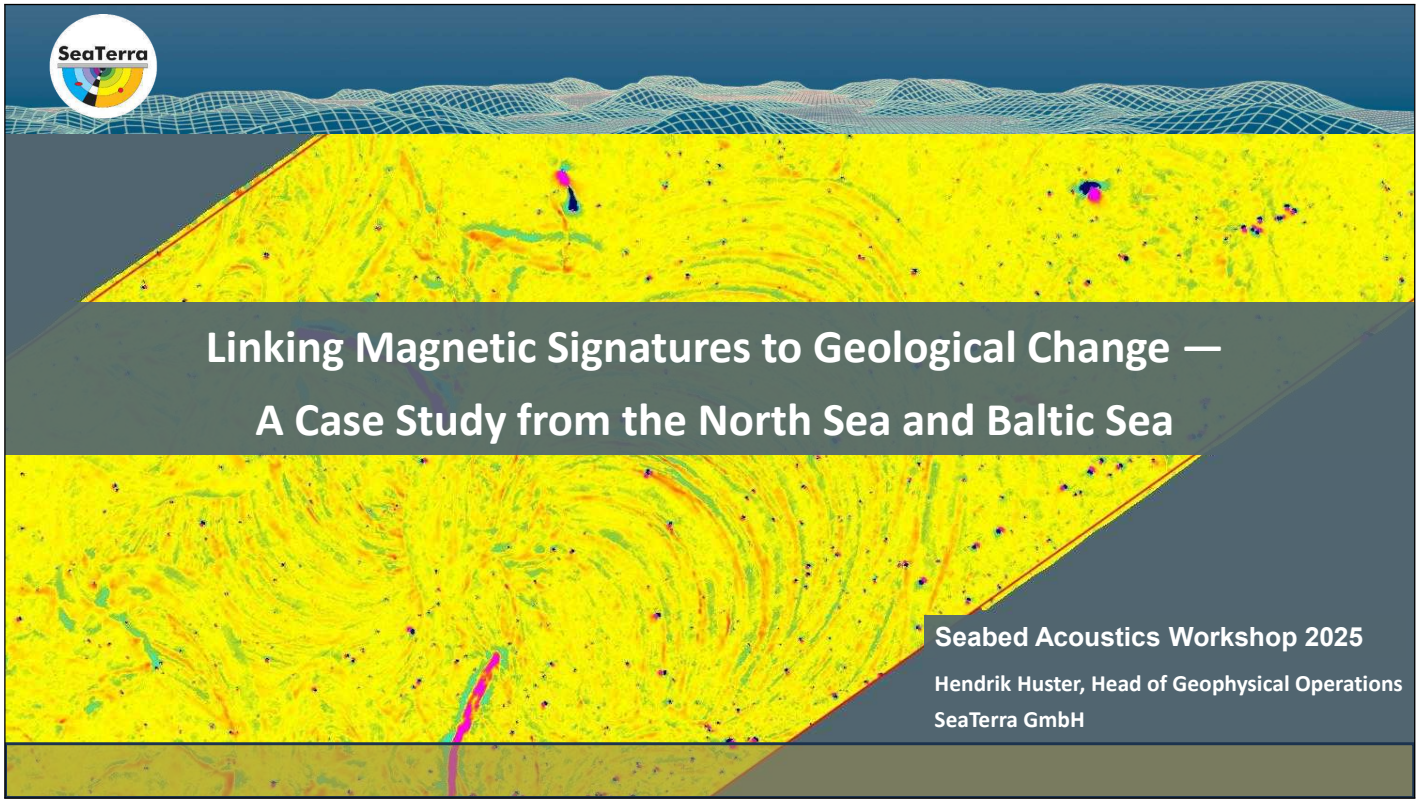
Proceedings of the 11 th Workshop "Seabed Acoustics", Presentation P07:

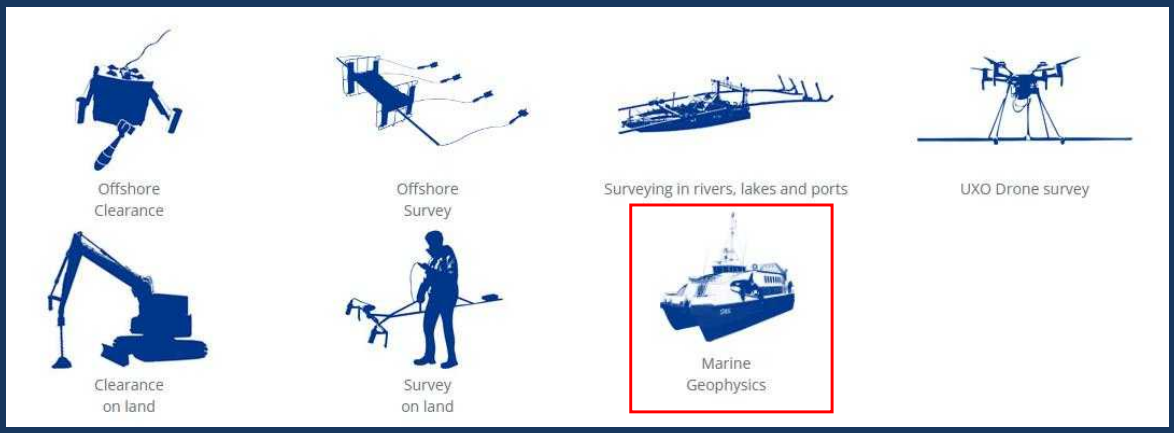
Linking Magnetic Signatures to Geological Change — A Case Study from the North Sea and Baltic Sea

Hendrik Huster
SeaTerra GmbH, Germany

5 th November 2025



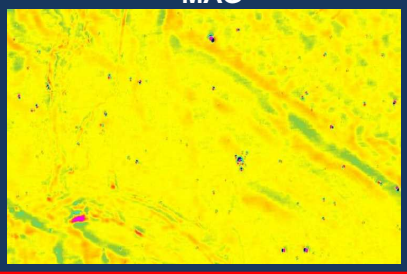
About us



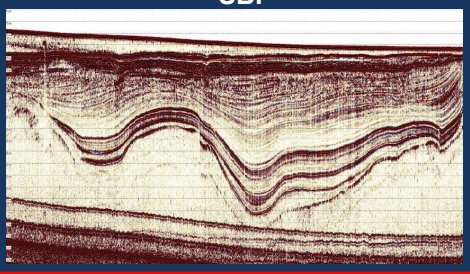
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Marine Geophysical Survey - 2025

MAG

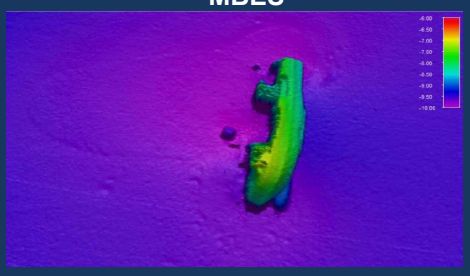


SBP



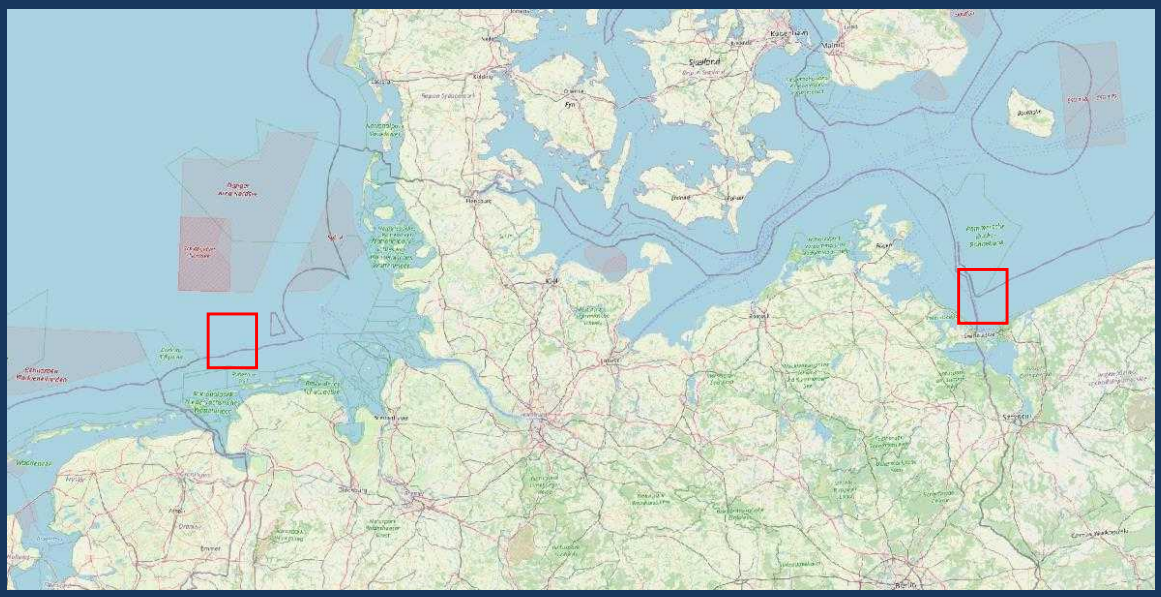
SSS

MBES



SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

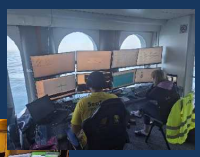
Case Study – The Survey Areas



SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Survey Equipment

Survey vessel:
Stribog



SBP Survey:
Innomar Medium 100,
Mounted on hydraulic pole

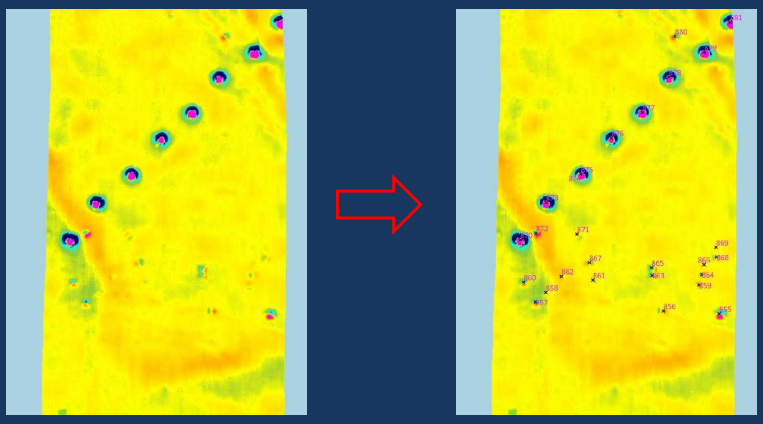
MAG Survey:
Geometrix G882 towed on EIVA SF,
positioned with USBL

SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Data Interpretation - MAG

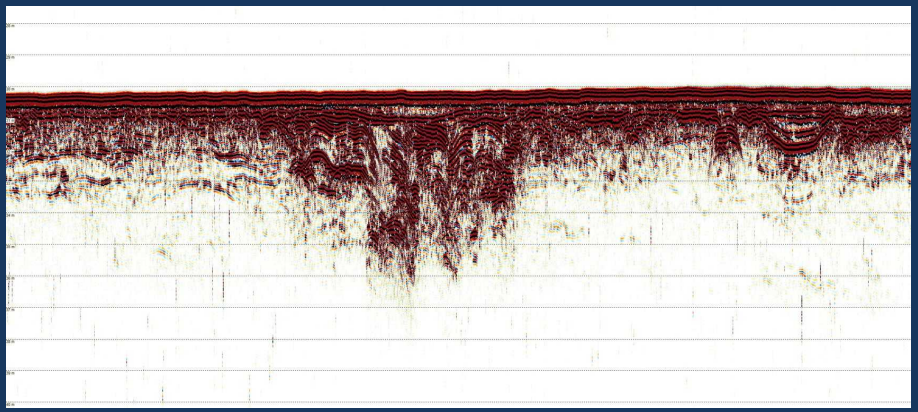
For magnetic data the focus is usualy put on object and UXO detection.

Magnetic signatures from the geology are mostly supressed by filters and neglected.



Data Interpretation - SBP

Example North Sea

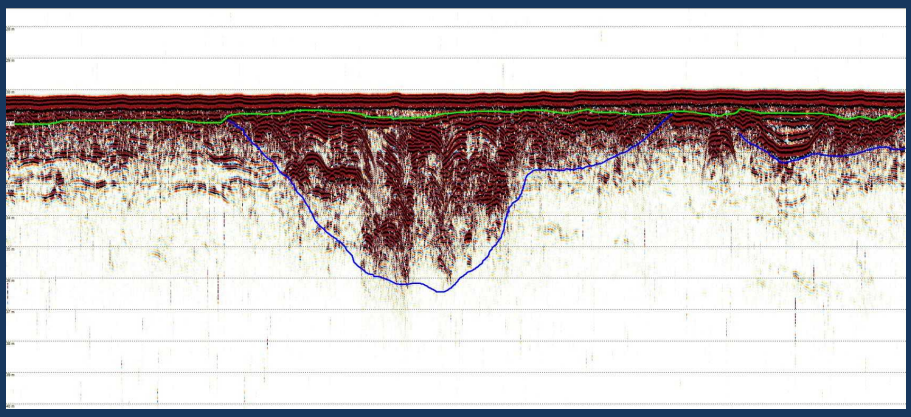


Data Interpretation - SBP

Example North Sea

In this example we picked two reflectors.

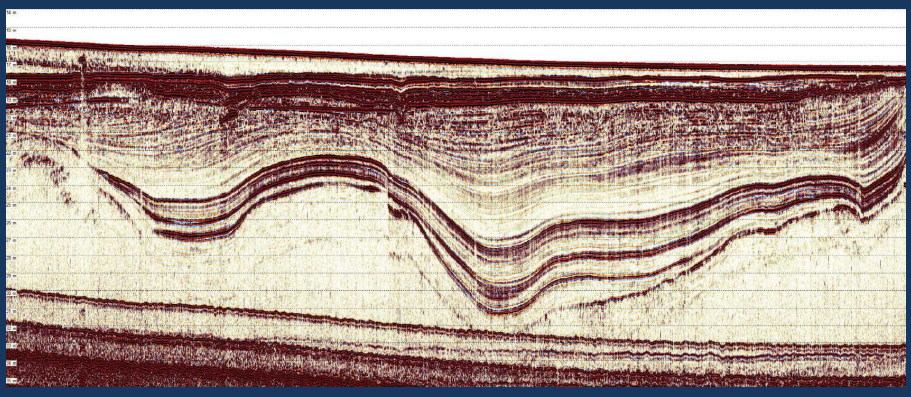
- Green: Lower boundary of the uppermost layer. Spatially continuous and often transparent
- Blue: Bottom of buried channel-like structures. Discontinuous and hard to track.



SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Data Interpretation - SBP

Examples Baltic Sea

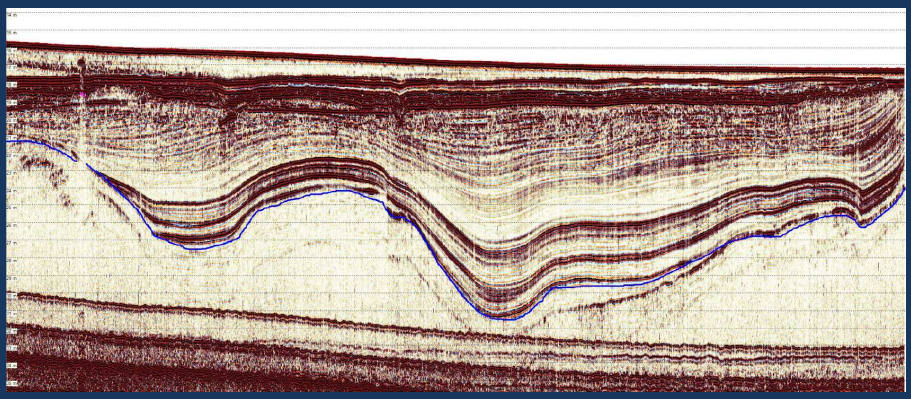


SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Data Interpretation - SBP

Examples Baltic Sea

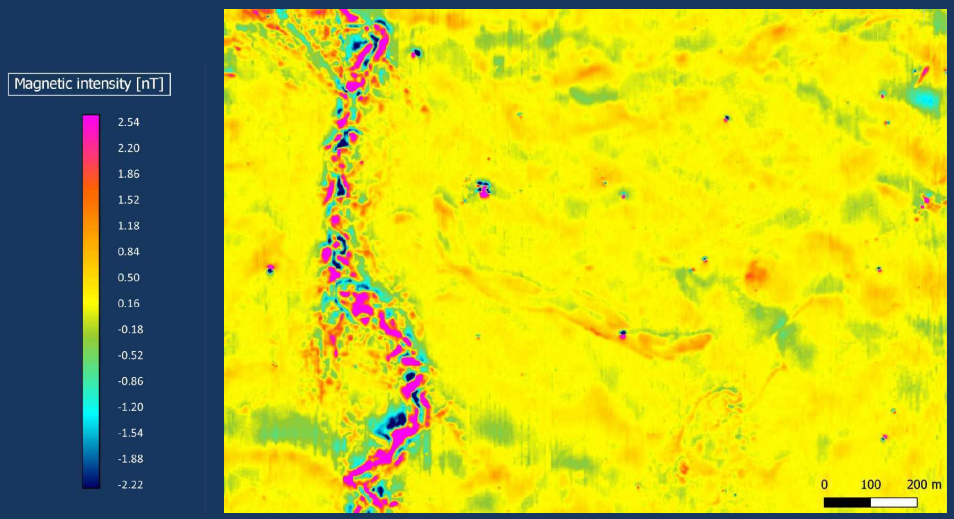
In this example we picked the deepest distinguishable extend of the stratified sediments (Blue).



SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Data Results – SBP + MAG

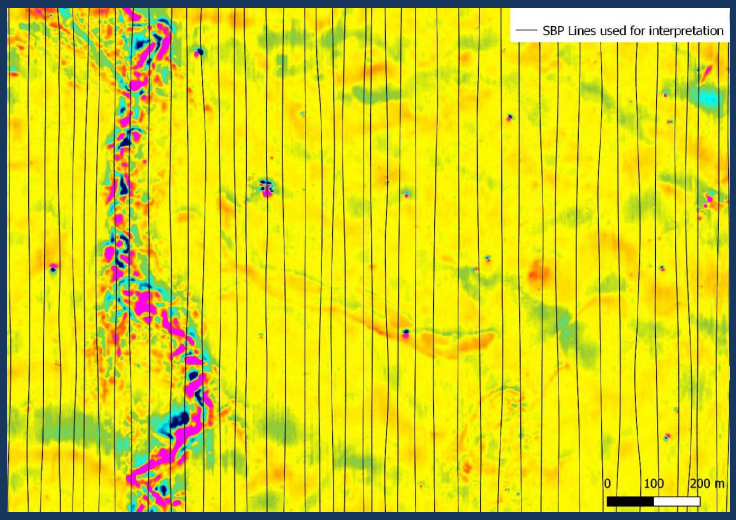
Example 1, North Sea



SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Data Results – SBP + MAG

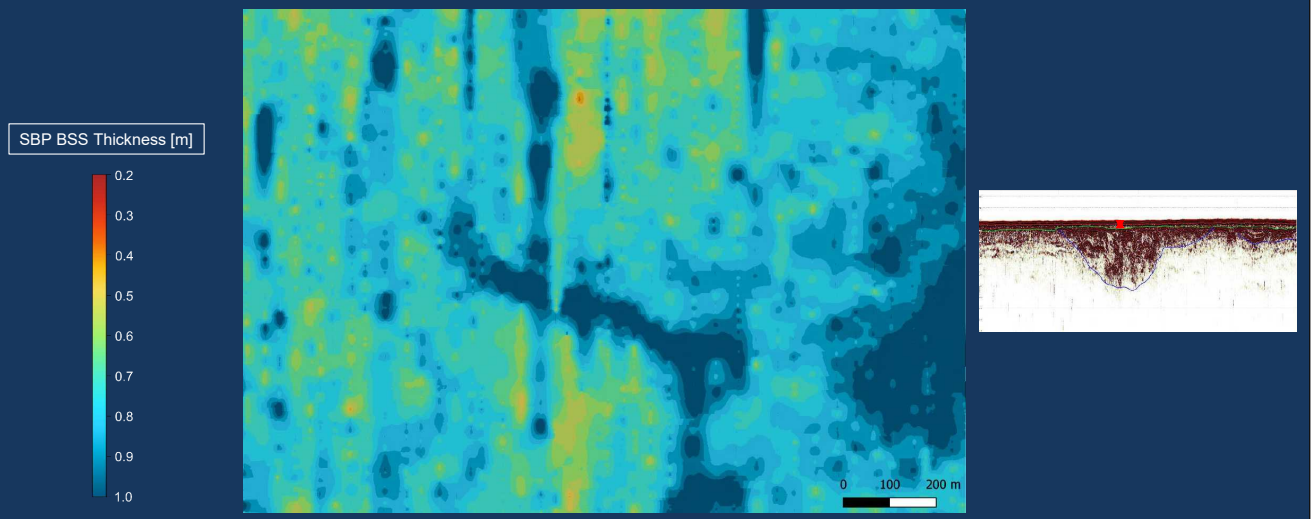
Example 1, North Sea



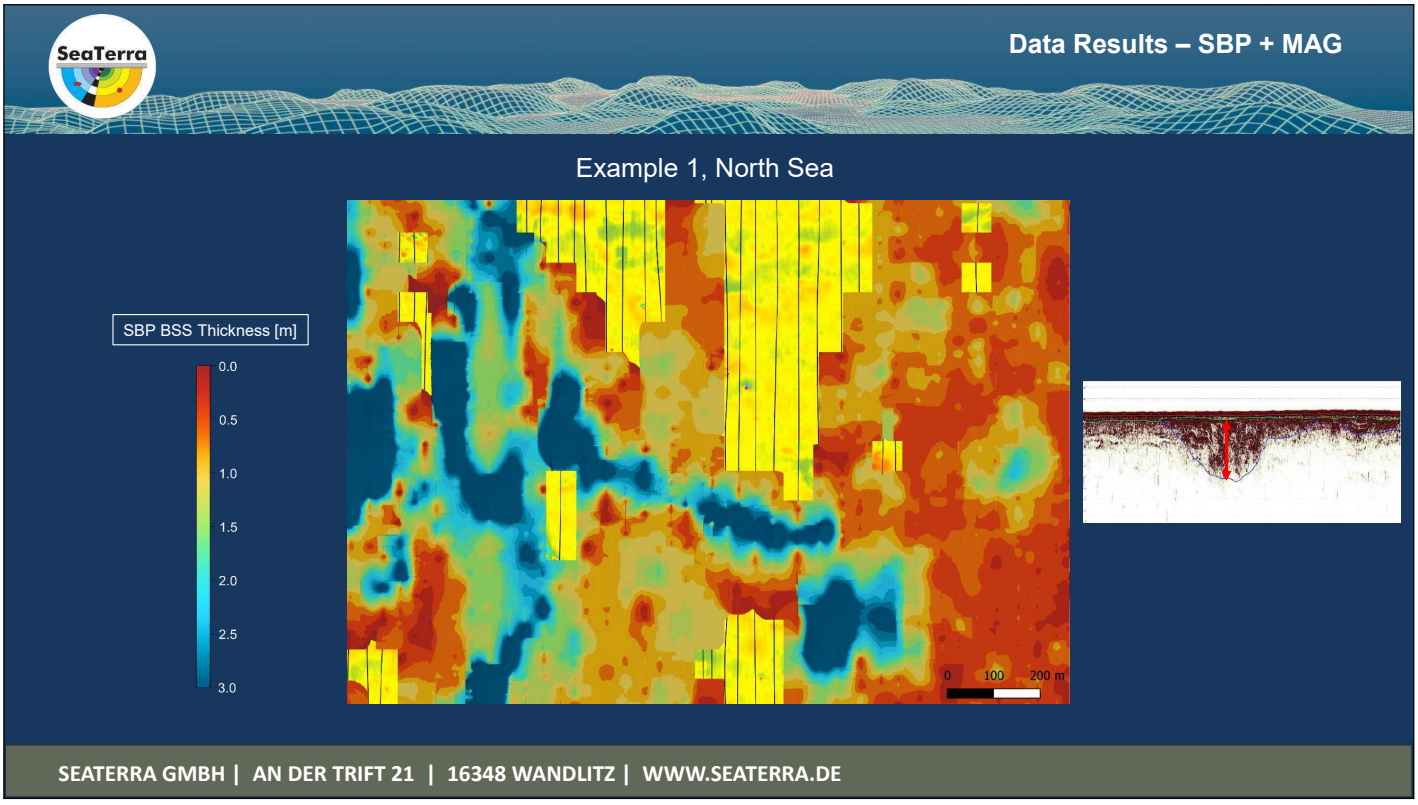
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

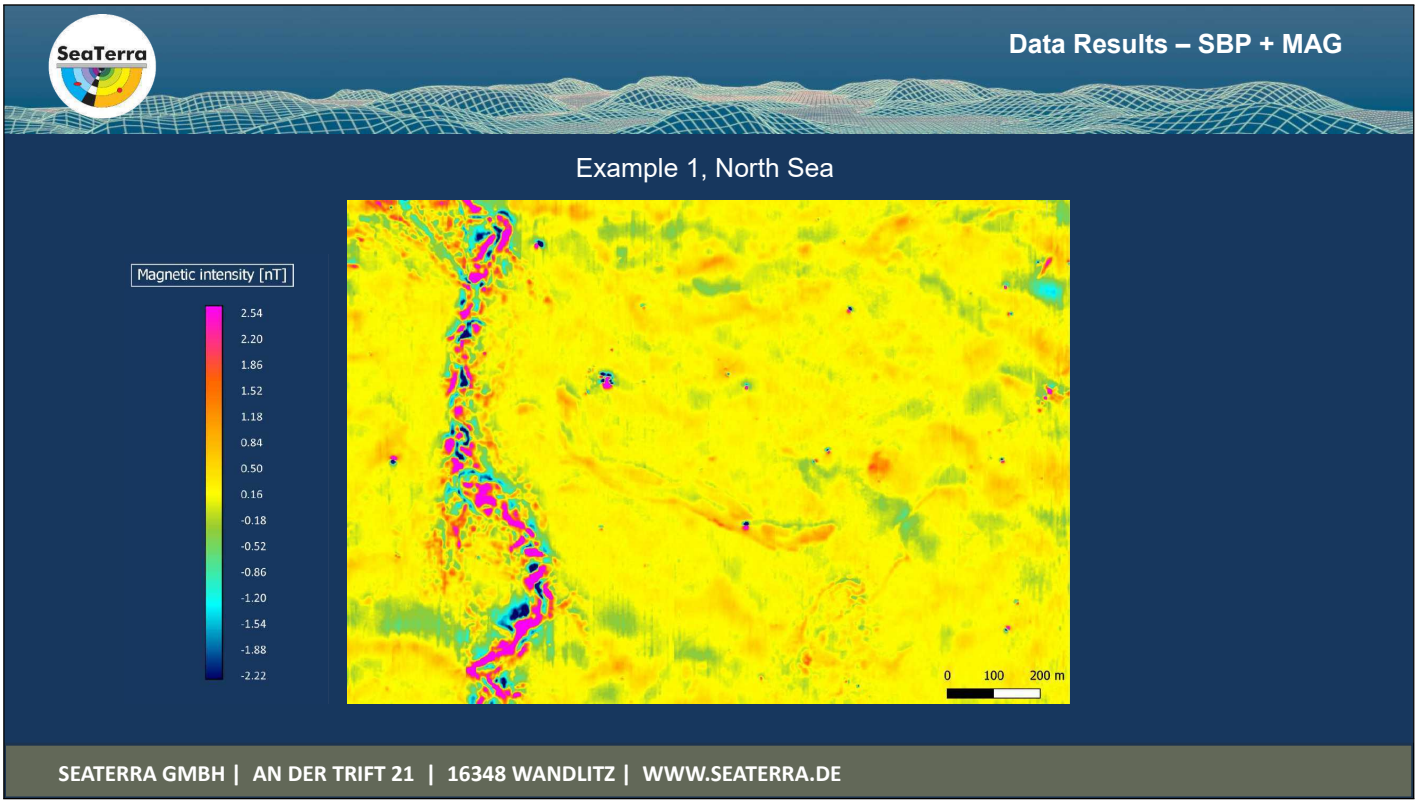
Data Results – SBP + MAG

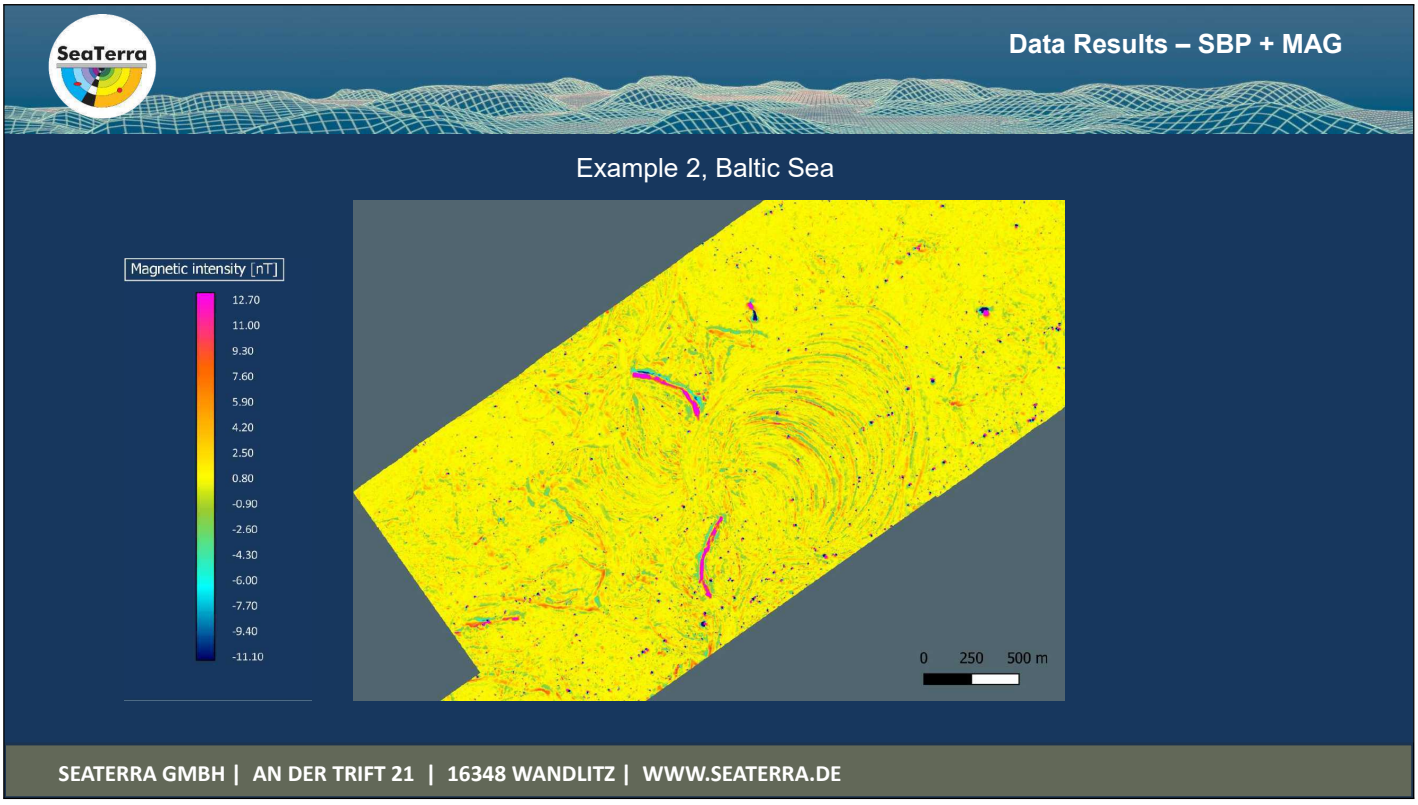
Example 1, North Sea

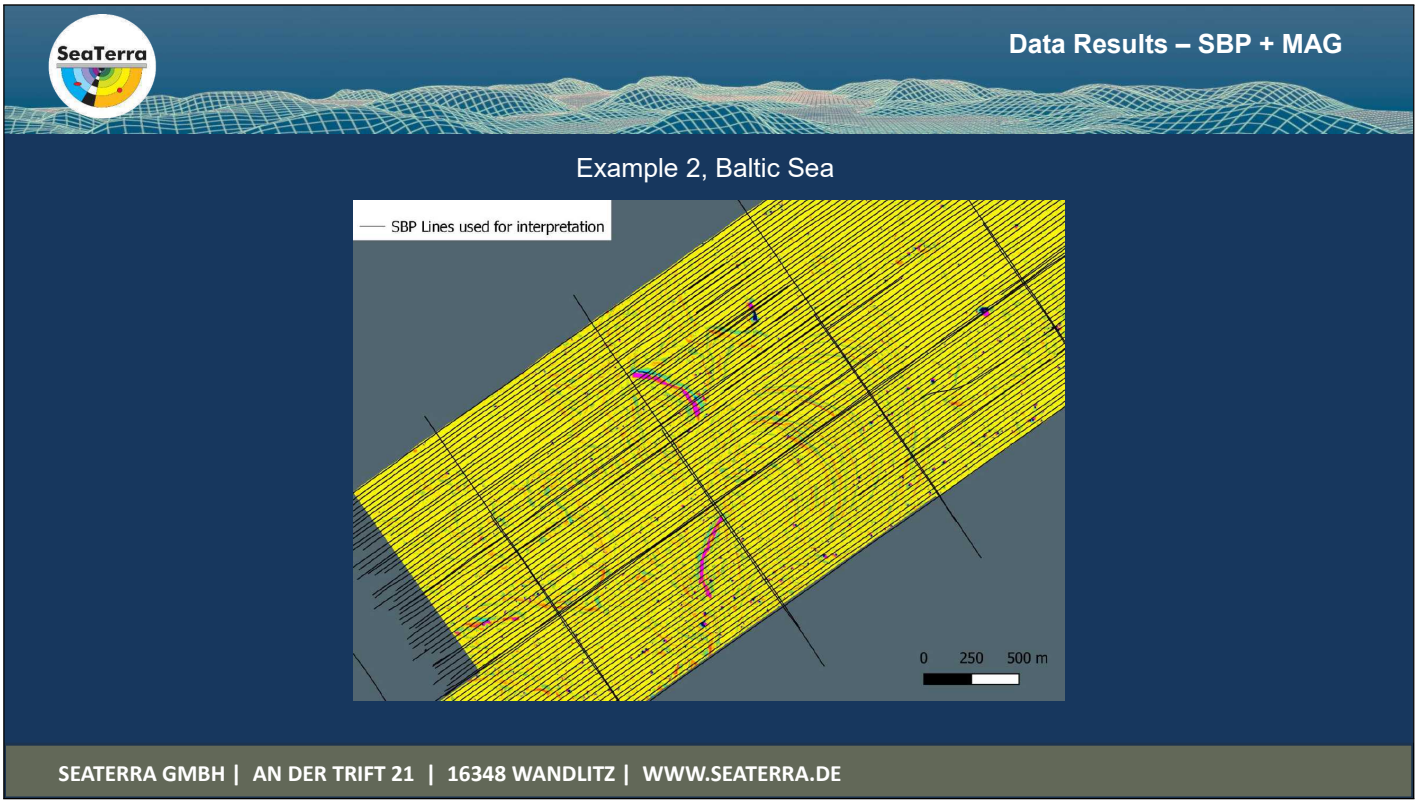


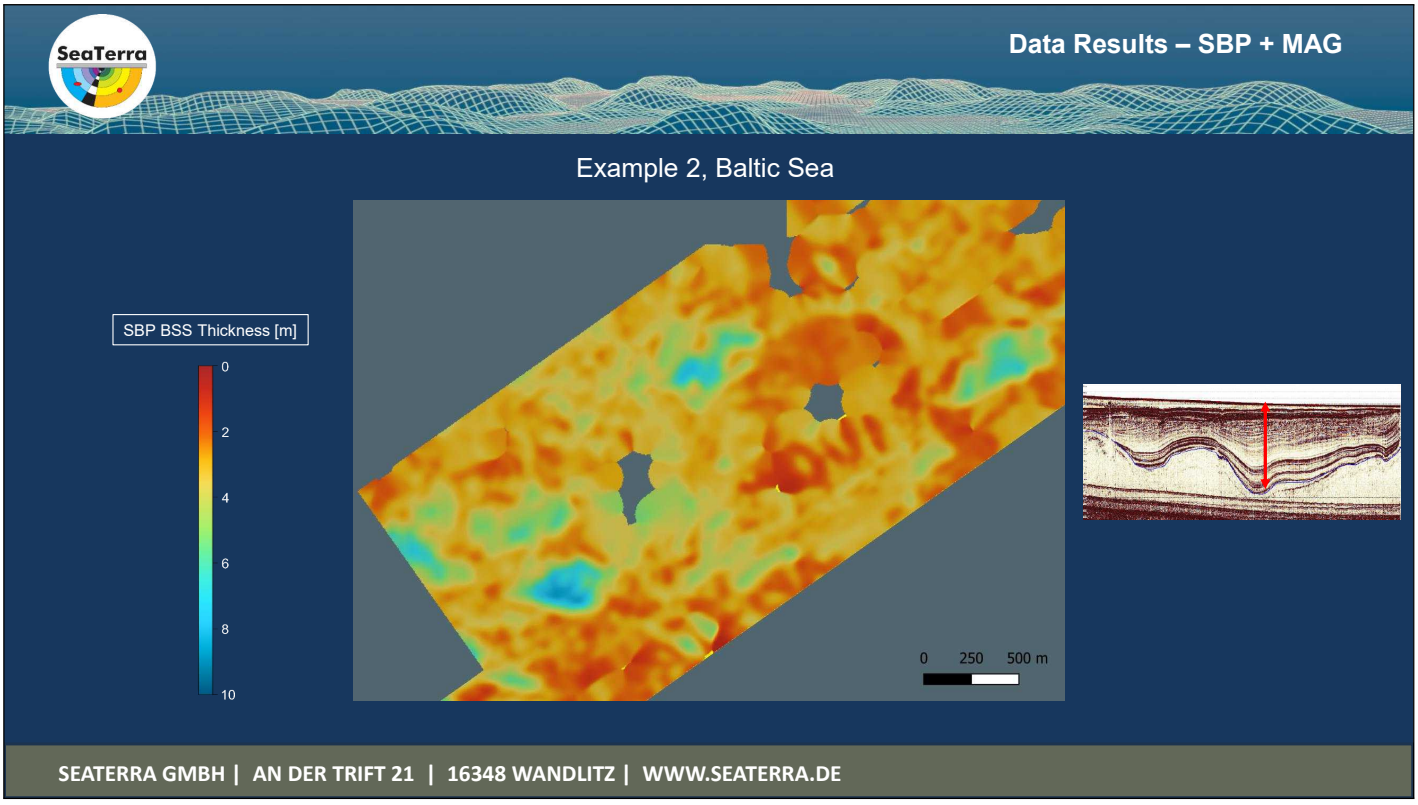
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

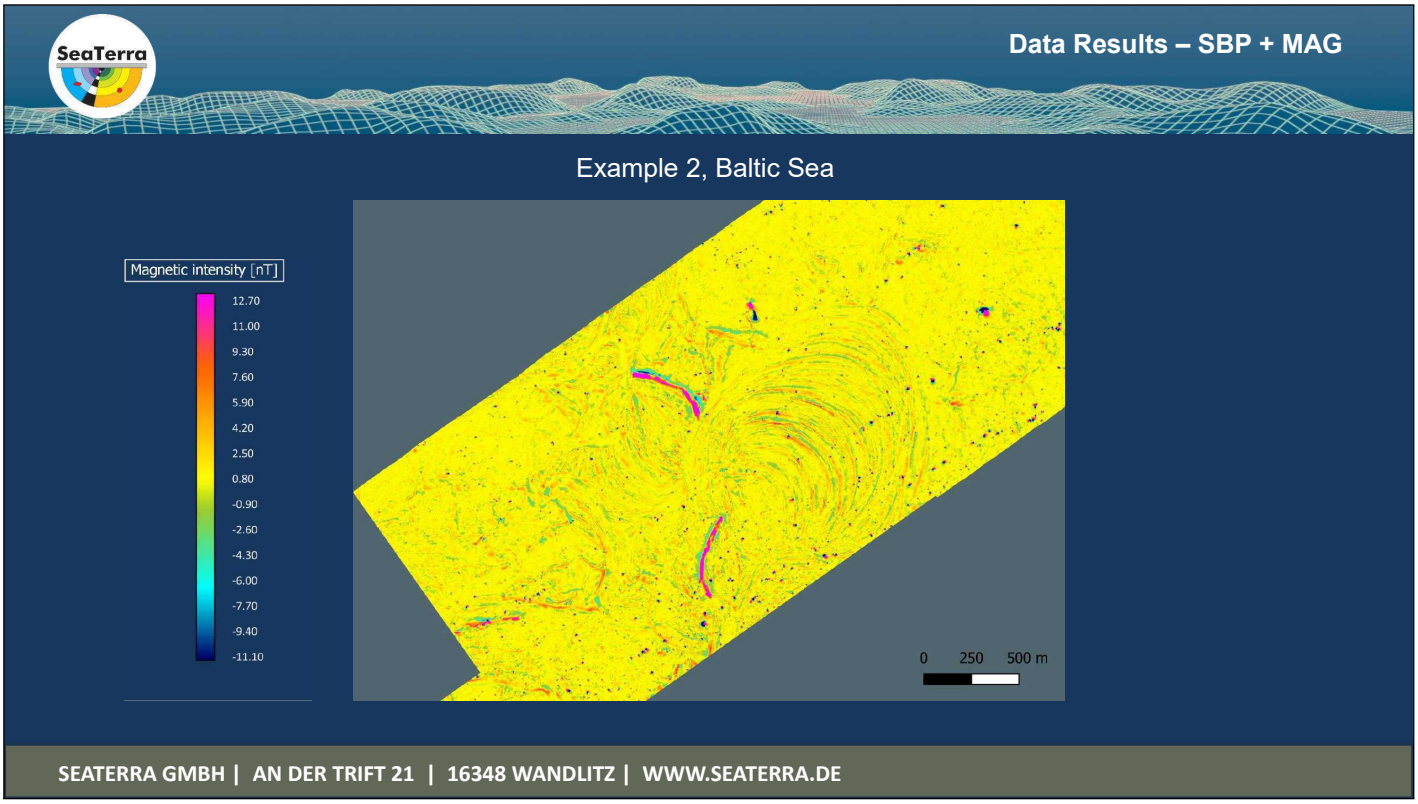

SeaTerra
Data Results – SBP + MAG
Example 1, North Sea
SBP BSS Thickness [m]
0.0
0.5
1.0
1.5
2.0
2.5
3.0
0
100
200 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

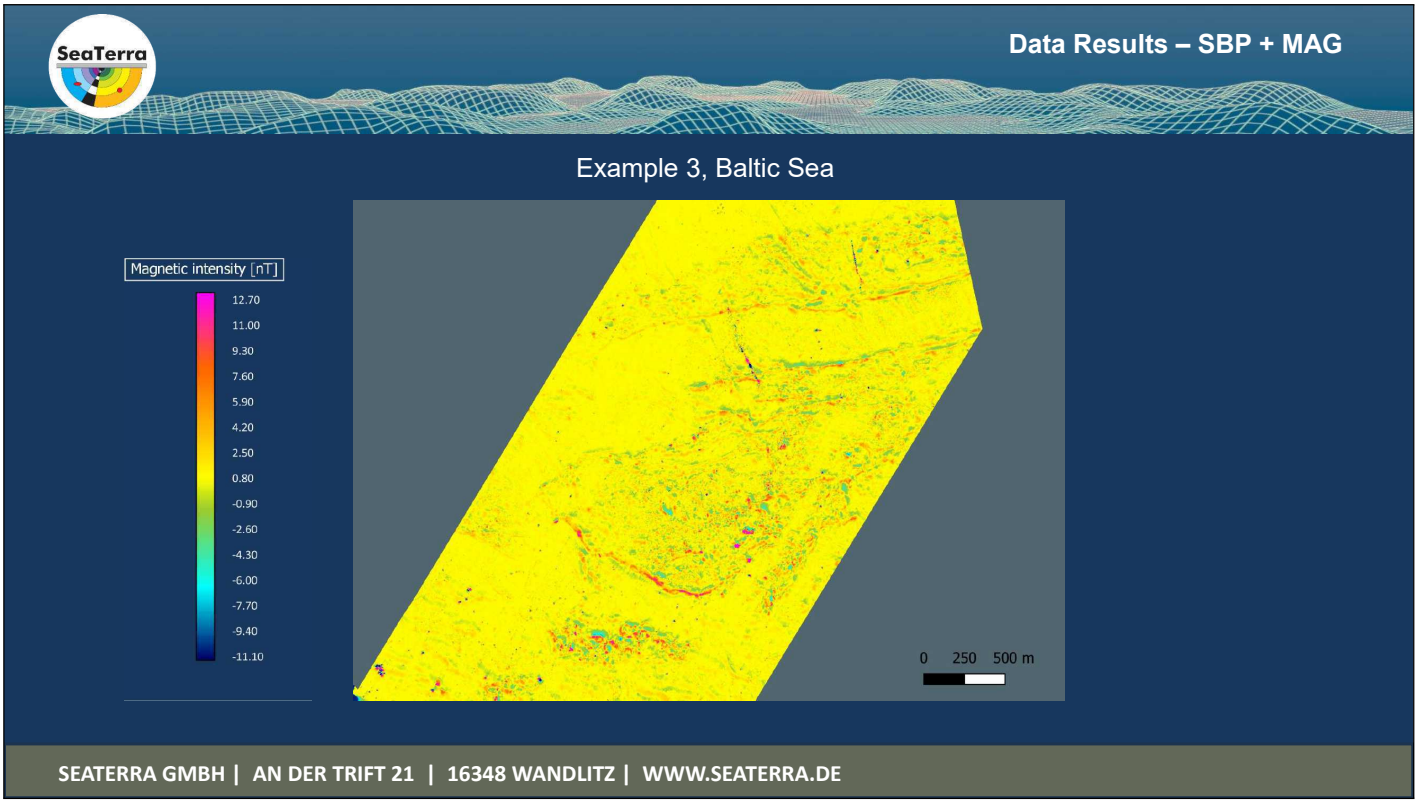

SeaTerra
Data Results – SBP + MAG
Example 1, North Sea
Magnetic intensity [nT]
2.54
2.20
1.86
1.52
1.18
0.84
0.50
0.16
-0.18
-0.52
-0.86
-1.20
-1.54
-1.88
-2.22
0
100
200 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

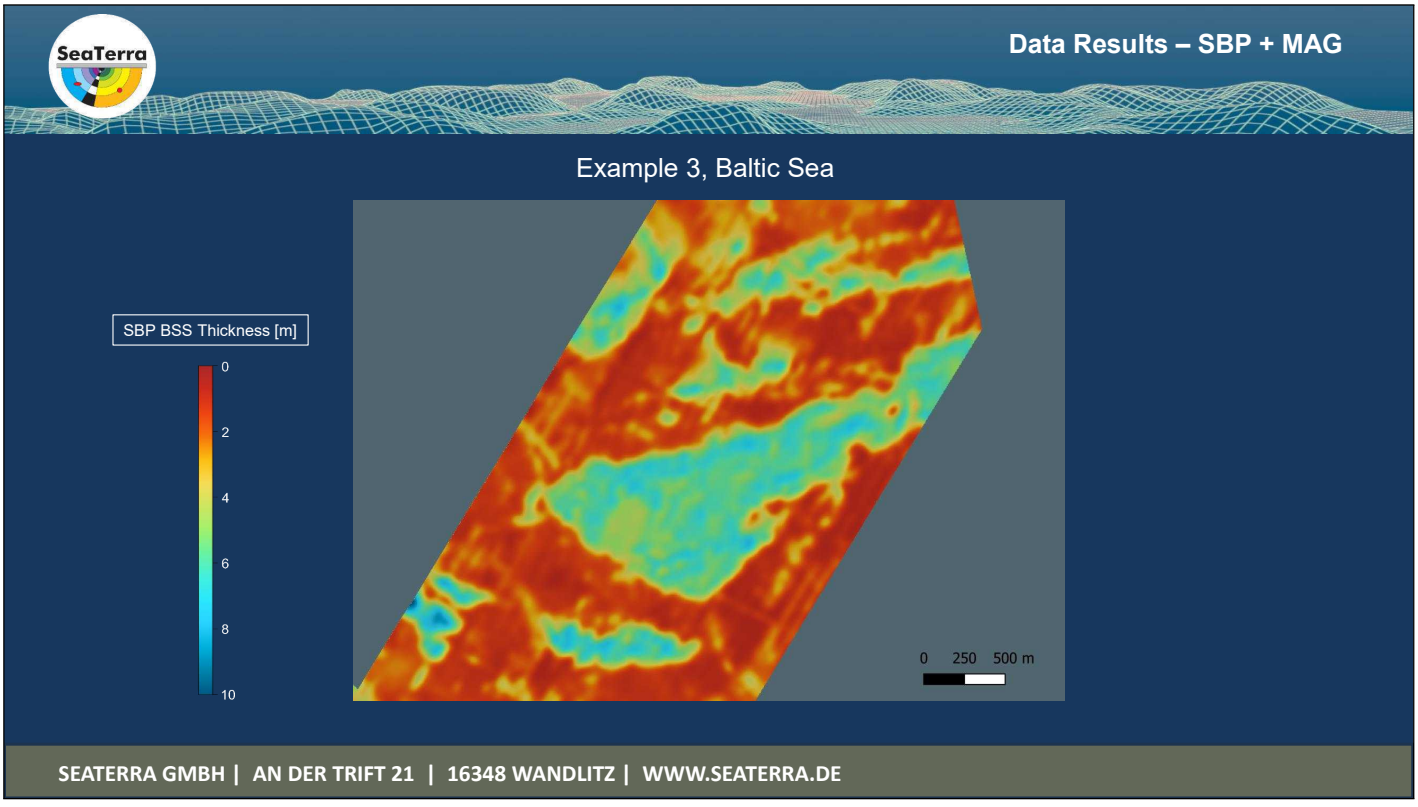

SeaTerra
Data Results – SBP + MAG
Example 2, Baltic Sea
Magnetic intensity [nT]
12.70
11.00
9.30
7.60
5.90
4.20
2.50
0.80
-0.90
-2.60
-4.30
-6.00
-7.70
-9.40
-11.10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

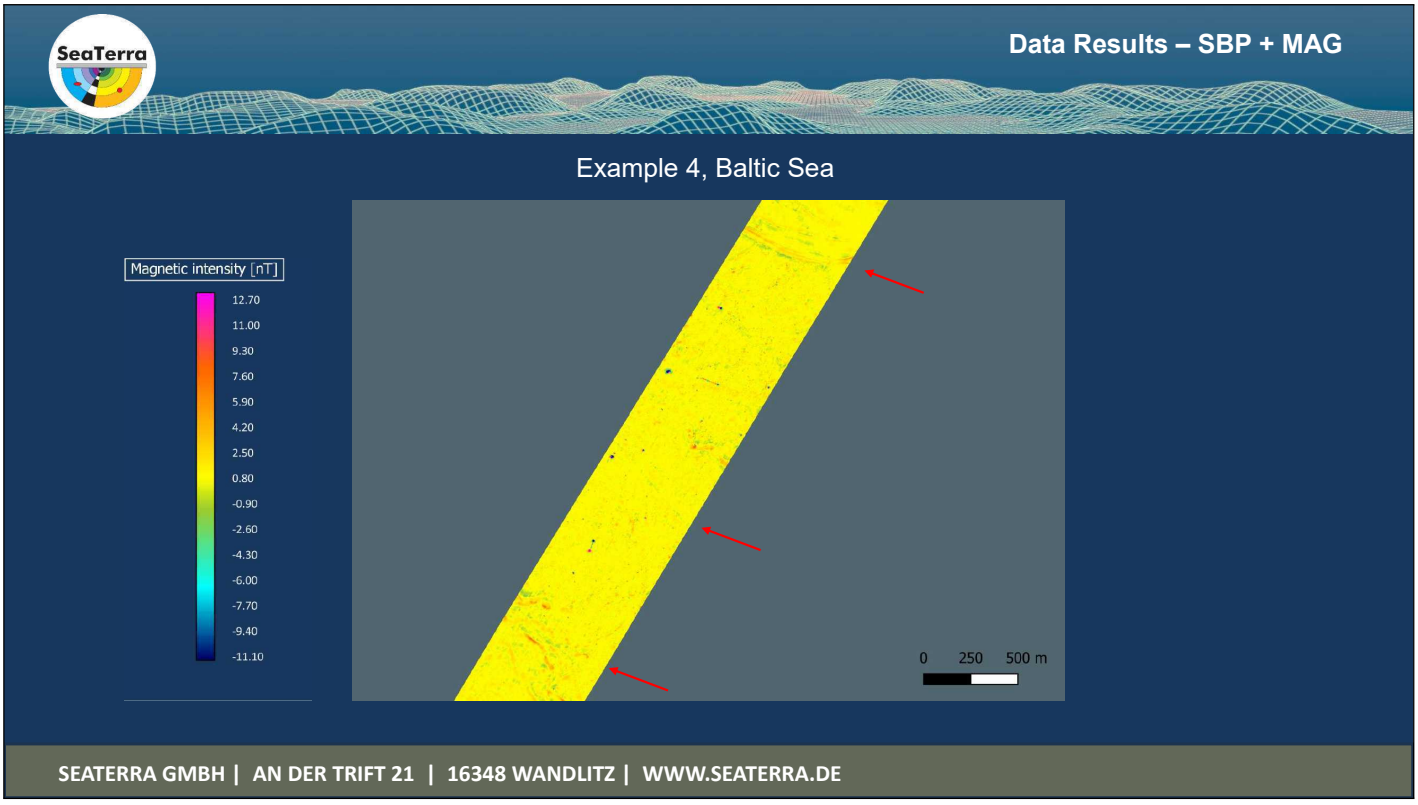

SeaTerra
Data Results – SBP + MAG
Example 2, Baltic Sea
SBP Lines used for interpretation
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

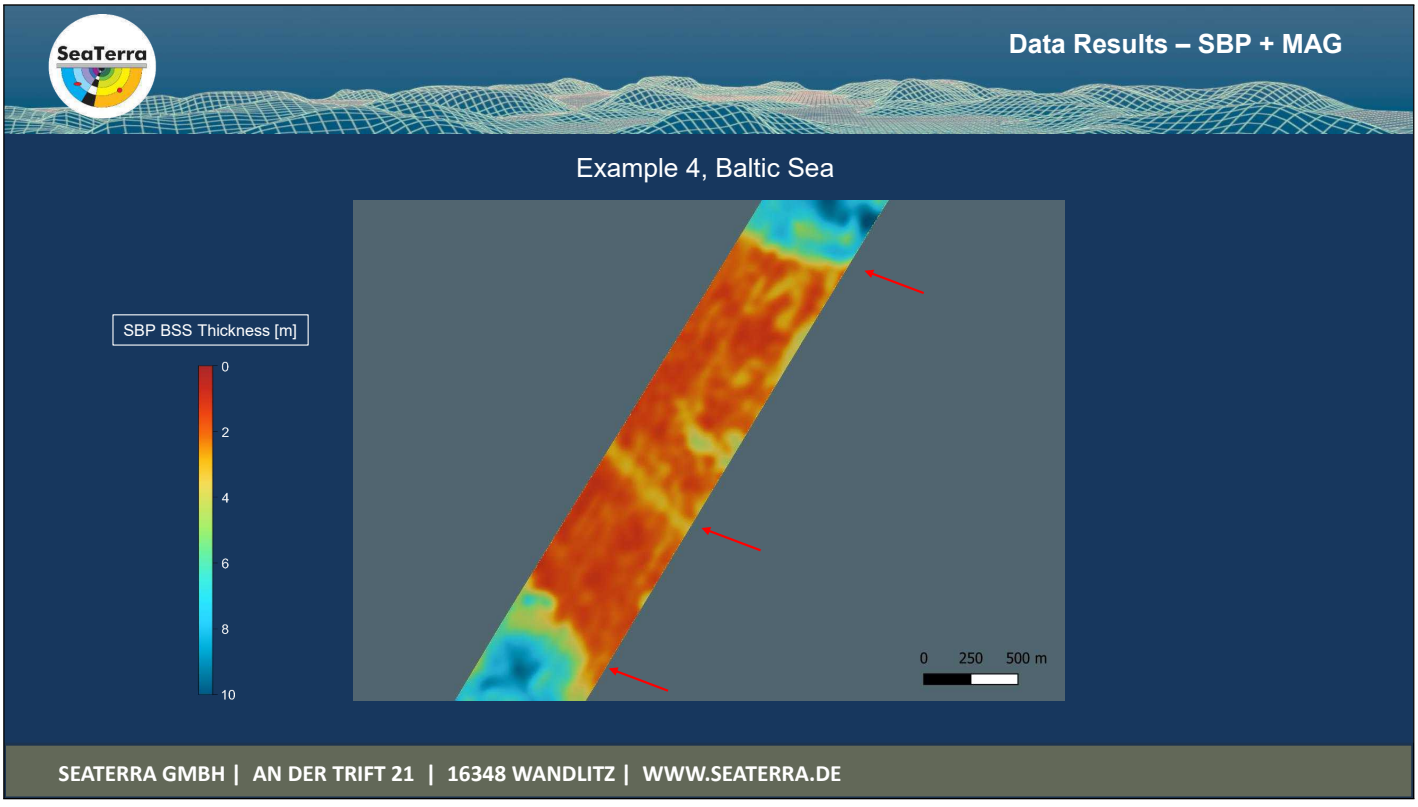

SeaTerra
Data Results – SBP + MAG
Example 2, Baltic Sea
SBP BSS Thickness [m]
0
2
4
6
8
10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE


SeaTerra
Data Results – SBP + MAG
Example 2, Baltic Sea
Magnetic intensity [nT]
12.70
11.00
9.30
7.60
5.90
4.20
2.50
0.80
-0.90
-2.60
-4.30
-6.00
-7.70
-9.40
-11.10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE


SeaTerra
Data Results – SBP + MAG
Example 3, Baltic Sea
Magnetic intensity [nT]
12.70
11.00
9.30
7.60
5.90
4.20
2.50
0.80
-0.90
-2.60
-4.30
-6.00
-7.70
-9.40
-11.10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE


SeaTerra
Data Results – SBP + MAG
Example 3, Baltic Sea
SBP BSS Thickness [m]
0
2
4
6
8
10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE


SeaTerra
Data Results – SBP + MAG
Example 4, Baltic Sea
Magnetic intensity [nT]
12.70
11.00
9.30
7.60
5.90
4.20
2.50
0.80
-0.90
-2.60
-4.30
-6.00
-7.70
-9.40
-11.10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE


SeaTerra
Data Results – SBP + MAG
Example 4, Baltic Sea
SBP BSS Thickness [m]
0
2
4
6
8
10
0 250 500 m
SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Conclusion

Summary

- While collecting and interpreting magnetic data for obsticle and UXO detection, we see that near surface changes in geology are often accompanied by clear changes in the magnetic signature near the seafloor.
- This behaviour is seen in different environments (North Sea, Baltic Sea).
- Acquiring SBP and magnetic data and correlating both types of data can benefit and facilitate a coherent interpretation for the near surface areas.

SEATERRA GMBH | AN DER TRIFT 21 | 16348 WANDLITZ | WWW.SEATERRA.DE

Thank you for your attention!

Hendrik Huster
SeaTerra GmbH

Geophysics & EOD Services

An der Trift 21
16348 Wandlitz - Germany
Tel.: +49 (0)33397 297 27
Fax: +49 (0)33397 297 29
www.seaterra.de