



Hidrocibalae

CROATIA

Hydrographic data processing
centre

*Andrijana Horvat,
Data processor at Hidrocibalae d.o.o.
2023*



ABOUT US

A SMALL TEAM OF BIG DATA ENTHUSIASTS.

Hidrocibalae was founded in 2020 by Dino Dragun, MSc of Geodesy and Geoinformatics with over 15 years of experience in data processing and project management. Dino has successfully completed more than 100 offshore survey projects and published more than 15 scientific researches on hydrography-related topics. In two years we have grown to a team of 22 professionals specialized in Hydrography, Oceanography, Geology, Geography, Geomatics, and Data Science.



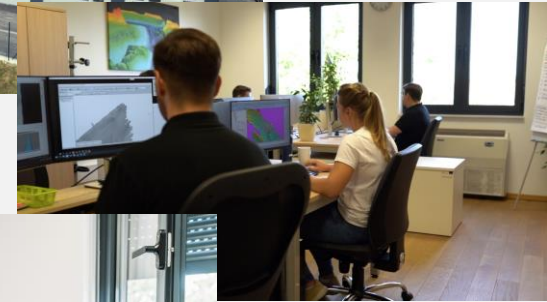
WHAT WE DO:

- High-resolution marine geophysical survey data processing
- sensors: MBES, SSS, SBP, UHR, UXO, MAG...
- Consulting in hydrographic research
- Reports, Charting and GIS (SSDM –Seabed Survey Data Model)
- Hydrographic monitoring of inland waters

Zagreb



Vinkovci





- 90% of our projects are related to processing of survey data in all phases of the construction and existence of offshore wind farms
 - PLANING PHASE: initial research to determine the depths, composition and morphology of the seabed, objects on the seabed, remaining explosive devices, wrecks, characteristics of the sediment and bottom layers, etc.
 - CONSTRUCTION PHASE: monitoring the accuracy of the construction of the wind farms in the sea and the communication lines of electricity that transmit it to the coast.
 - MONITORING PHASE: annual monitoring of installed turbines and power transmission cables to prevent damage



- Hydrographic, oceanographic, geophysical and seismic survey related to oil and gas platforms and monitoring of pipelines

Princess Elisabeth Island

- World's first artificial energy island
- Under construction in Belgian part of the North sea
- This is an electricity hub where cables from Belgian offshore wind plants will be connected
- Future interconnectors with other European countries such as the United Kingdom and Denmark



The Xlinks Morocco-UK Power Project

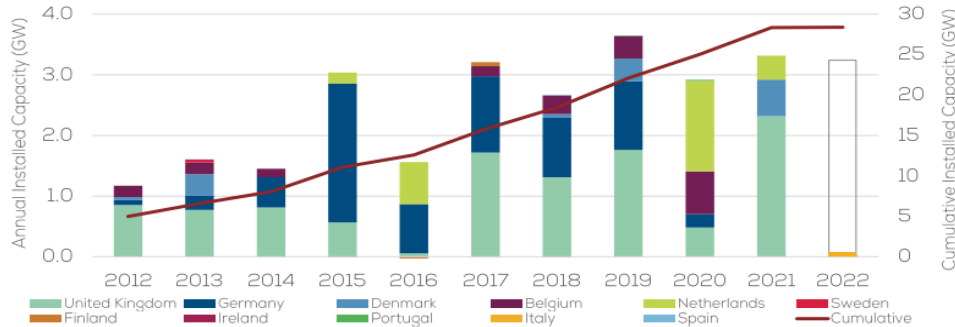
- UK's goal is to establish Zero-Carbon electricity network by 2035
- Electricity generation facility entirely powered by solar and wind energy combined with a battery storage facility
- Located in Morocco's renewable energy rich region of Guelmim Oued Noun on 1500 km²
- Will generate 10.5GW of zero carbon electricity from the sun and wind
- Clean power for 7 million British homes (supplying 8% of Britains electricity needs)



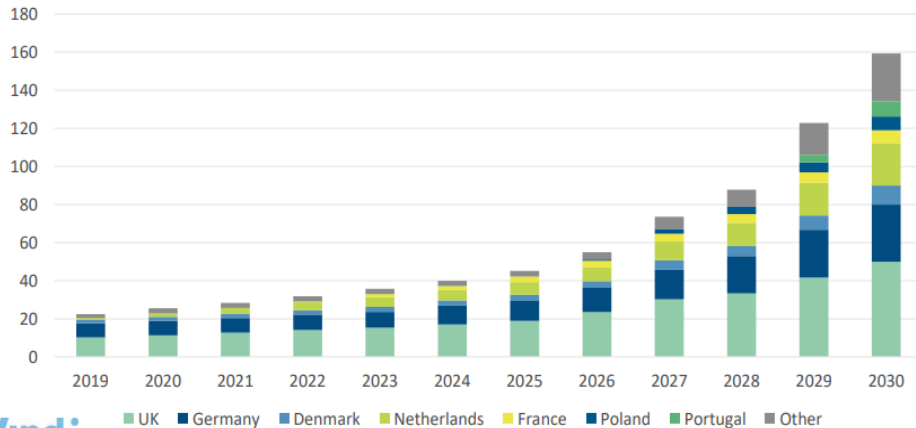
Wind energy

- Furthermore, through a series of directives, the European Union encourages the increase of the capacity of the system of renewable energy sources.
- By 'Energy Roadmap 2050' document, the share of renewable energy sources in the production of electricity is predicted and expected to be 97%.
- The deployment of offshore wind energy is at the core of delivering the European Green Deal.
- The installed offshore wind capacity in the EU was 14.6 GW in 2021 and is set to increase by at least 25 times by 2030, using the vast potential of the 5 EU sea basins.

Europe connected 30 MW in the first half of 2022.
We expect several wind farms to connect to the grid in the second half of the year



European Government pledges now add up to 160 GW of offshore wind by 2030, delivering on this ambitions is key





Offshore Wind

Wind power is the most efficient technology to produce energy in a safe and environmentally sustainable manner!

Clean

- it does not require any combustion process, it is an energy with zero greenhouse gas (GEI) emissions, the main culprits of global warming.

Inexhaustible

- wind is an unlimited resource, and so is its use as long as there are sufficient air currents.

Cheap

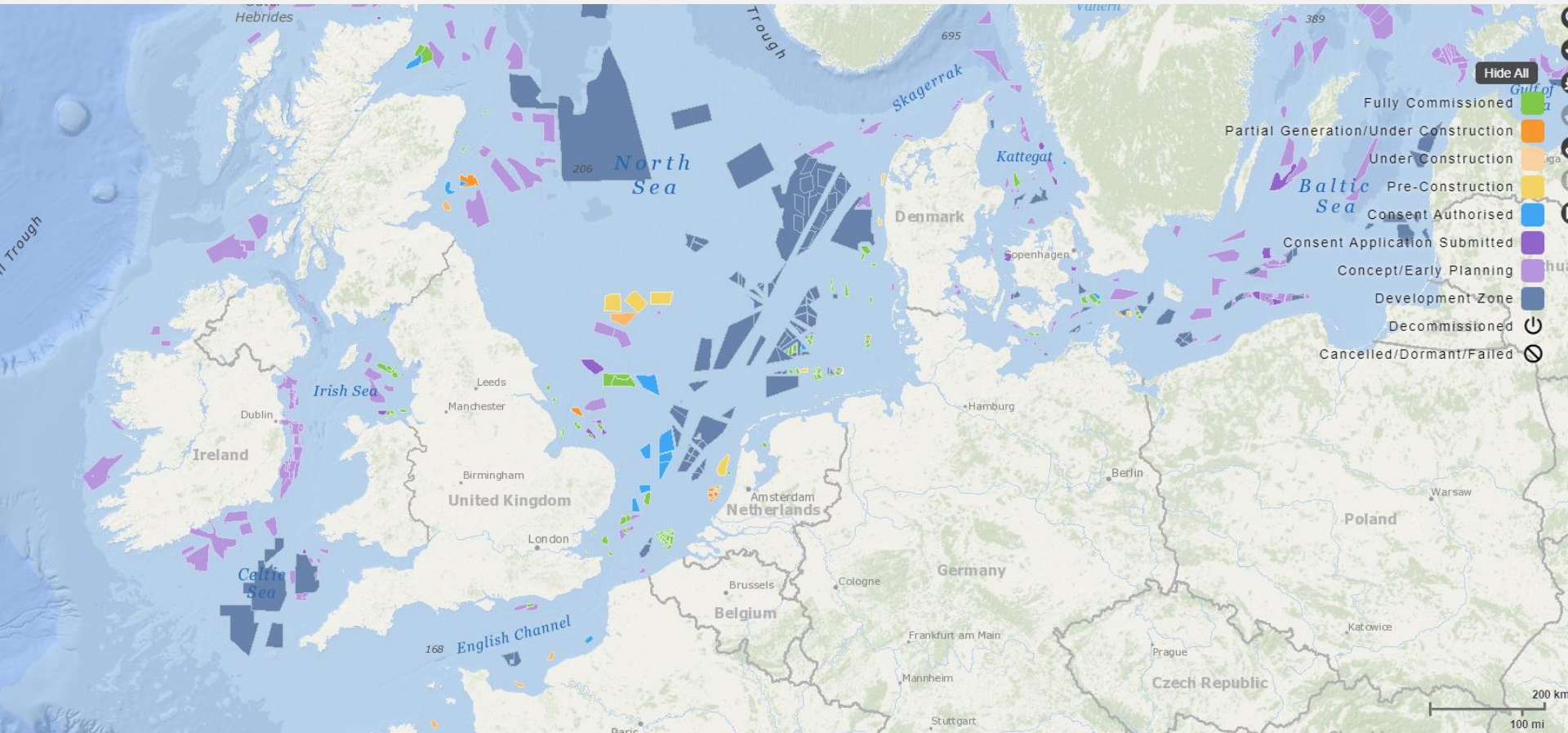
- both the cost per kW produced and its maintenance is quite low. In areas where the wind blows harder, the benefit is even greater.

Low impact

- wind farms are built after a rigorous analysis and planning process. In addition, depopulated areas are sought to avoid negative effects on inhabitants.

Creates wealth and jobs

- according to the International Renewable Energy Agency (IRENA), wind energy already employs more than 1.2 million people today and the number of green jobs will not stop growing.



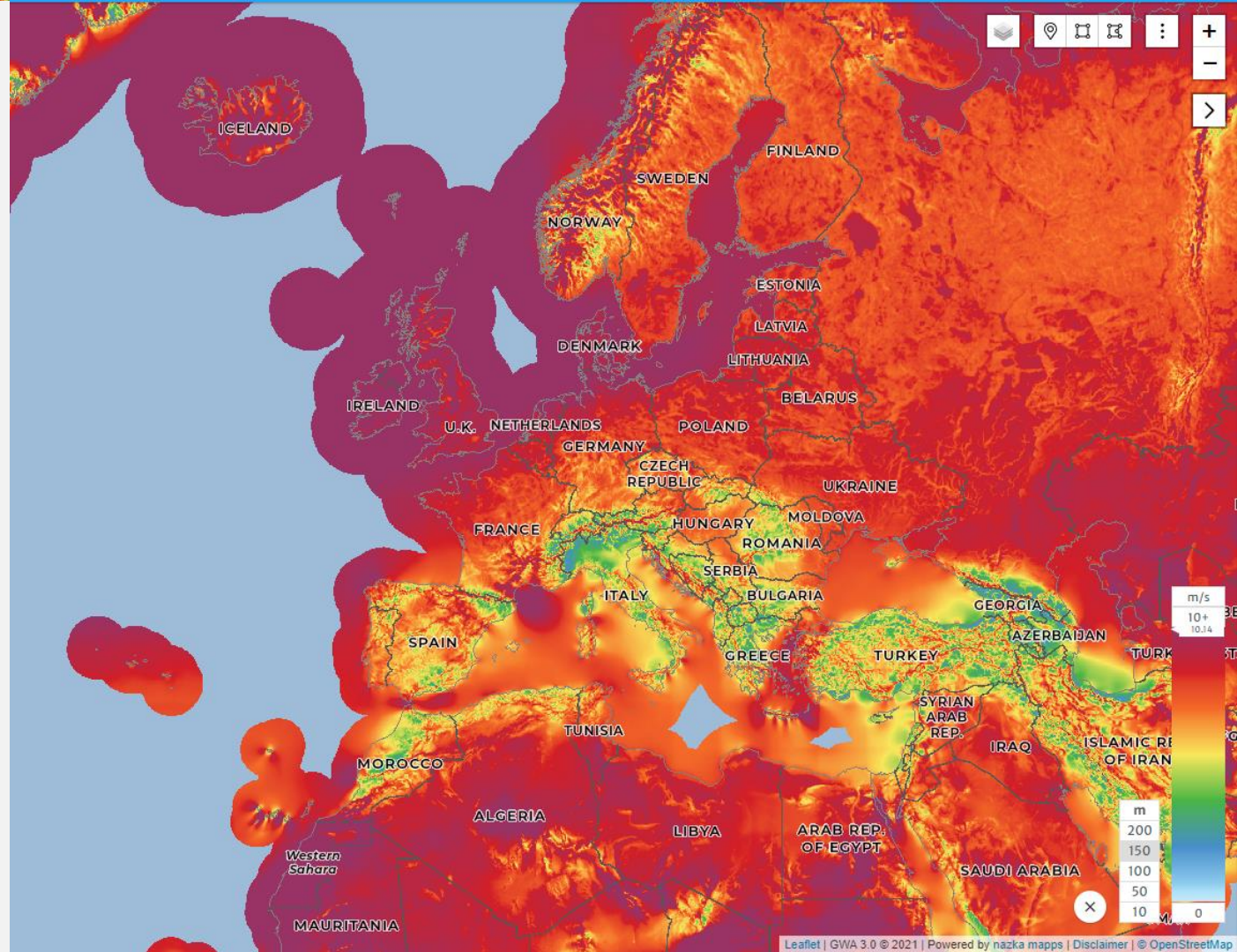
Average wind speed at 150 meters above the ground

Advantages

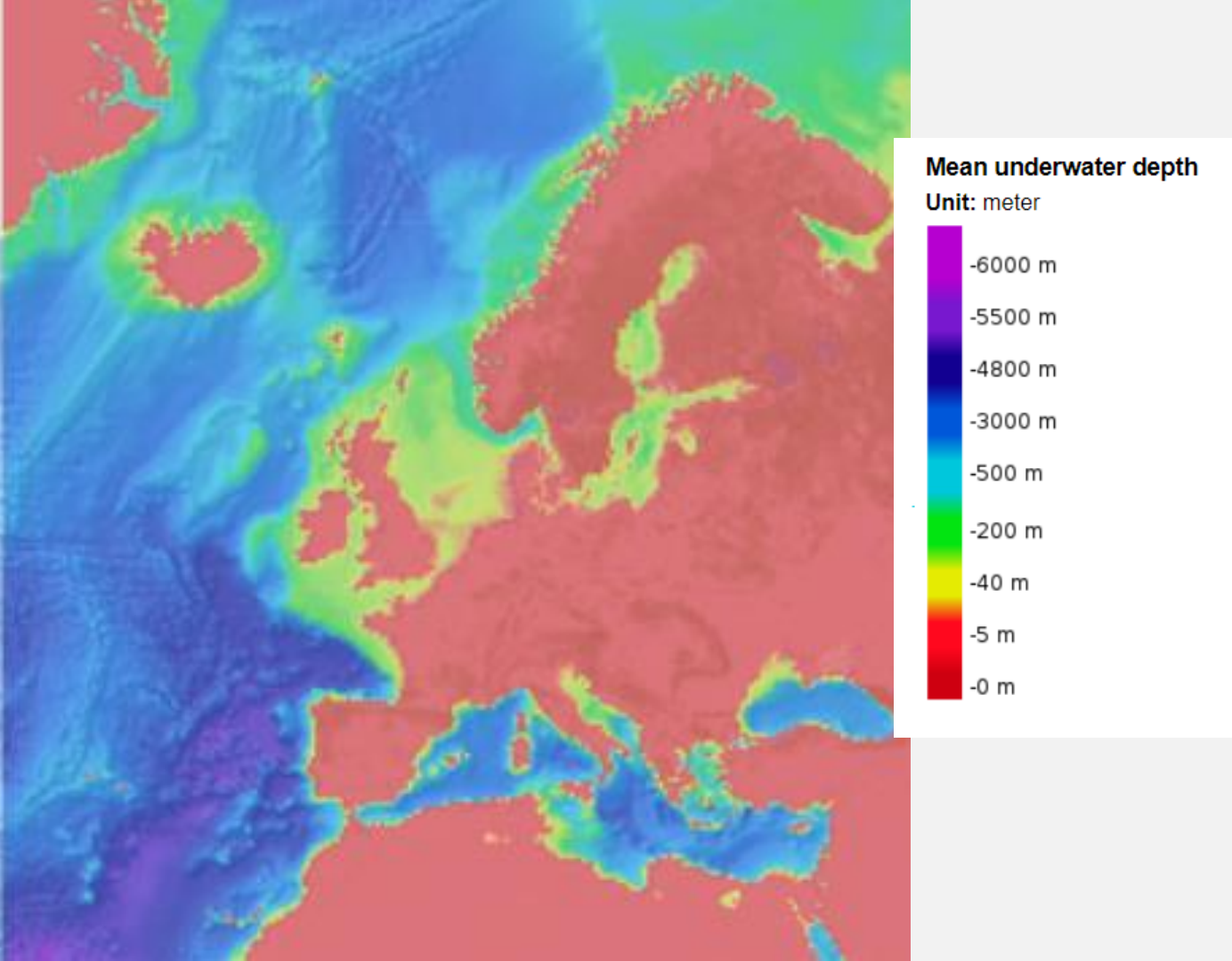
- Offshore wind speeds are faster than on land. Faster wind speeds offshore mean much more energy can be generated
- Offshore wind speeds are also steadier than on land, which results in a more reliable source of energy
- Coastal areas have very high energy needs

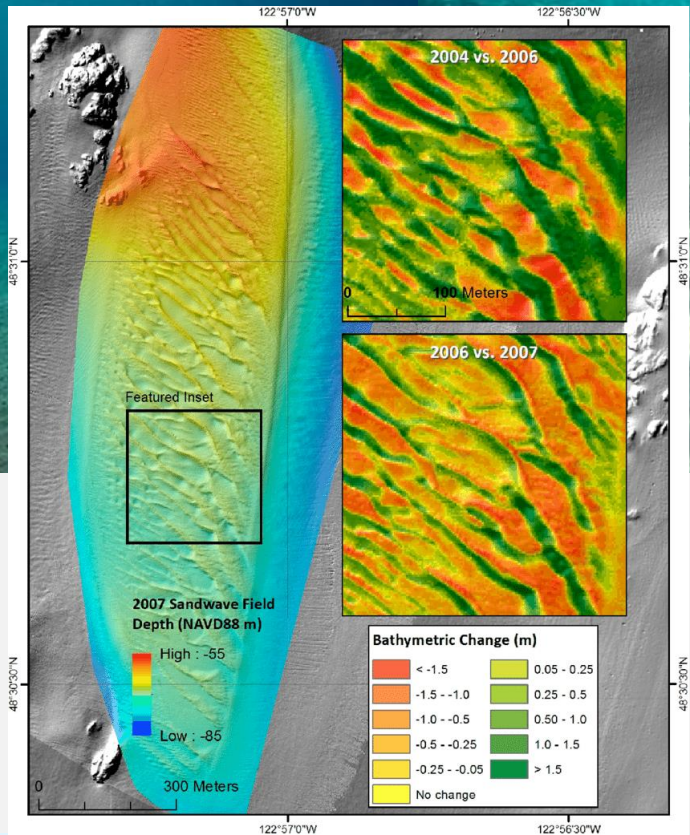
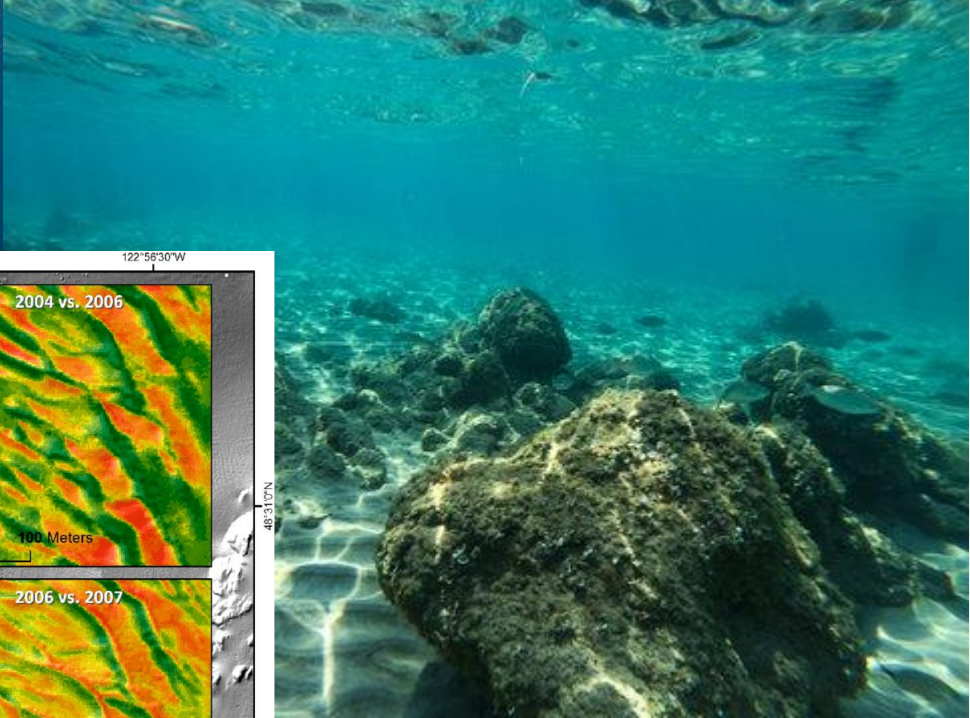
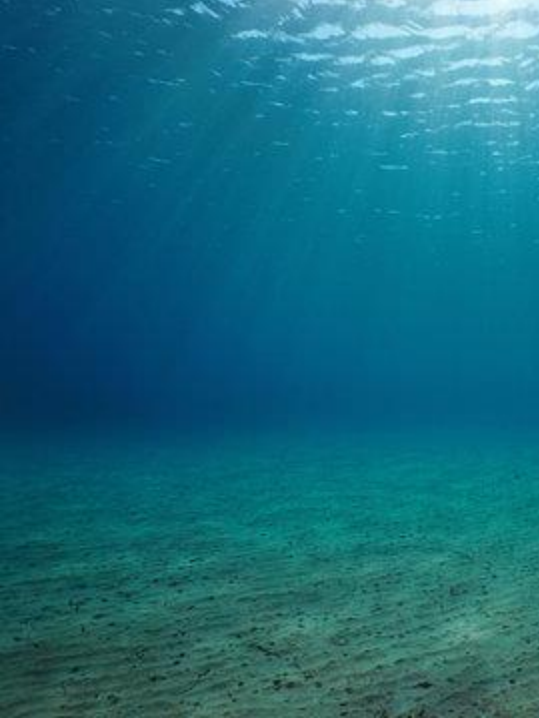
Disadvantages

- Offshore wind farms can be expensive and difficult to build and maintain, due to waves, high wind, heavy storms, and installation under the seafloor
- may be unpopular among local residents, as well as affecting tourism and property values



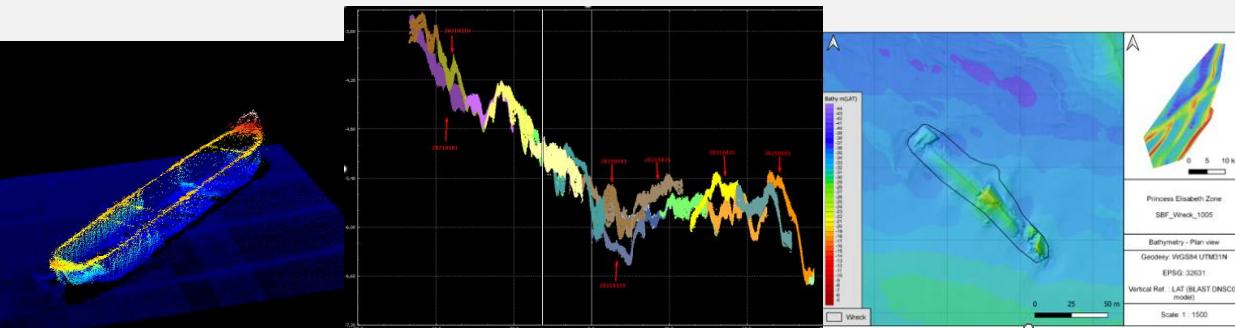
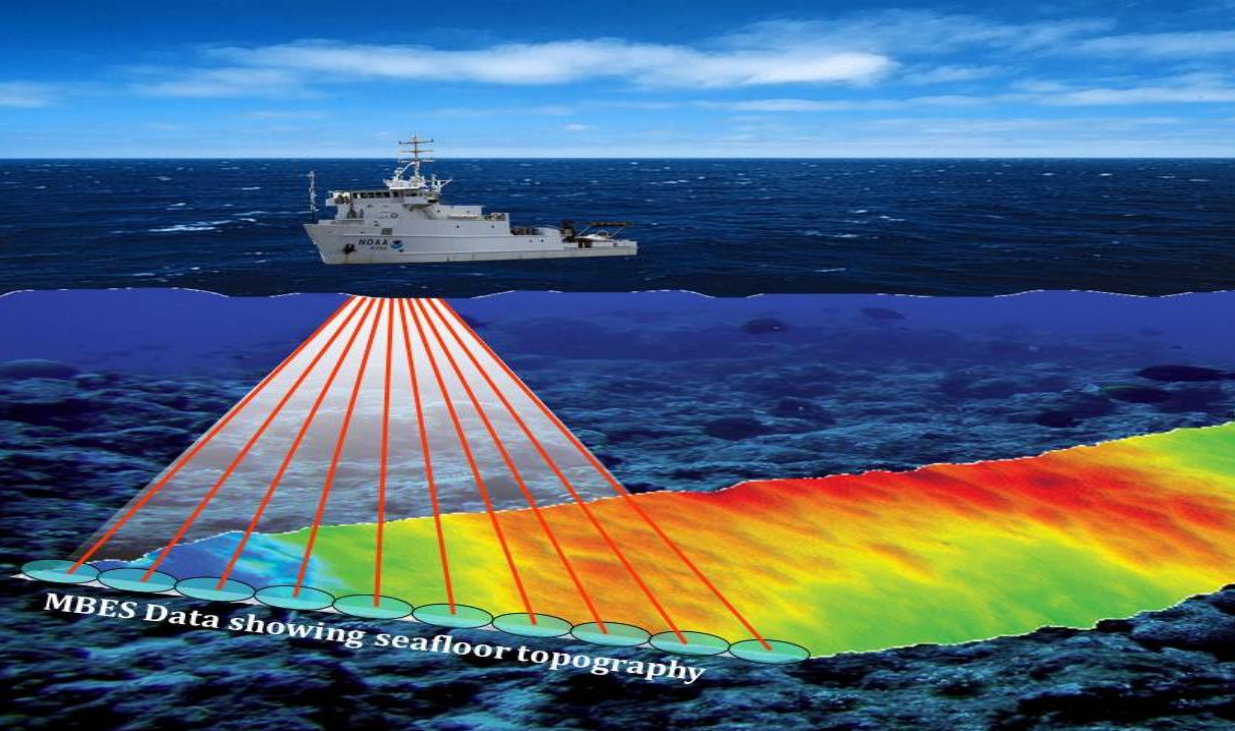
Mean water depth

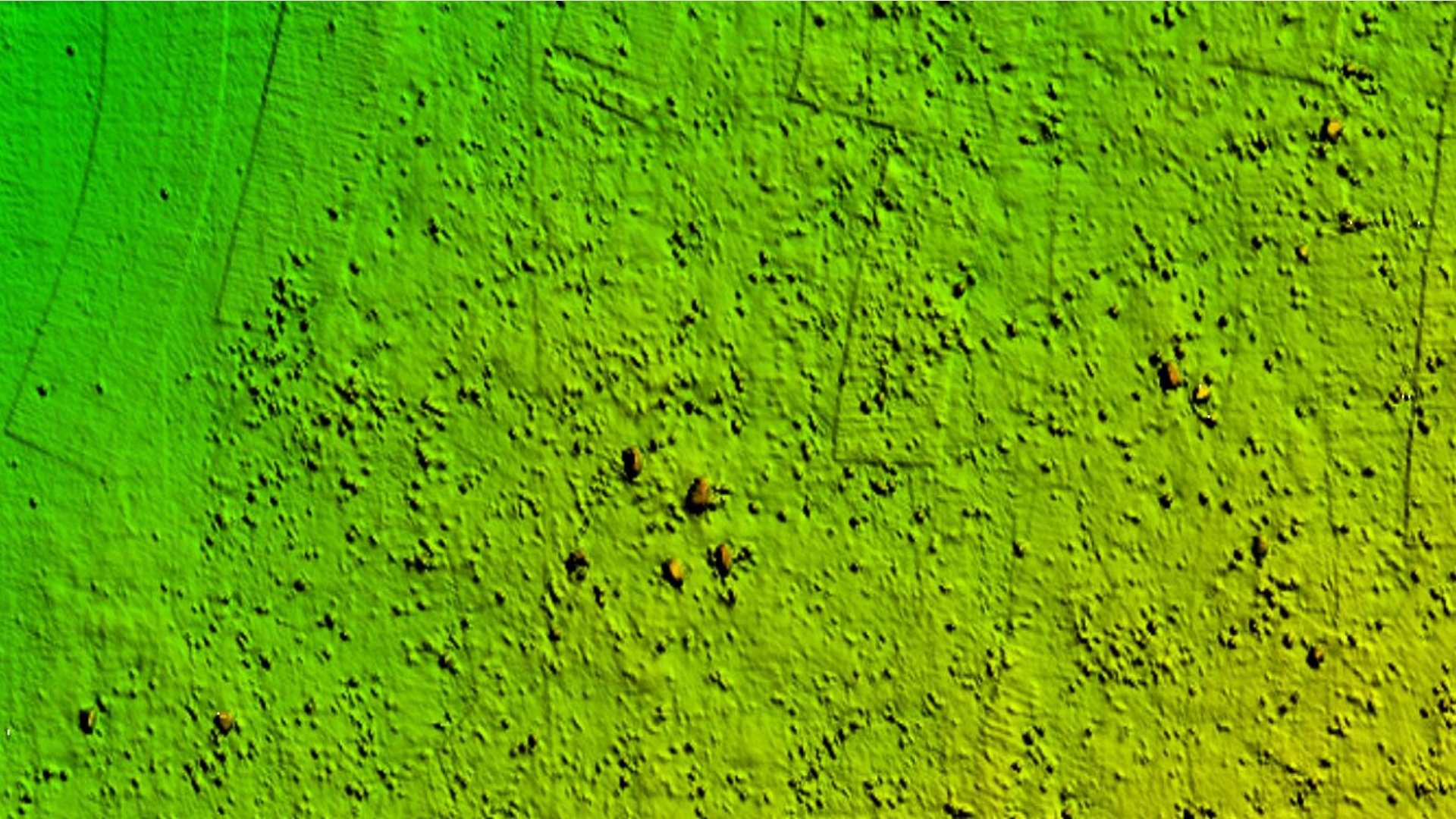




Multibeam echosounder

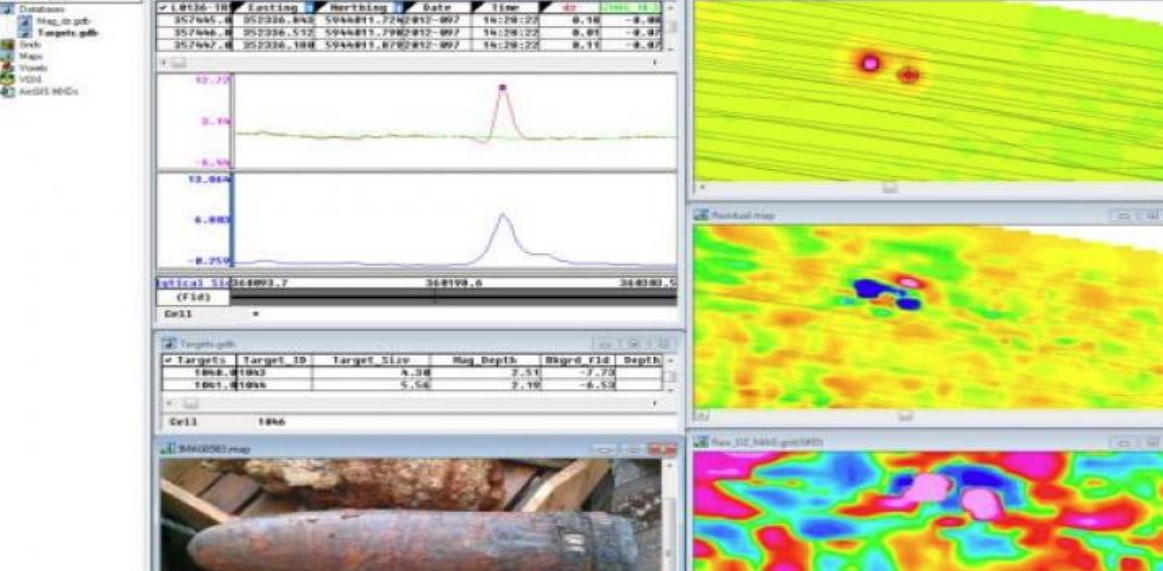
- A multibeam echosounder (MBES) is a type of sonar that is used to map the seabed.
- It emits acoustic waves in a fan shape beneath its transceiver. The time it takes for the sound waves to reflect off the seabed and return to the receiver is used to calculate the water depth.
- **PURPOSE:** to determine the depths of the seabed, the morphology of the seabed and identify objects on seafloor, positioning of other sensors data





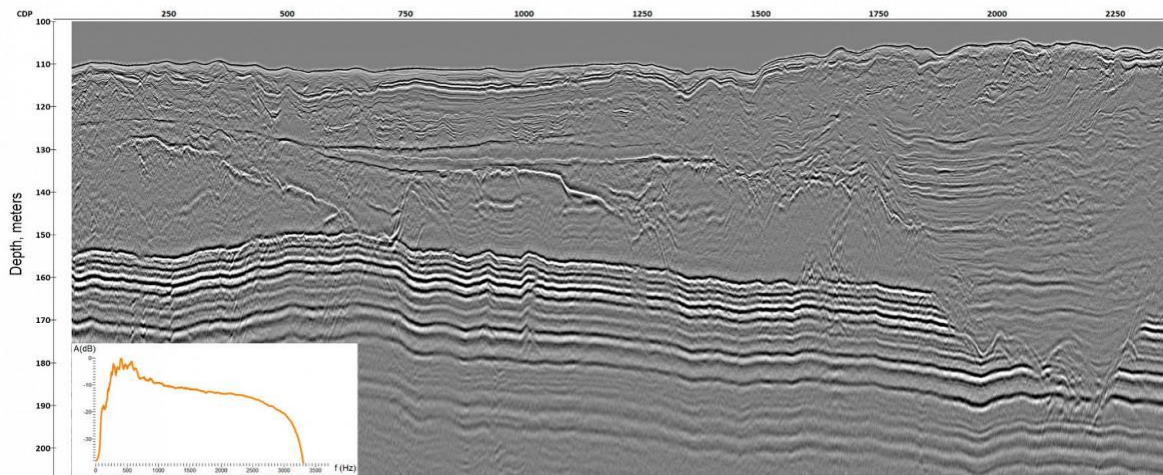
Magnetometer (MAG)

- PURPOSE** : measurement of the earth's magnetic field and 'anomaly', detection of explosive devices at the bottom of the sea

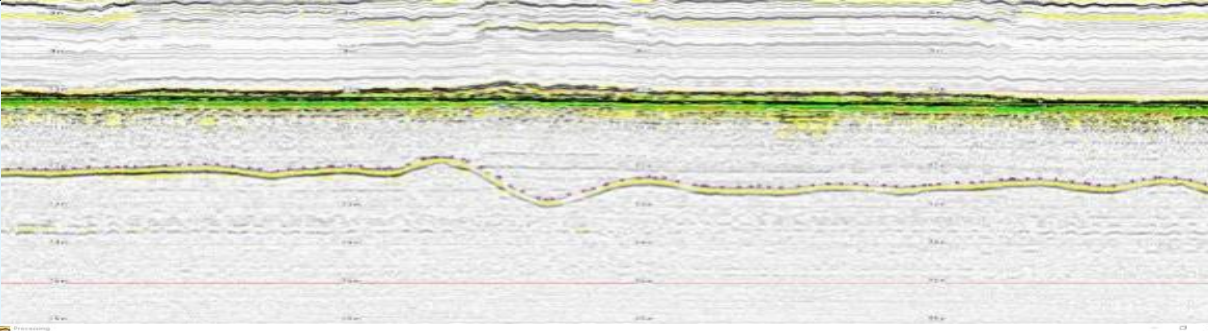
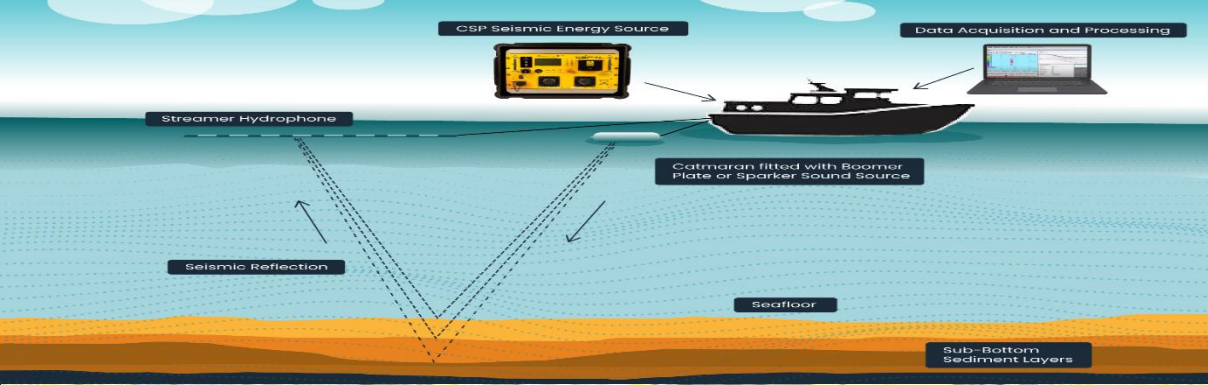


HRS/UHRS

- PURPOSE:** detection of deeper layers of the bottom, detection of 'shallow gas'

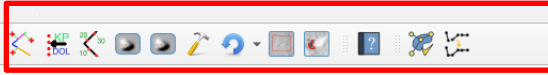


SUB BOTTOM PROFILER



- Sub Bottom Profilers are one of the most effective tools used to identify and characterize layers of sediment or rock under the seafloor.
- **PURPOSE:** detection of shallow layers of the bottom, detection of the depth of communication lines





Processing Toolbox

Processing Toolbox

Search...

- Recently used
- Cartography
- Database
- File tools

Python Console



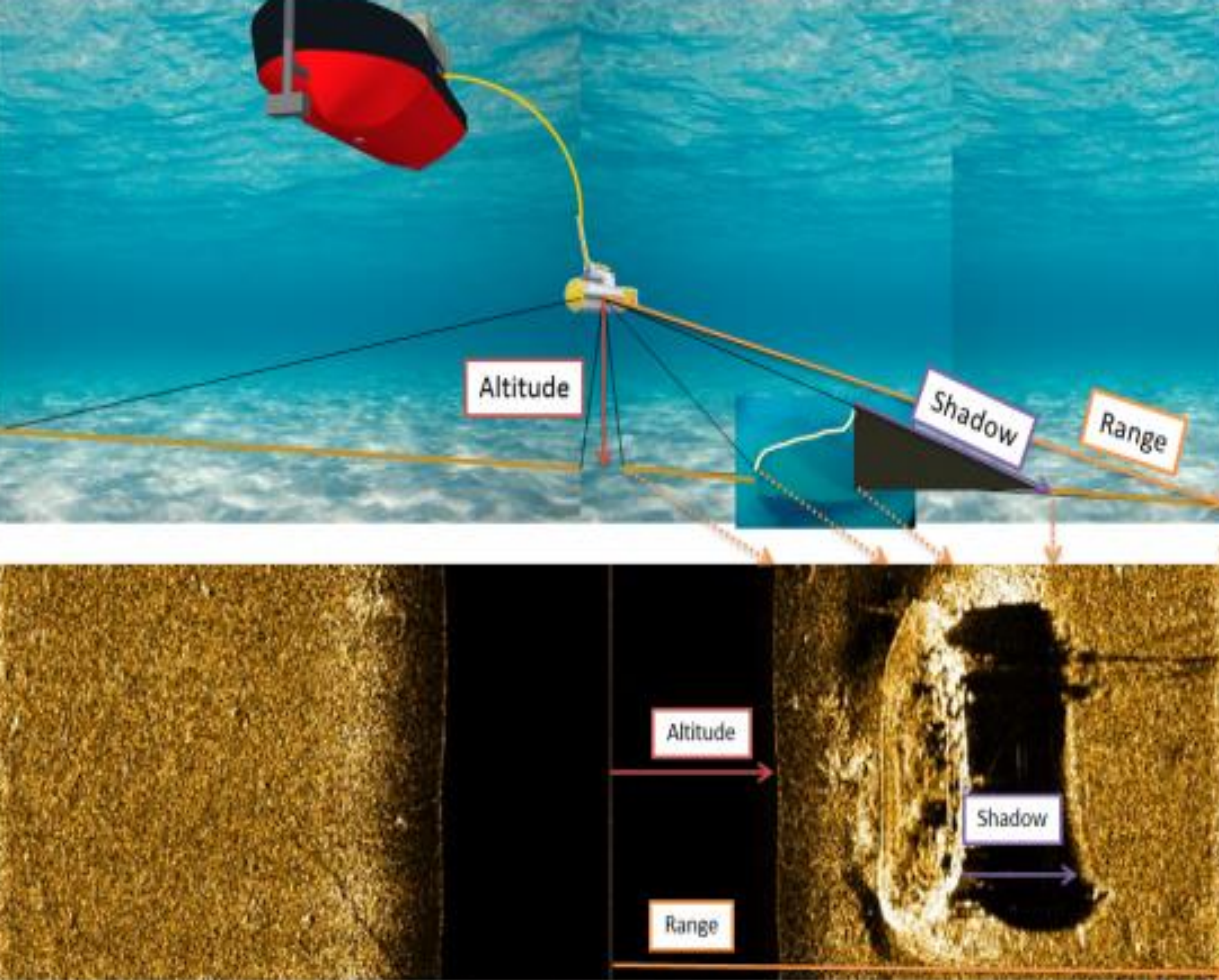
```
1 # Python Console
2 # Use iface to access QGIS AP
  I interface or type help(ifac
  e) for more info
3 # Security warning: typing co
  mmands from an untrusted sour
  ce can harm your computer
4
```

```
16 """
17
18 #TO DO 2: Define name of attribute field in which seabed depth is stored.
19 seabedAttributeField = "Seabed_m"
20
21 #TO DO 3: Define name of attribute fields in which geological horizons depth is stored, from shallowest to deepest horizons
22 horizonAttributeFields = ["H100_m", "H200_m", "H300_m", "H400_m"]
23
24 #TO DO 4: Define minimum allowed distance between lines
25 minimumDistance = 0.01
26
27 #TO DO 5: Define no-data value
28 noDataValue = 999
29
30 #TO DO 6: Define if you want to reverse the priority of attributive columns defined in the variable horizonAttributeFields: False -- c
31 reversePriority = False
32
33 #TO DO 7: Define sign of depth value: True -- negative values, False -- positive values
34 depthValueNegative = True
35
36 exportCSV = True
37
38 ##### SCRIPT CODE #####
```

Log Messages

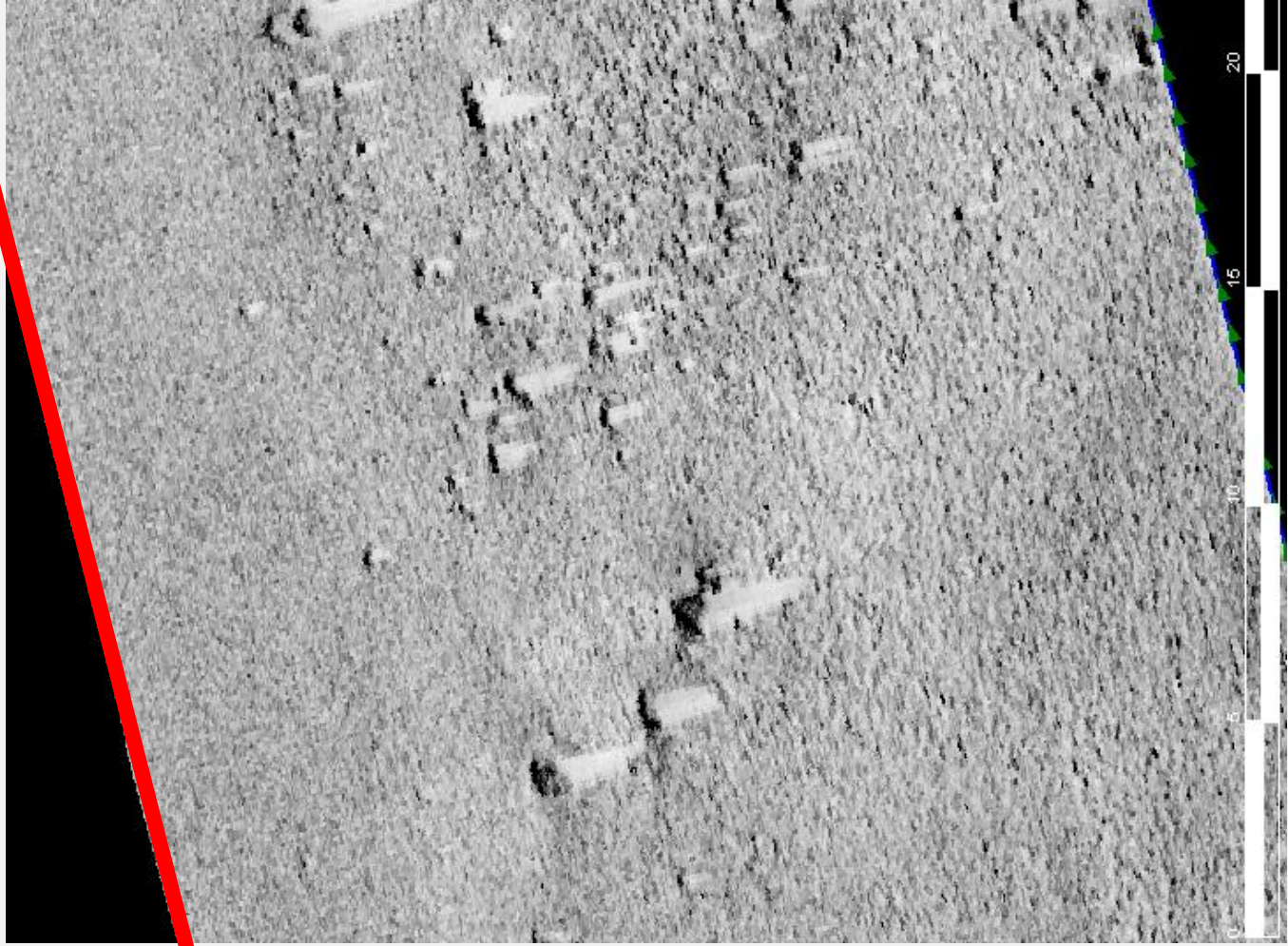
Plugins X Python warning X General X

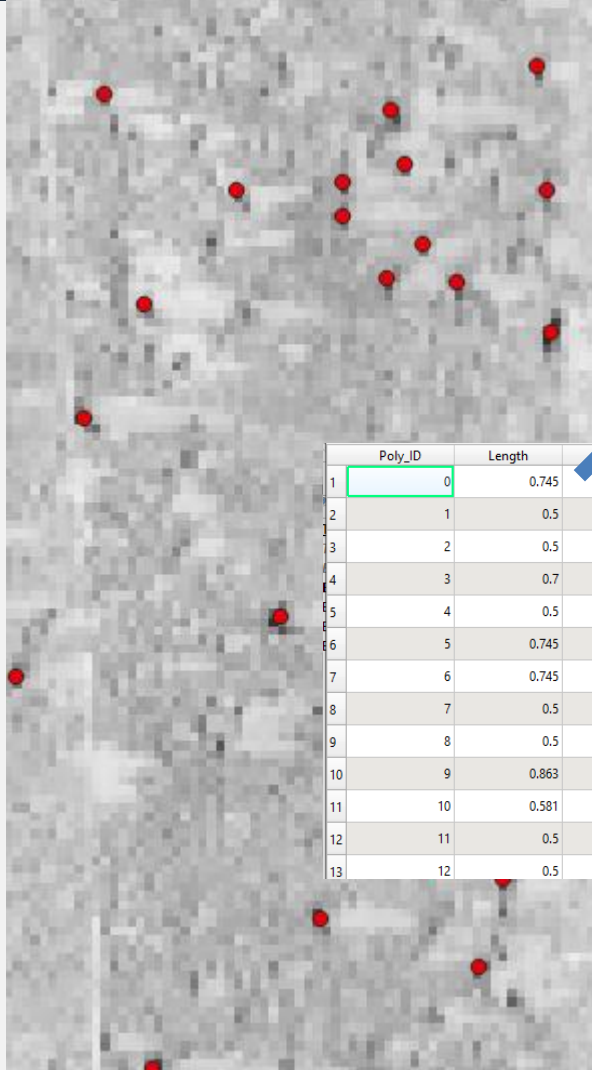
Side-scan sonar



- Side-scan uses a sonar device that emits conical or fan-shaped pulses down toward the seafloor across a wide angle perpendicular to the path of the sensor through the water, which may be towed from a surface vessel. The intensity of the acoustic reflections from the seafloor of this fan-shaped beam is recorded in a series of cross-track slices.
- PURPOSE:** commonly used tool to detect debris items and other obstructions on the seafloor that may be hazardous to shipping or to seafloor installations, and also is able to provide an understanding of the differences in material and texture type of the seabed.

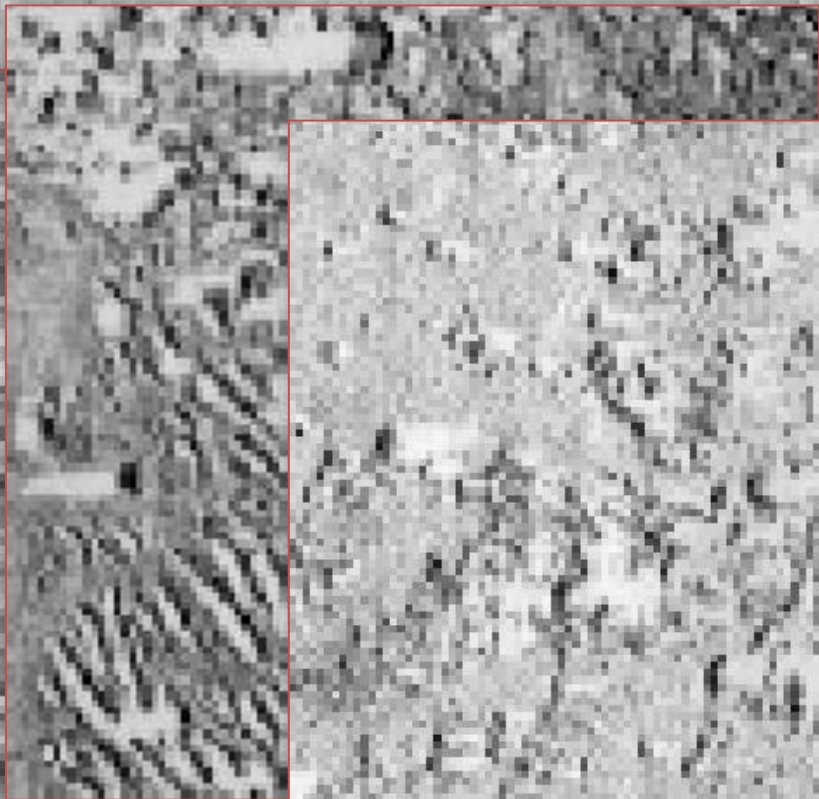
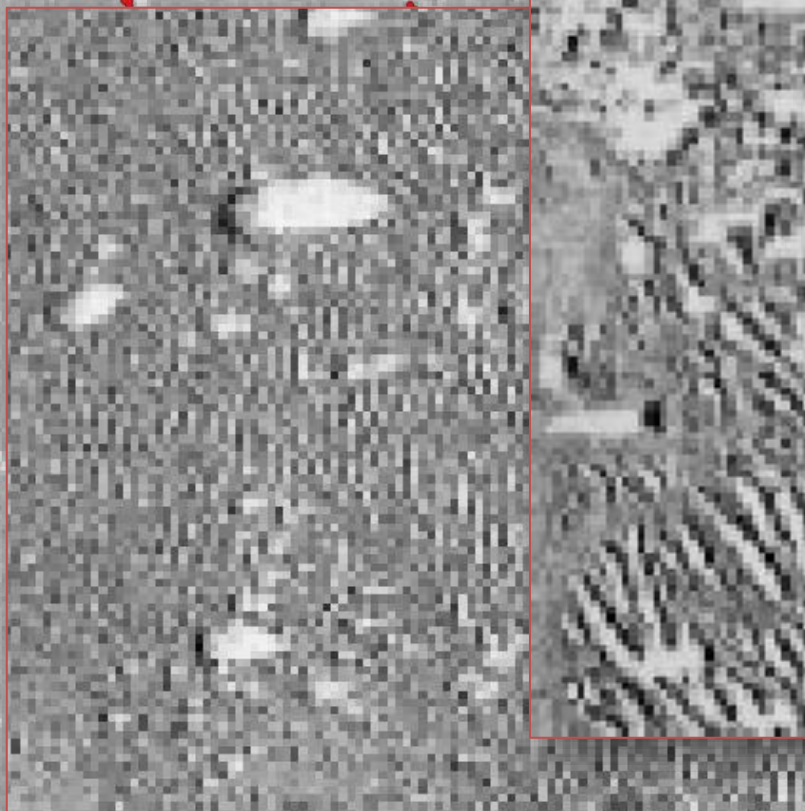
ing #	136033	Range	37 m	Latitude	42.46 1780 N	Fish Heading	252.8 deg	Pressure	106.1 psia	TowFish	11
Time	17:24:17	Speed	4.1 knots	Longitude	070.38 4640 W	Pitch	3.2 deg	Temp	3.0 deg	Altitude	
Date	8/23/2001	Depth	62.7 m	Course	323.9 deg	Roll	2.4 deg	Errors	No Errors	(meters)	

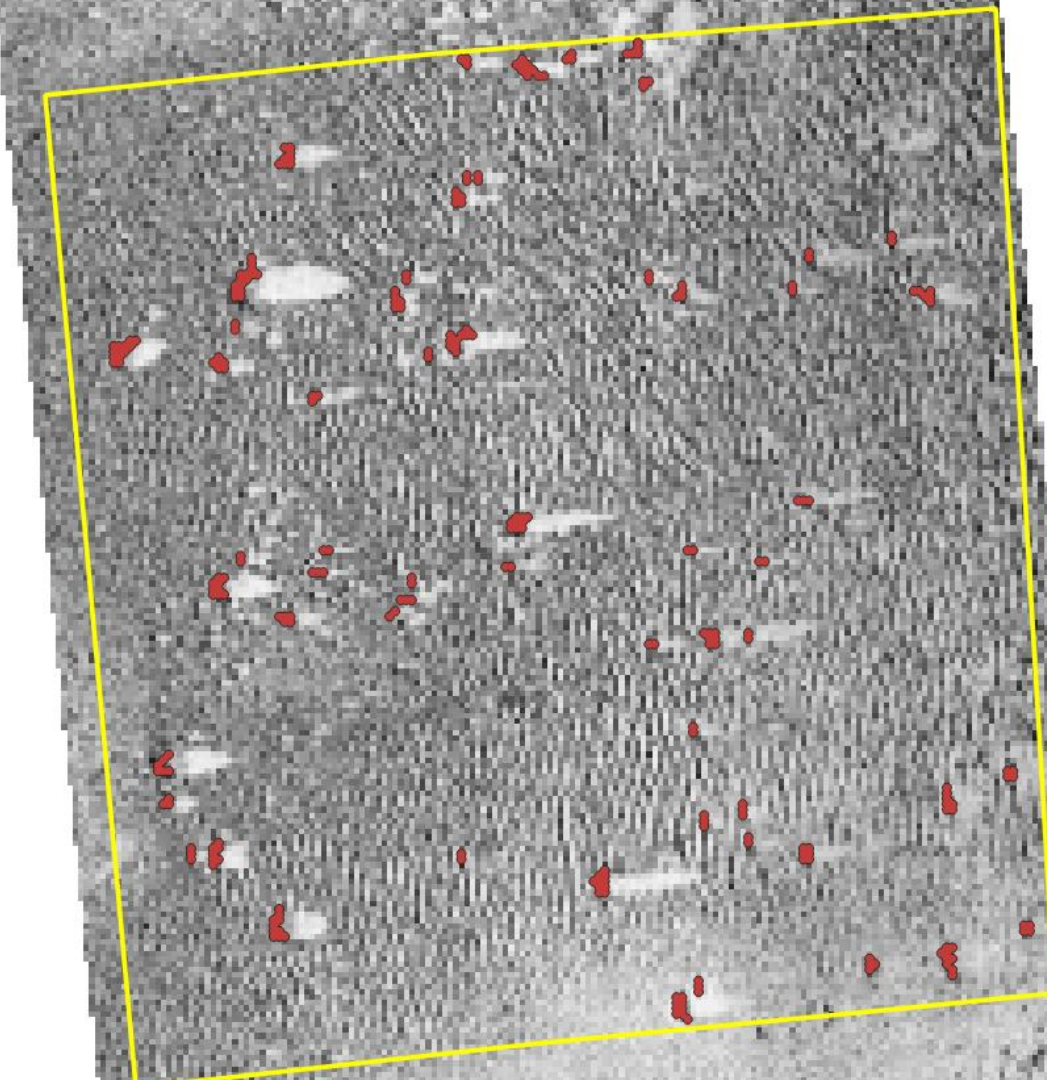
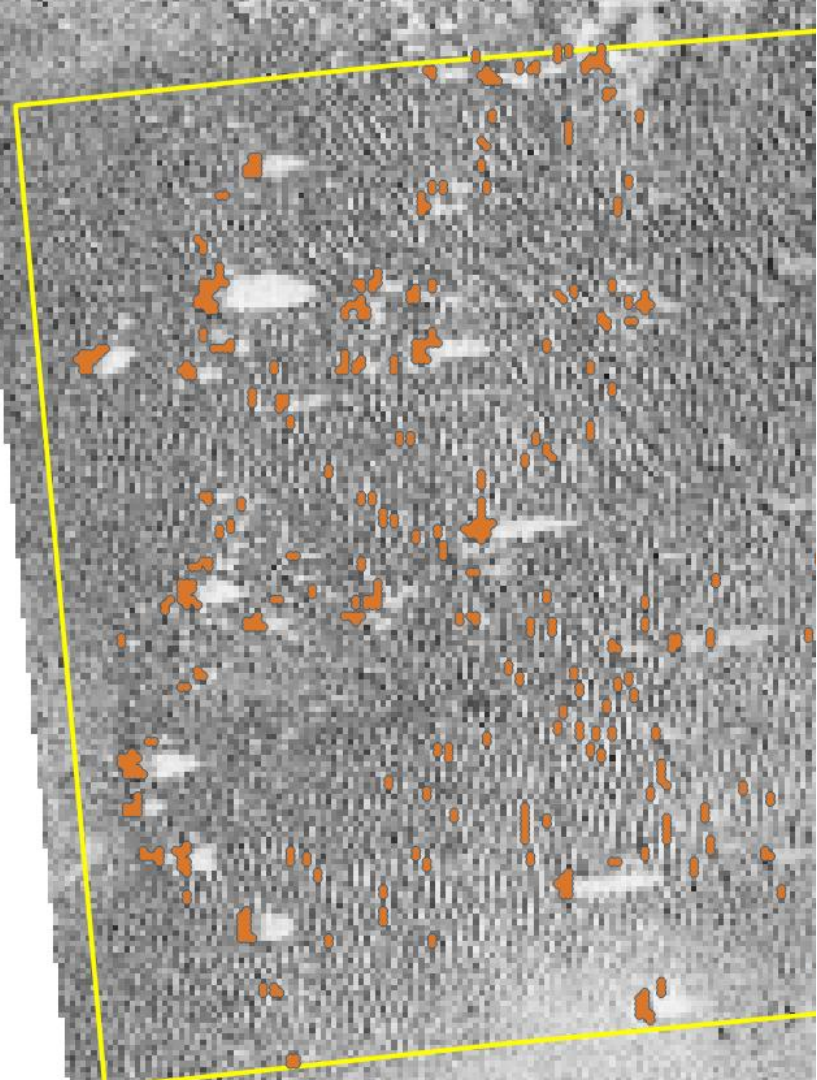


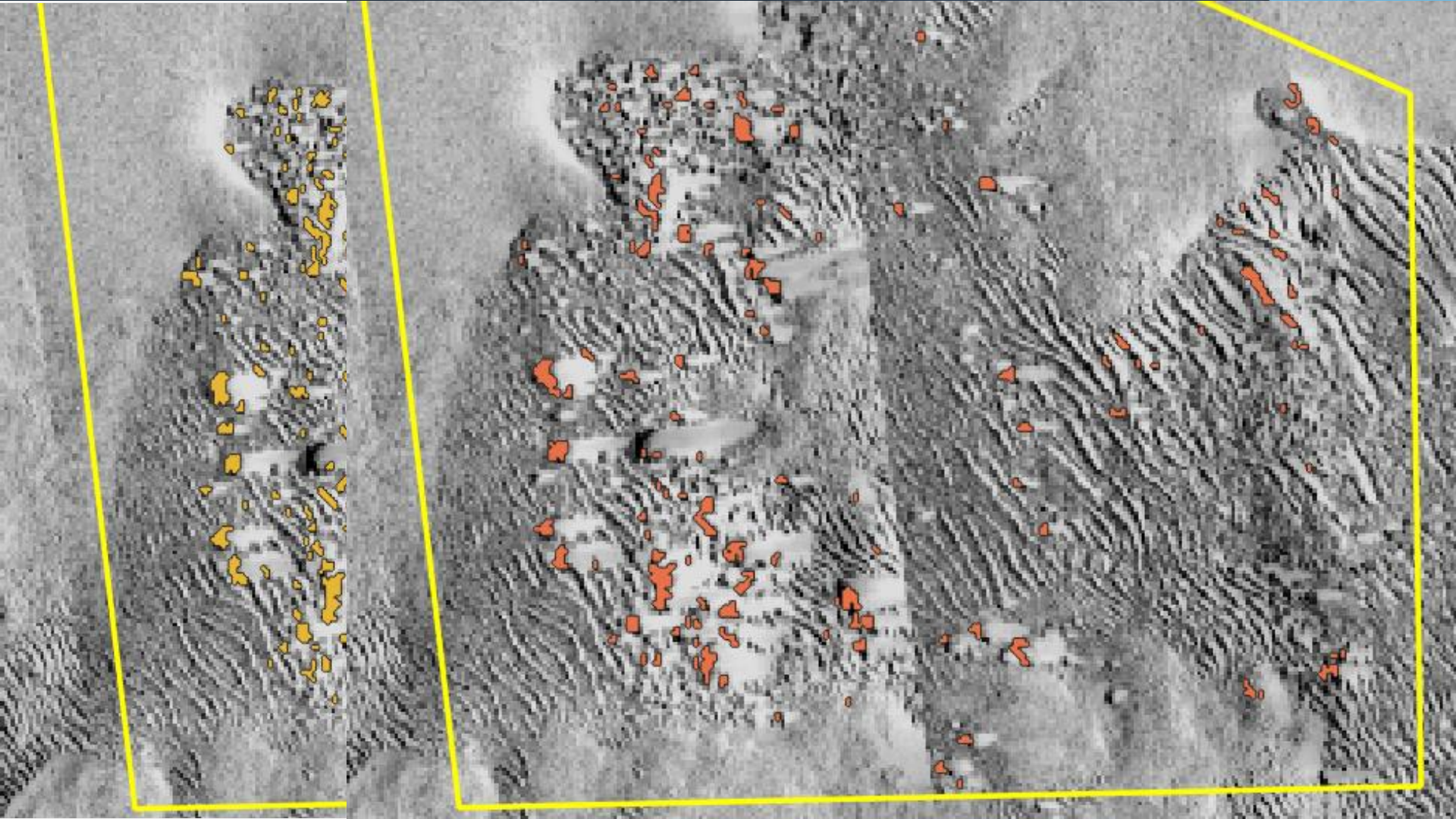


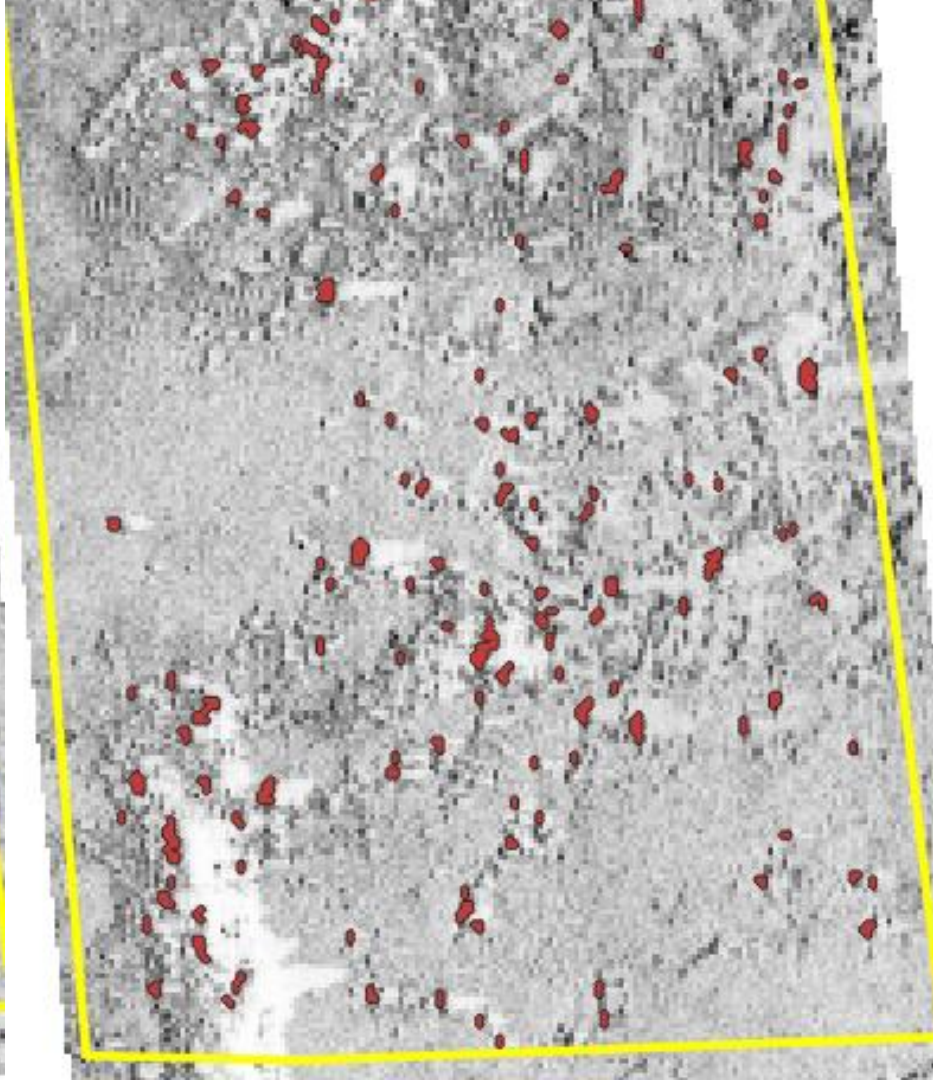
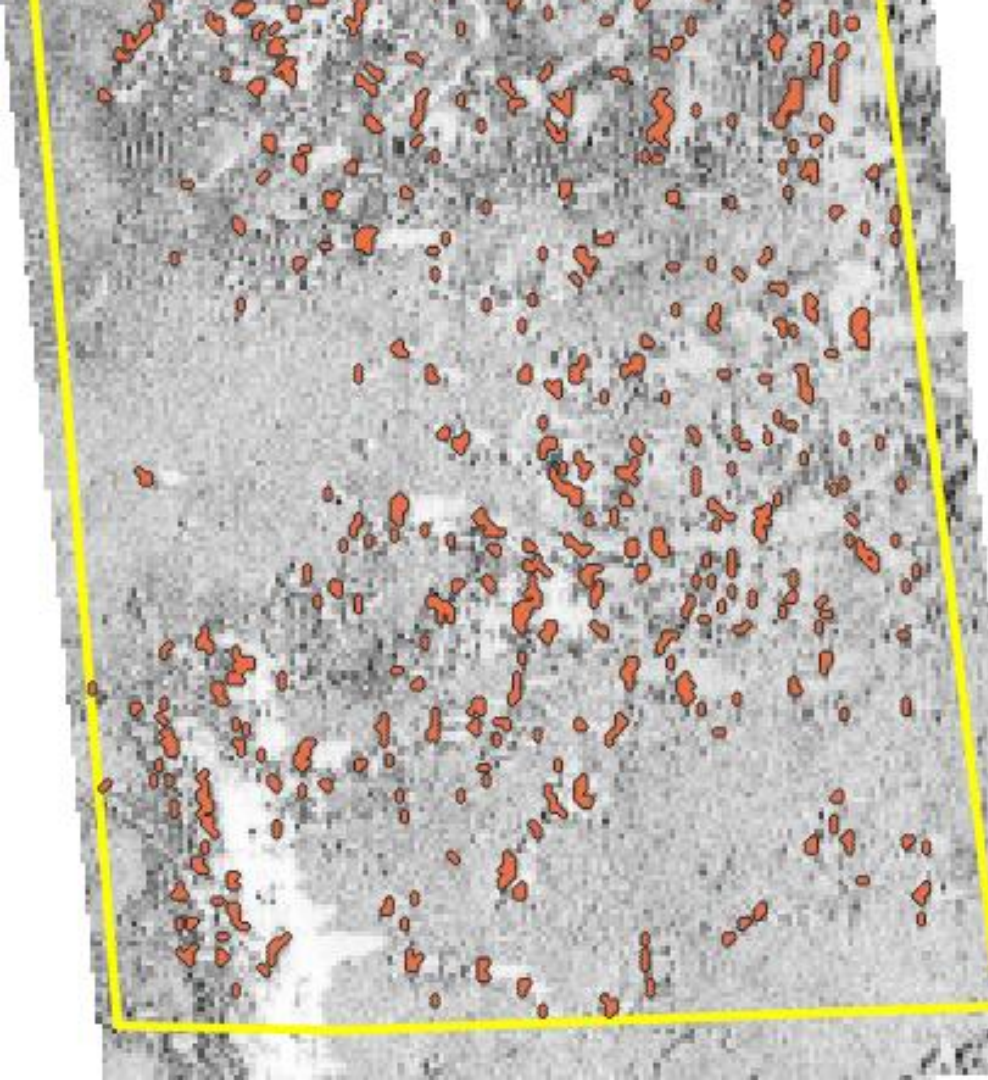
	Poly_ID	Length	Width
1	0	0.745	0.486
2	1	0.5	0.244
3	2	0.5	0.244
4	3	0.7	0.3
5	4	0.5	0.244
6	5	0.745	0.296
7	6	0.745	0.496
8	7	0.5	0.244
9	8	0.5	0.244
10	9	0.863	0.224
11	10	0.581	0.224
12	11	0.5	0.244
13	12	0.5	0.244

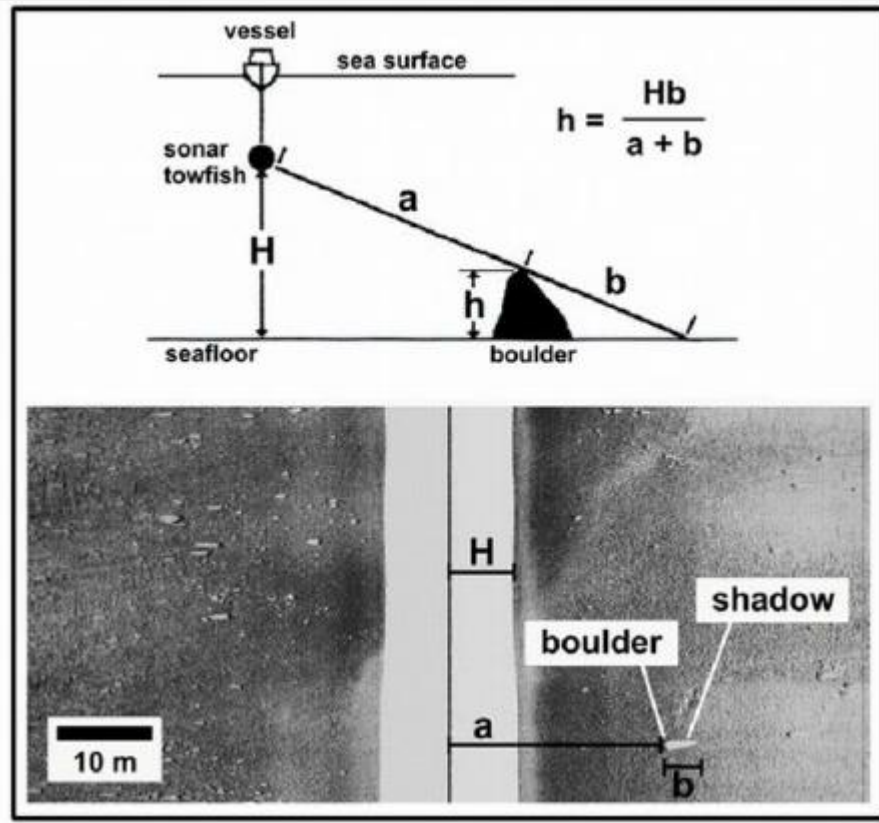


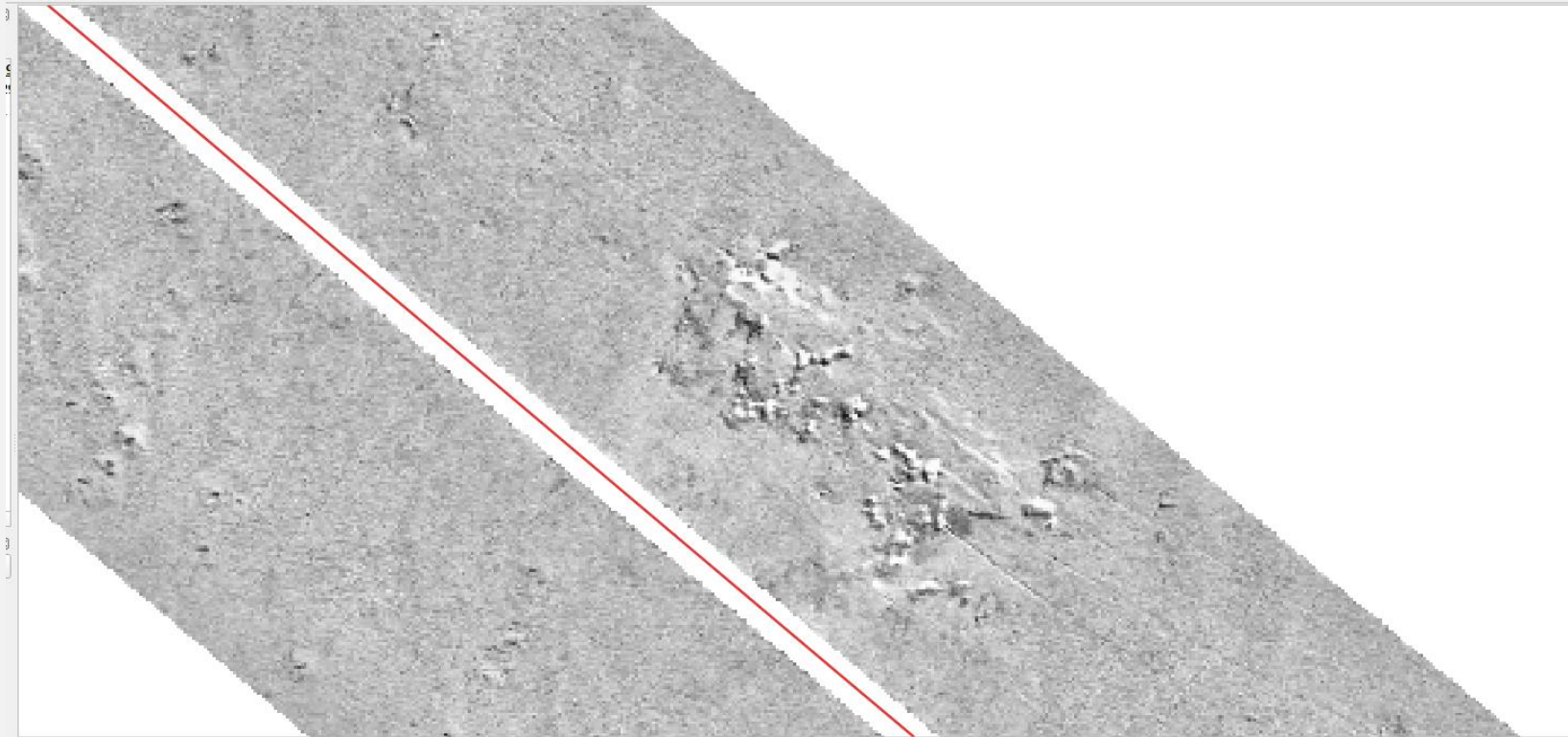














Thank you for attention !

