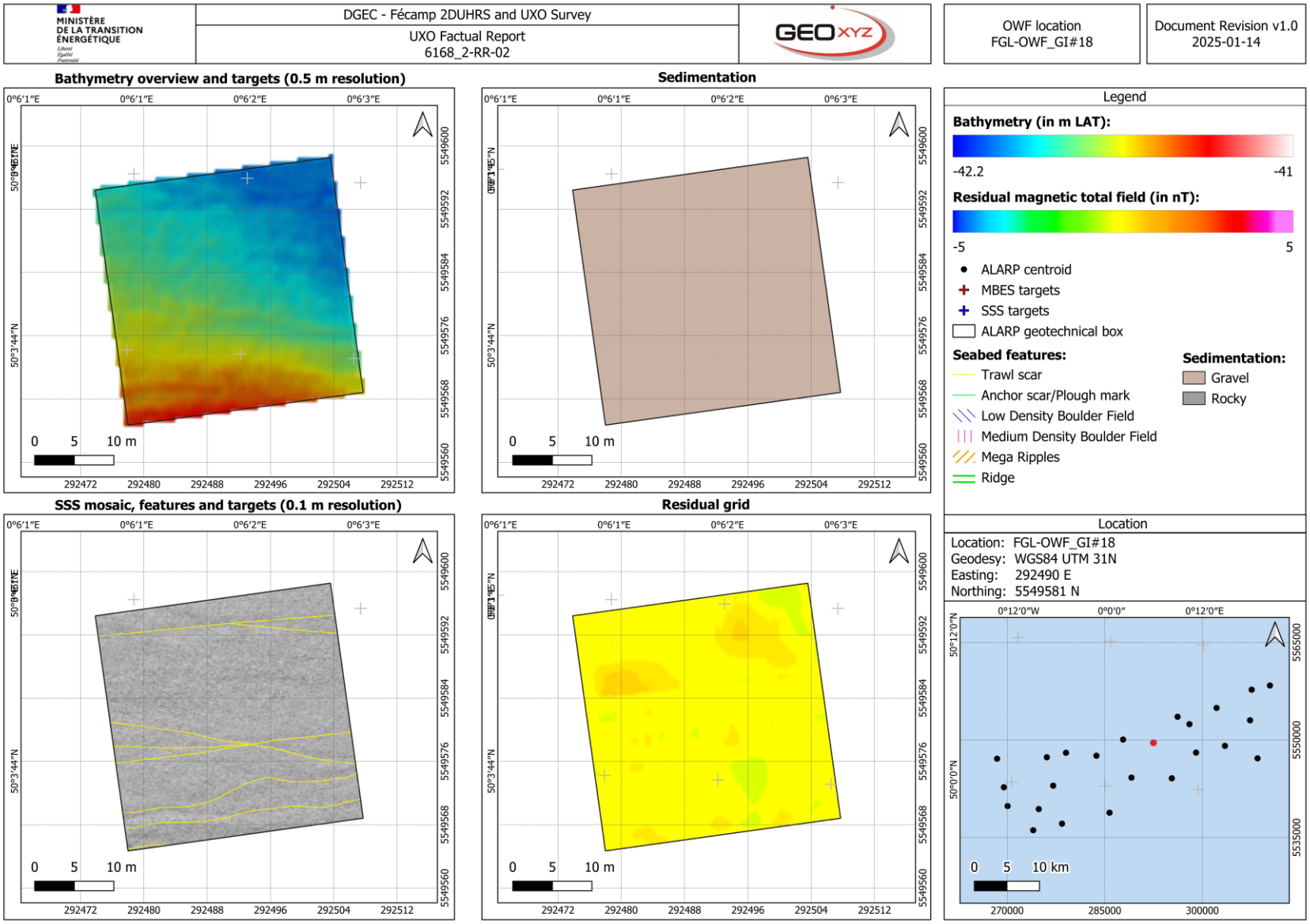

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#13
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°12'59"W
0°12'58"W
0°12'57"W
49°59'33"N
5542768
5542760
5542752
5542744
5542736
5542728
269472
269480
269488
269496
269504
269512
269520
0 5 10 m
Legend
Bathymetry (in m LAT):
-45
-44.5
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#13
Geodesy: WGS84 UTM 31N
Easting: 269494 E
Northing: 5542745 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000

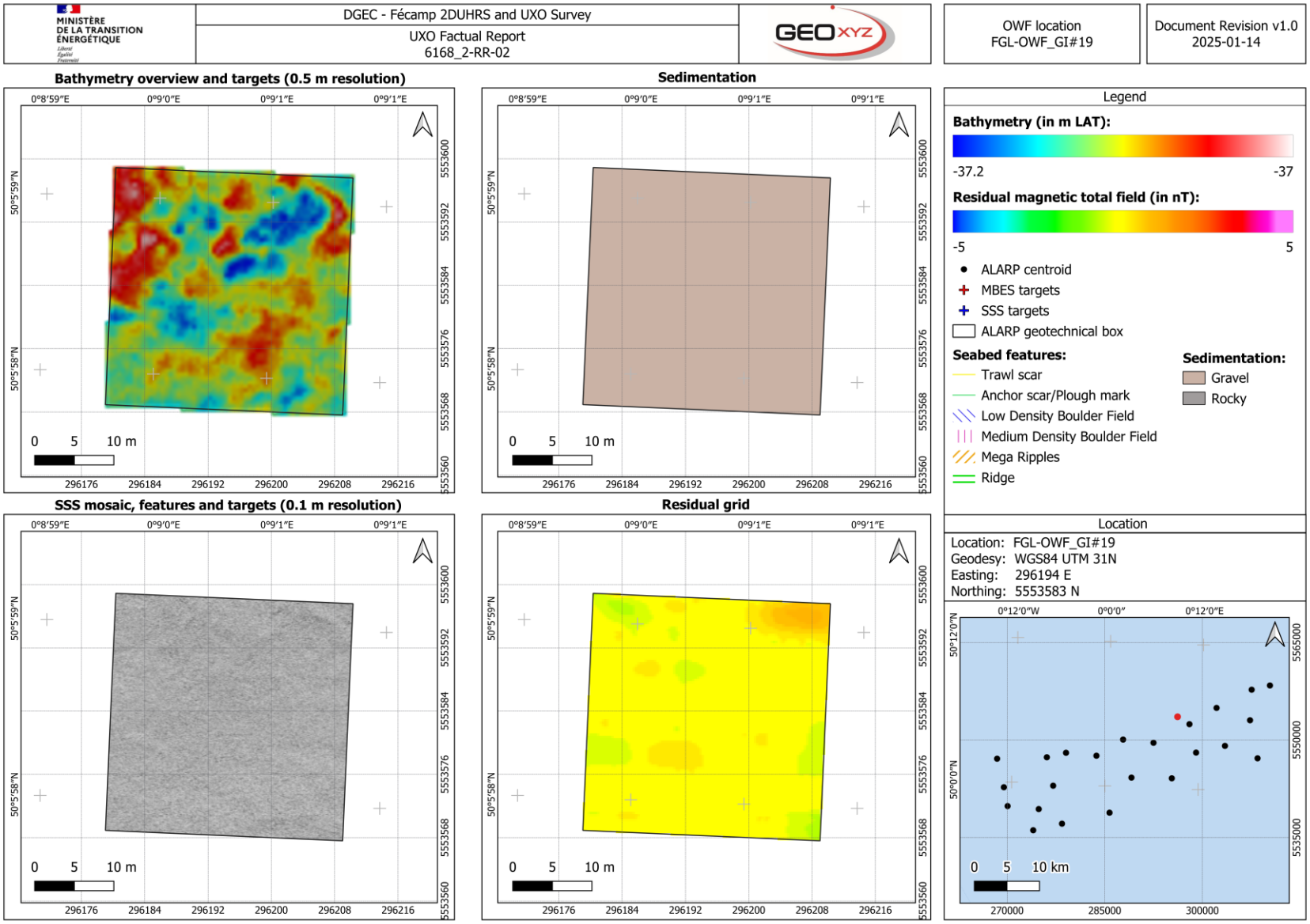

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#14
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°12'24"W
0°12'23"W
0°12'22"W
49°58'0"N
5539872
5539864
5539856
5539848
5539840
5539832
0 5 10 m
270048
270056
270064
270072
270080
270088
270096
Legend
Bathymetry (in m LAT):
-47
-46
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#14
Geodesy: WGS84 UTM 31N
Easting: 270070 E
Northing: 5539849 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000

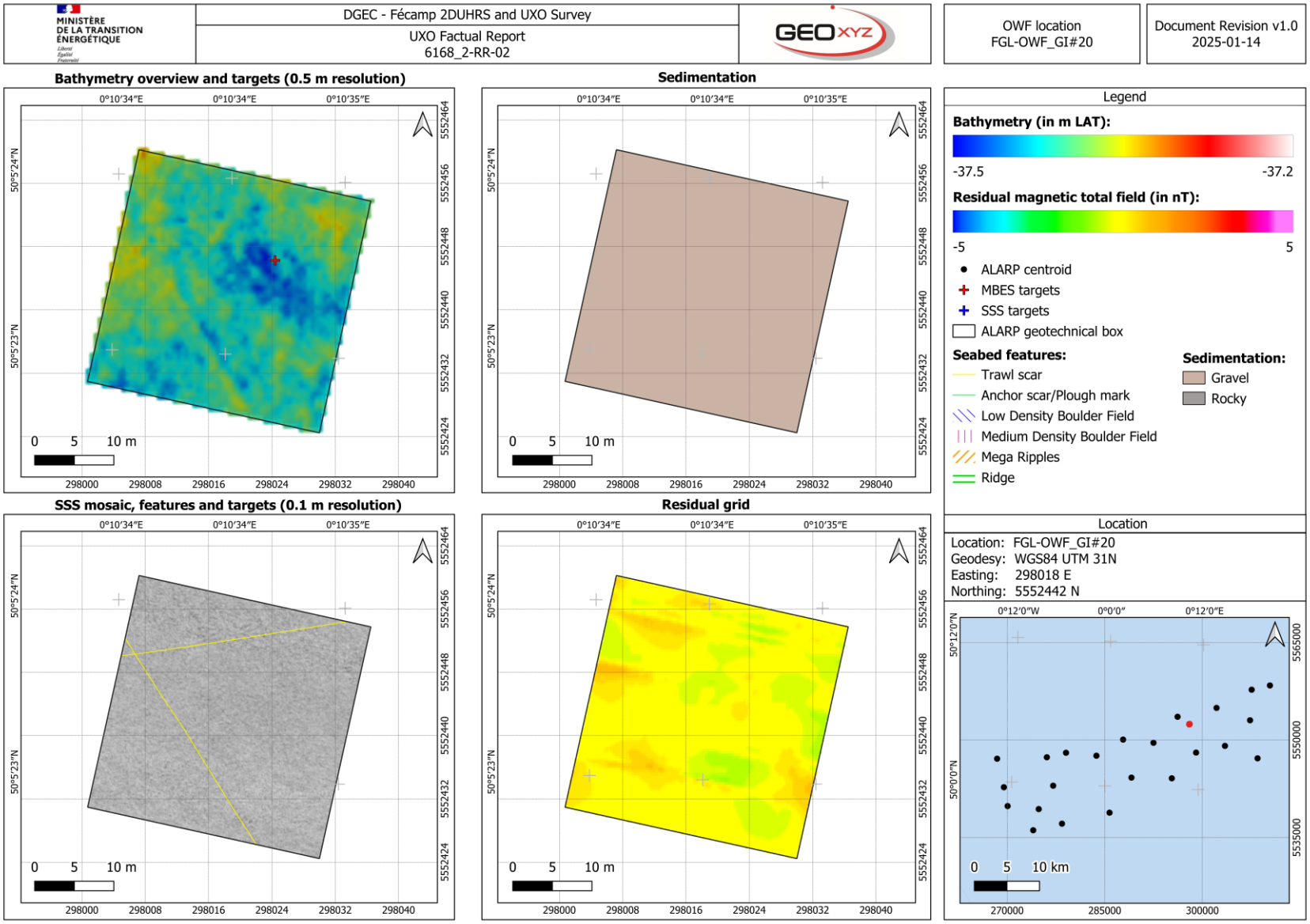

MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#15
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-47.5
-46
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#15
Geodesy: WGS84 UTM 31N
Easting: 276099 E
Northing: 5547355 N
0°7'37"W
0°7'36"W
0°7'36"W
50°2'11"N
50°2'10"N
276080
276088
276096
276104
276112
276120
0 5 10 m
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
270000
285000
300000
0 5 10 km


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#16
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°5'11"W
0°5'10"W
0°5'9"W
50°2'38"N
50°2'37"N
279024
279032
279040
279048
279056
279064
279072
5548064
5548056
5548048
5548040
5548032
5548024
0 5 10 m
Legend
Bathymetry (in m LAT):
-40.7
-40
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#16
Geodesy: WGS84 UTM 31N
Easting: 279047 E
Northing: 5548044 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#17
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°2'5"E
0°2'6"E
0°2'7"E
50°3'55"N
50°3'54"N
5550096
5550088
5550080
5550072
5550064
5550056
287800
287808
287816
287824
287832
287840
0 5 10 m
Legend
Bathymetry (in m LAT):
-40
-38
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#17
Geodesy: WGS84 UTM 31N
Easting: 287819 E
Northing: 5550075 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#18
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0 5 10 m
Legend
Bathymetry (in m LAT):
-42.2
-41
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#18
Geodesy: WGS84 UTM 31N
Easting: 292490 E
Northing: 5549581 N
0 5 10 km


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#19
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°8'59"E
0°9'0"E
0°9'1"E
50°5'59"N
50°5'58"N
5553600
5553592
5553584
5553576
5553568
5553560
296176
296184
296192
296200
296208
296216
0 5 10 m
Legend
Bathymetry (in m LAT):
-37.2
-37
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#19
Geodesy: WGS84 UTM 31N
Easting: 296194 E
Northing: 5553583 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
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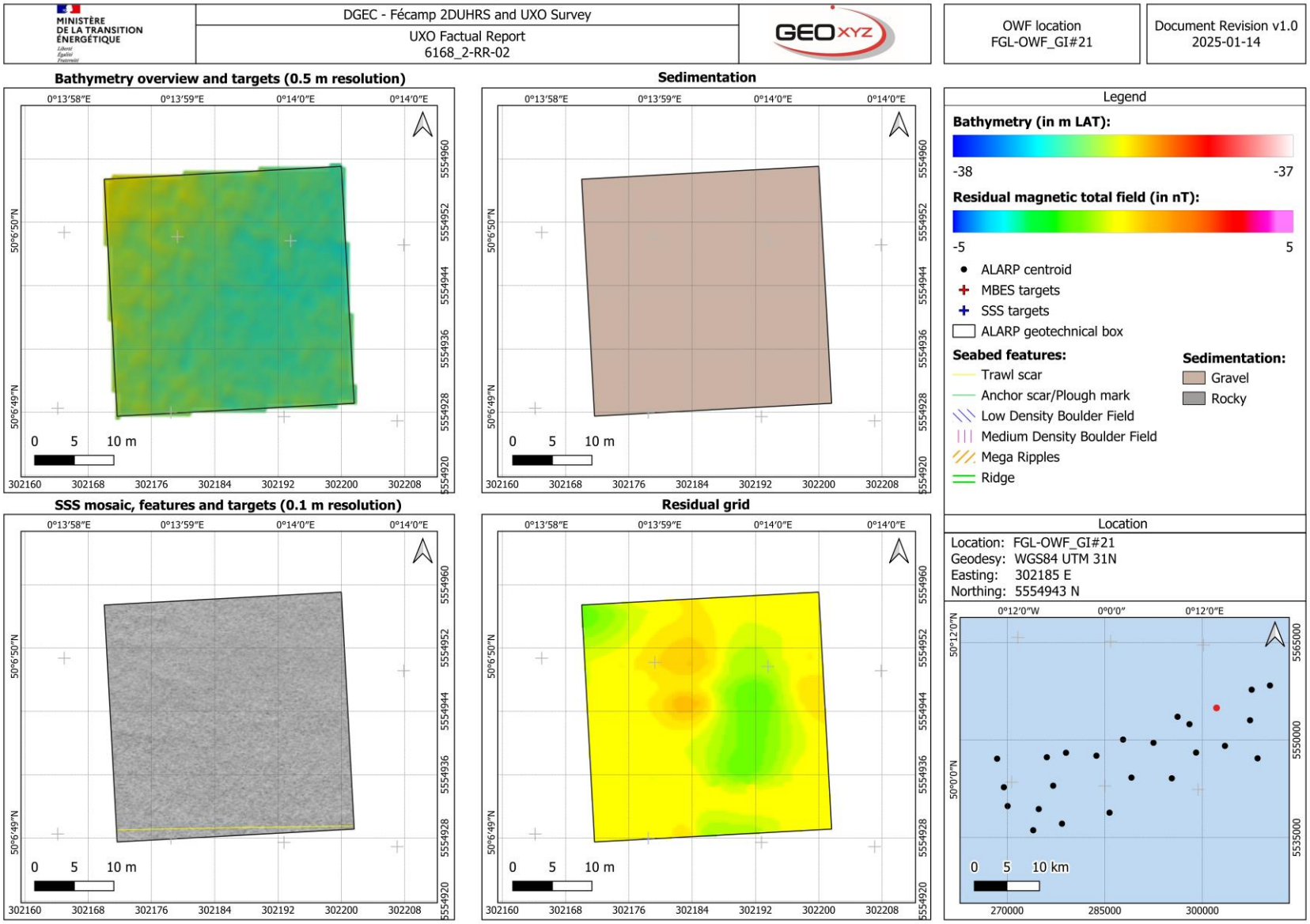
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#20
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°10'34"E
0°10'35"E
50°5'24"N
50°5'23"N
298000
298008
298016
298024
298032
298040
5552464
5552456
5552448
5552440
5552432
5552424
0 5 10 m
Legend
Bathymetry (in m LAT):
-37.5
-37.2
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#20
Geodesy: WGS84 UTM 31N
Easting: 298018 E
Northing: 5552442 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
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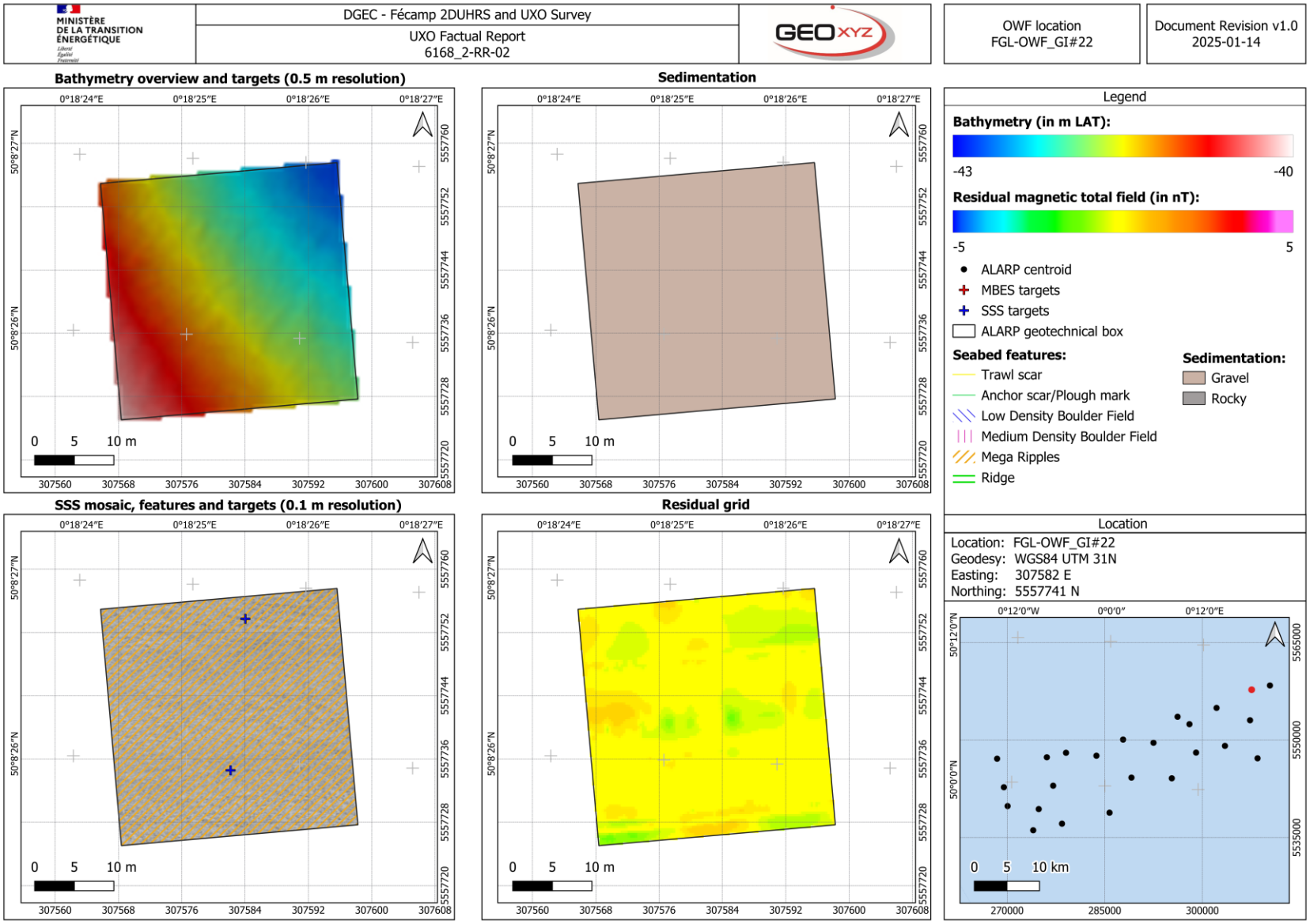
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#21
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°13'58"E
0°13'59"E
0°14'0"E
50°6'50"N
50°6'49"N
5554960
5554952
5554944
5554936
5554928
5554920
302160
302168
302176
302184
302192
302200
302208
0 5 10 m
Legend
Bathymetry (in m LAT):
-38
-37
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#21
Geodesy: WGS84 UTM 31N
Easting: 302185 E
Northing: 5554943 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
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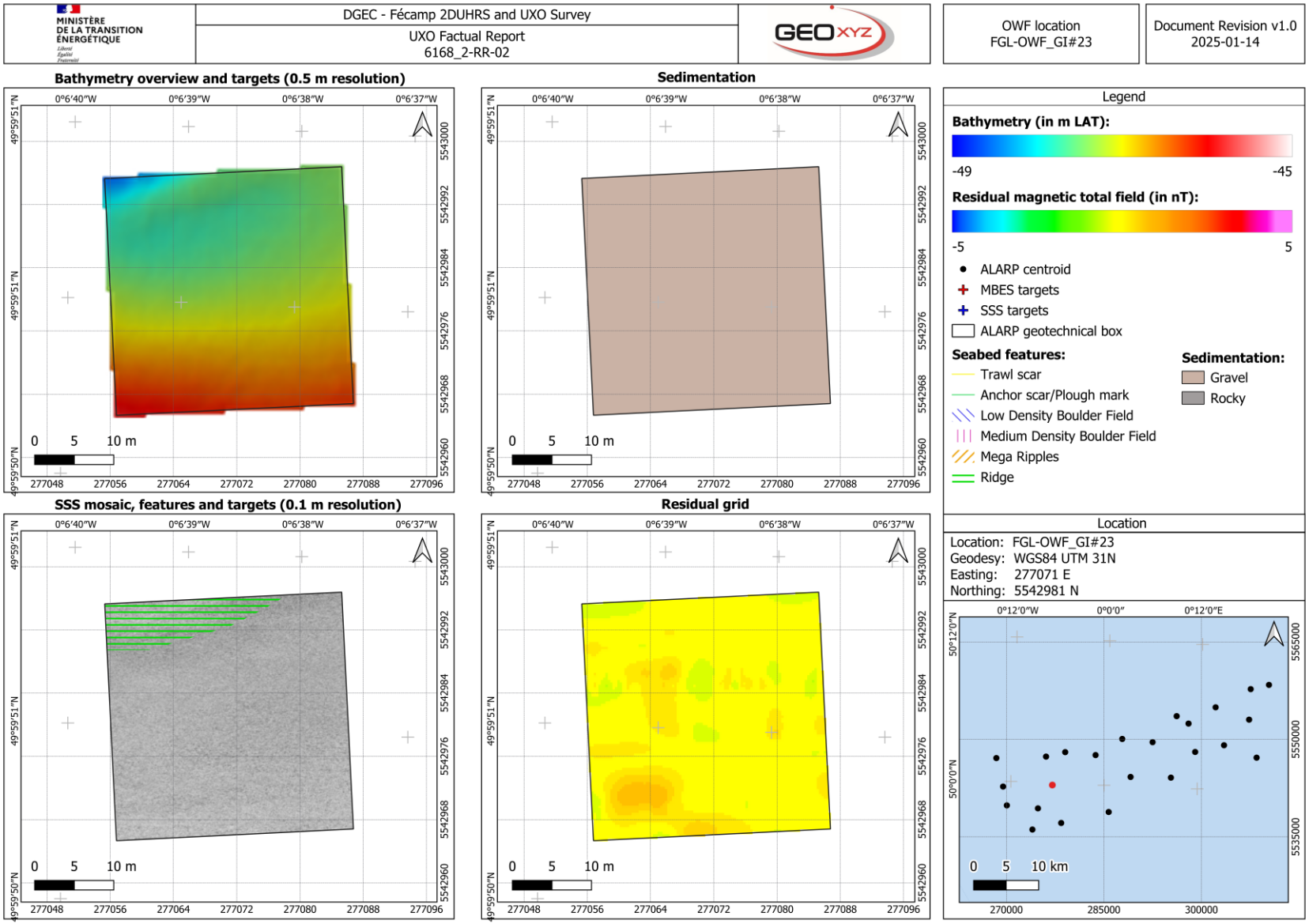
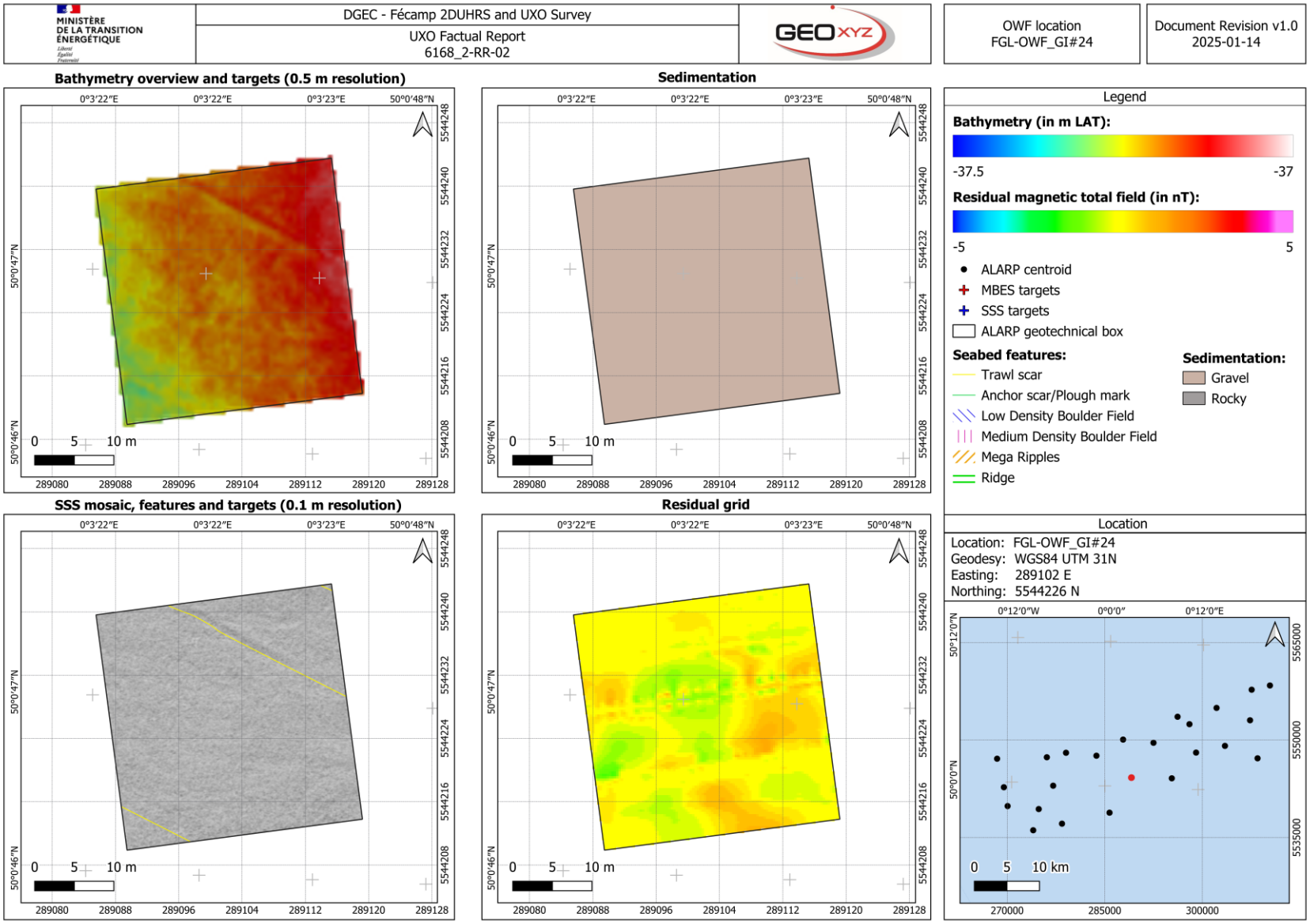
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#22
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°18'24"E
0°18'25"E
0°18'26"E
0°18'27"E
50°8'27"N
50°8'26"N
307560
307568
307576
307584
307592
307600
307608
5557760
5557752
5557744
5557736
5557728
5557720
0 5 10 m
Legend
Bathymetry (in m LAT):
-43
-40
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#22
Geodesy: WGS84 UTM 31N
Easting: 307582 E
Northing: 5557741 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#23
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
0°6'40"W
0°6'39"W
0°6'38"W
0°6'37"W
49°59'51"N
49°59'50"N
277048
277056
277064
277072
277080
277088
277096
5543000
5542992
5542984
5542976
5542968
5542960
0 5 10 m
Legend
Bathymetry (in m LAT):
-49
-45
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#23
Geodesy: WGS84 UTM 31N
Easting: 277071 E
Northing: 5542981 N
0°12'0"W
0°0'0"
0°12'0"E
50°12'0"N
50°0'0"N
5565000
5550000
5535000
0 5 10 km
270000
285000
300000


MINISTÈRE DE LA TRANSITION ÉNERGÉTIQUE
DGEC - Fécamp 2DUHRS and UXO Survey
UXO Factual Report
6168_2-RR-02
OWF location
FGL-OWF_GI#24
Document Revision v1.0
2025-01-14
Bathymetry overview and targets (0.5 m resolution)
Sedimentation
SSS mosaic, features and targets (0.1 m resolution)
Residual grid
Legend
Bathymetry (in m LAT):
-37.5
-37
Residual magnetic total field (in nT):
-5
5
ALARP centroid
MBES targets
SSS targets
ALARP geotechnical box
Seabed features:
Trawl scar
Anchor scar/Plough mark
Low Density Boulder Field
Medium Density Boulder Field
Mega Ripples
Ridge
Sedimentation:
Gravel
Rocky
Location
Location: FGL-OWF_GI#24
Geodesy: WGS84 UTM 31N
Easting: 289102 E
Northing: 5544226 N
0 5 10 m
0 5 10 km

APPENDIX B. ALARP CERTIFICATES