INTERNATIONAL HYDROGRAPHIC ORGANIZATION
1921
IHB MONACO BHI
IHO

Crowd Sourced Bathymetry

Andrew Schofield

Sea ID

Imperial Trans-Antarctic Expedition

MEN WANTED

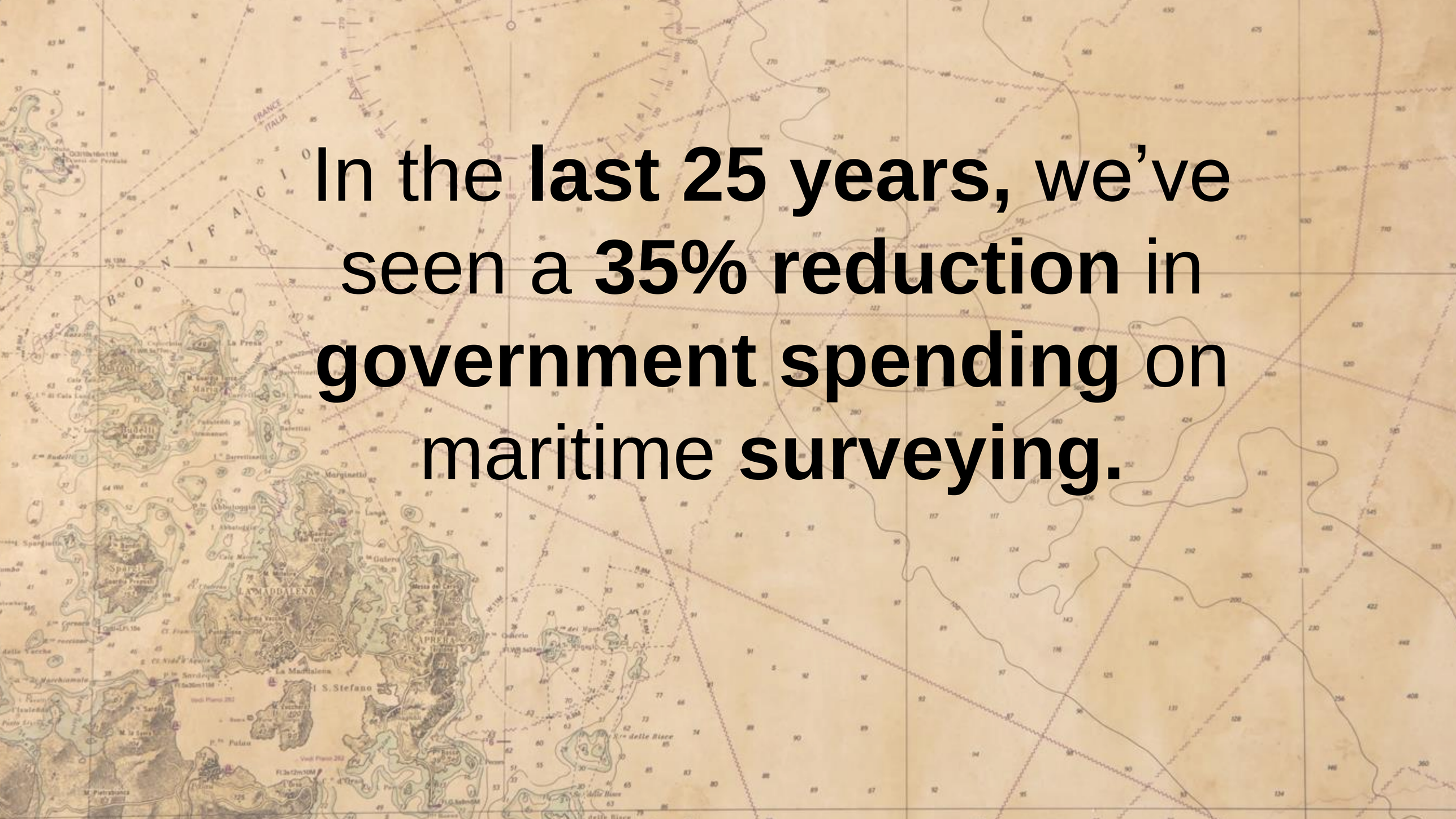
for hazardous journey, small wages, bitter cold, long months of complete darkness, constant danger, safe return doubtful, honor and recognition in case of success.

Ernest Shackleton 4 Burlington st.

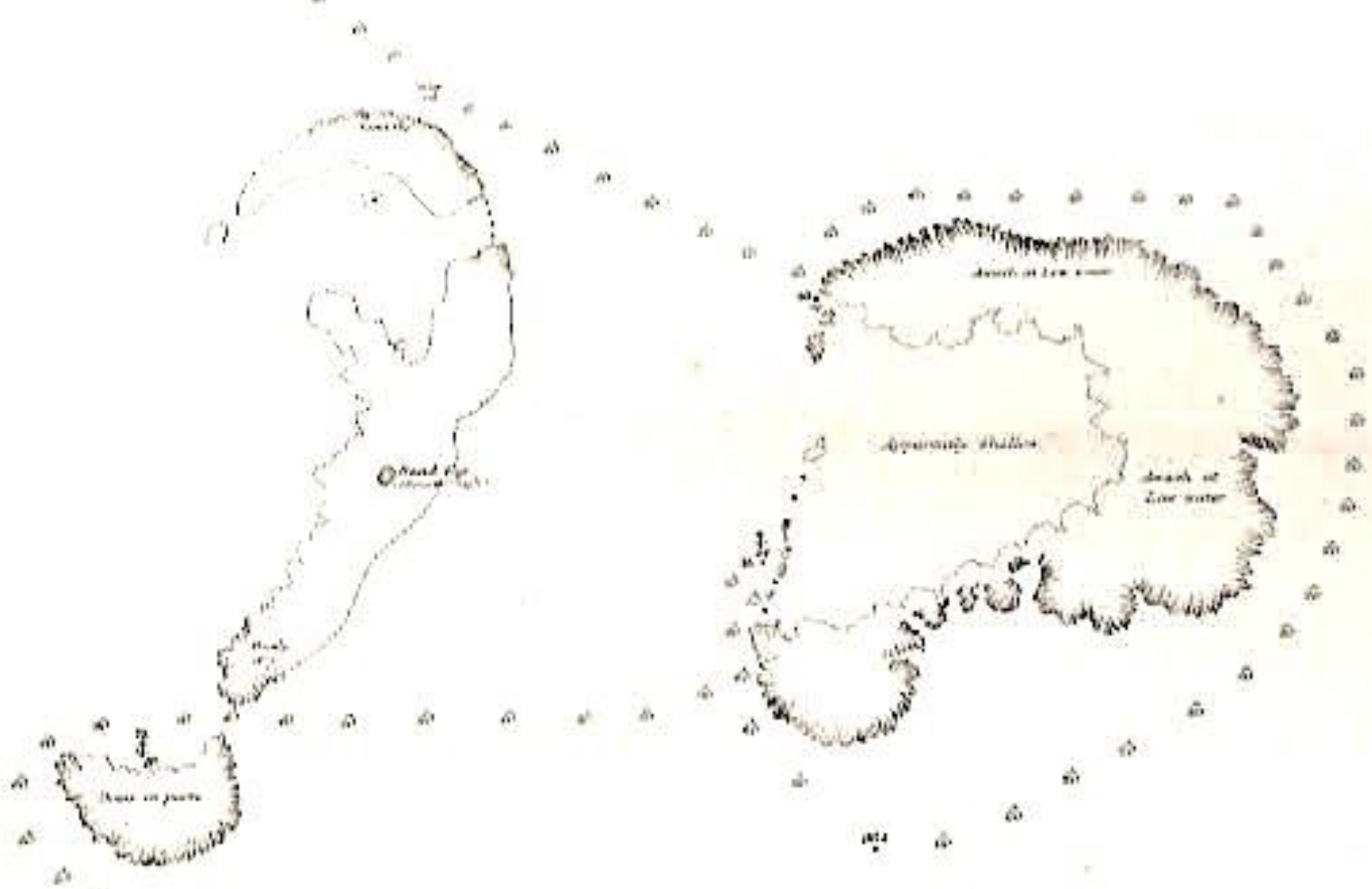
MEN—Neat-appearing young men of pleasing personality

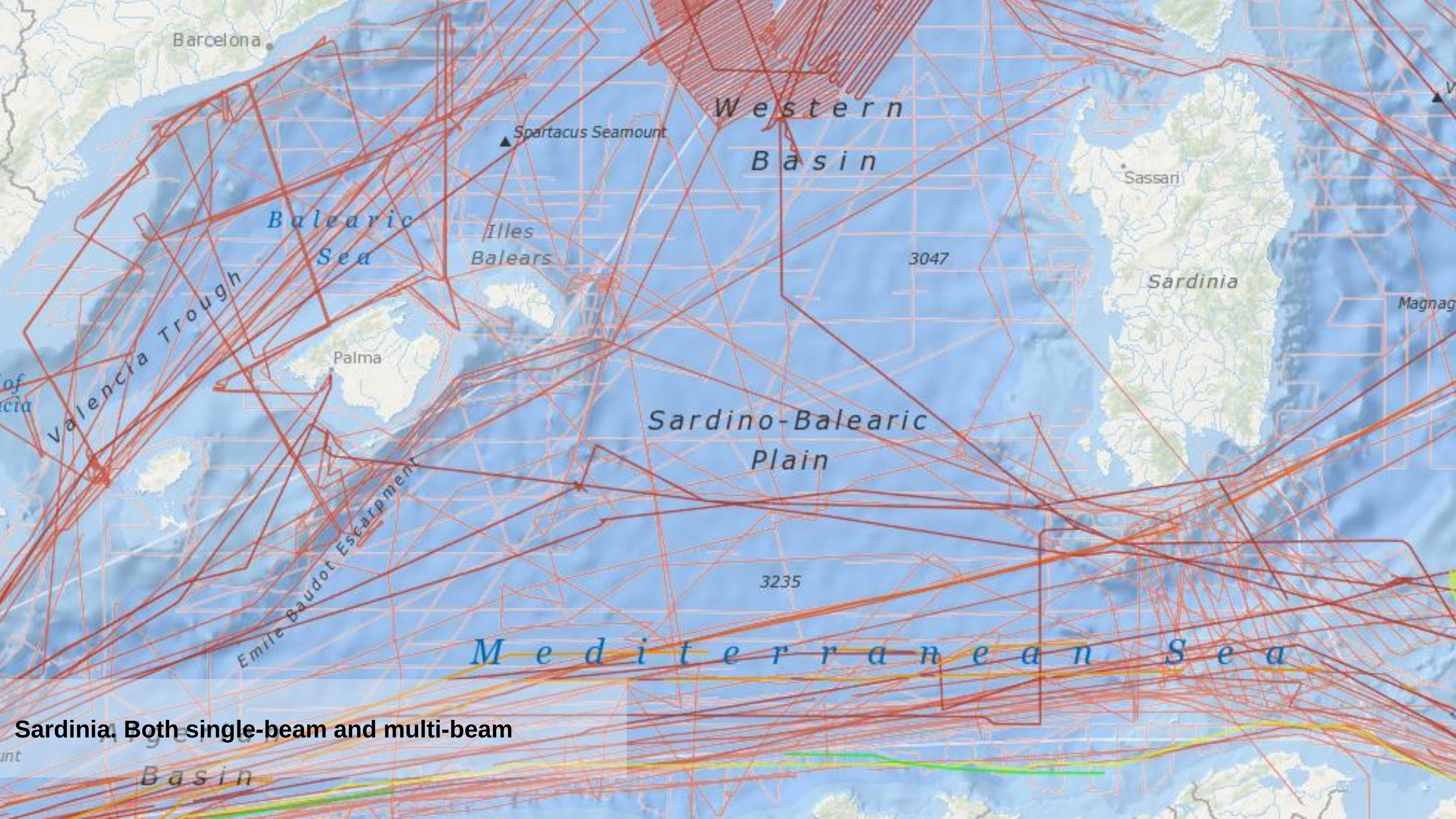
Missing data from 0 to 200 meters

Southwest Pacific	> 95%
Polar regions	> 95%
West Africa	> 80%
Caribbean	> 80%
Australia	~ 65%
Greece	65%
United States of America	~ 40%
United Kingdom	30%
France	19%

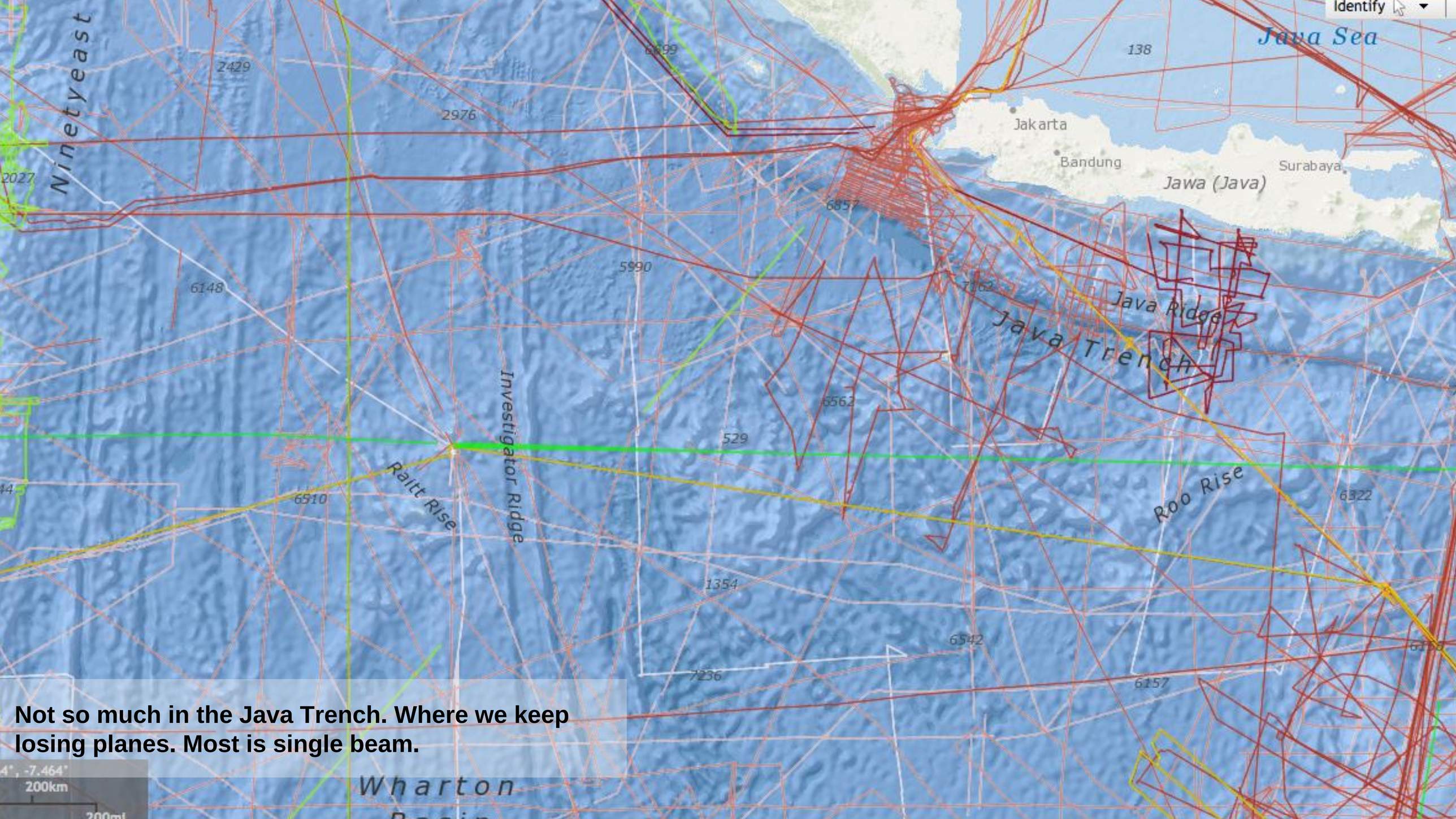

In the **last 25 years,** we've seen a **35% reduction** in **government spending** on maritime **surveying.**

Captain Cook leadline soundings!



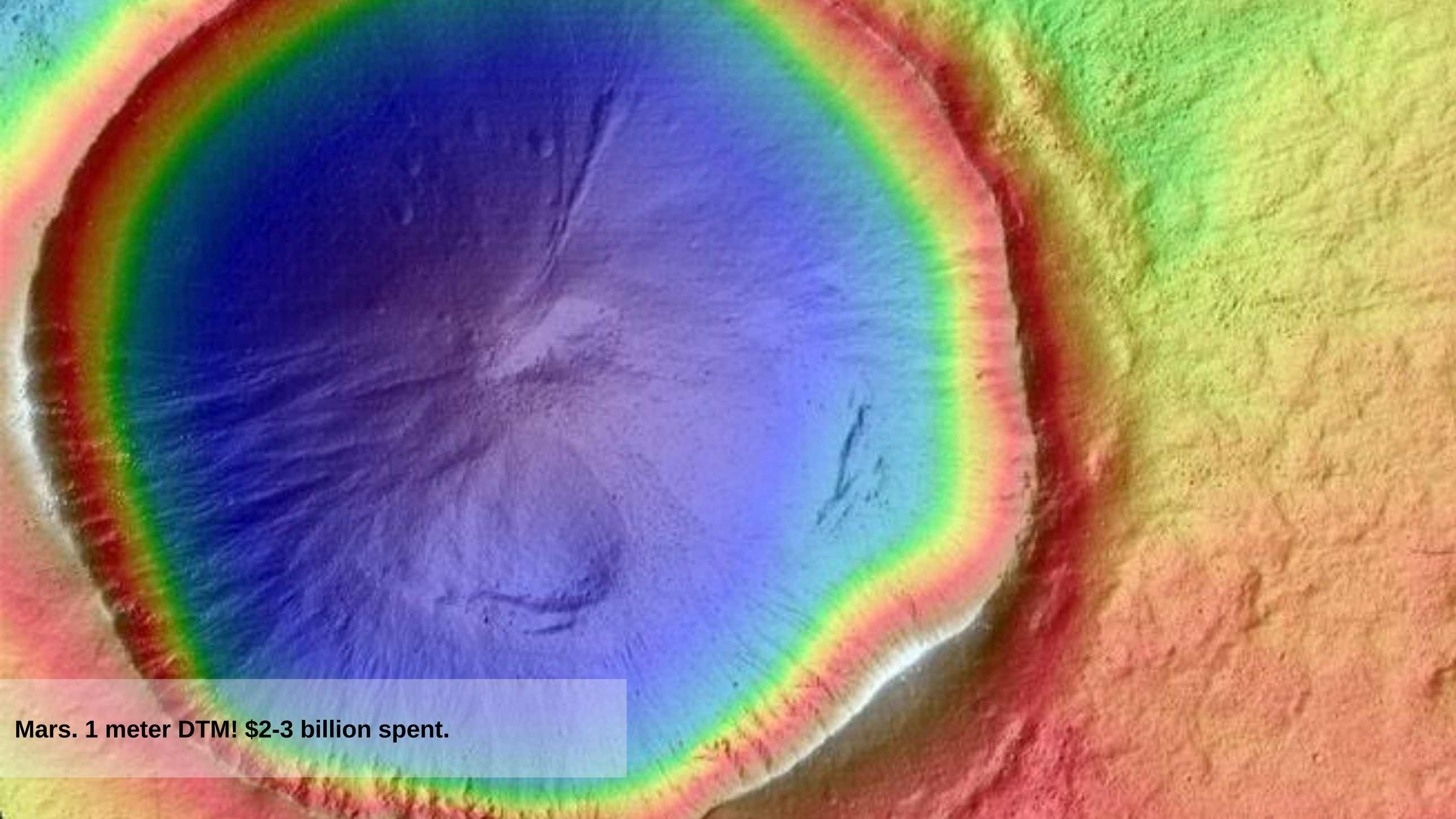


Sardinia. Both single-beam and multi-beam



Not so much in the Java Trench. Where we keep losing planes. Most is single beam.

“We have better maps of the Moon and Mars than of the ocean.”



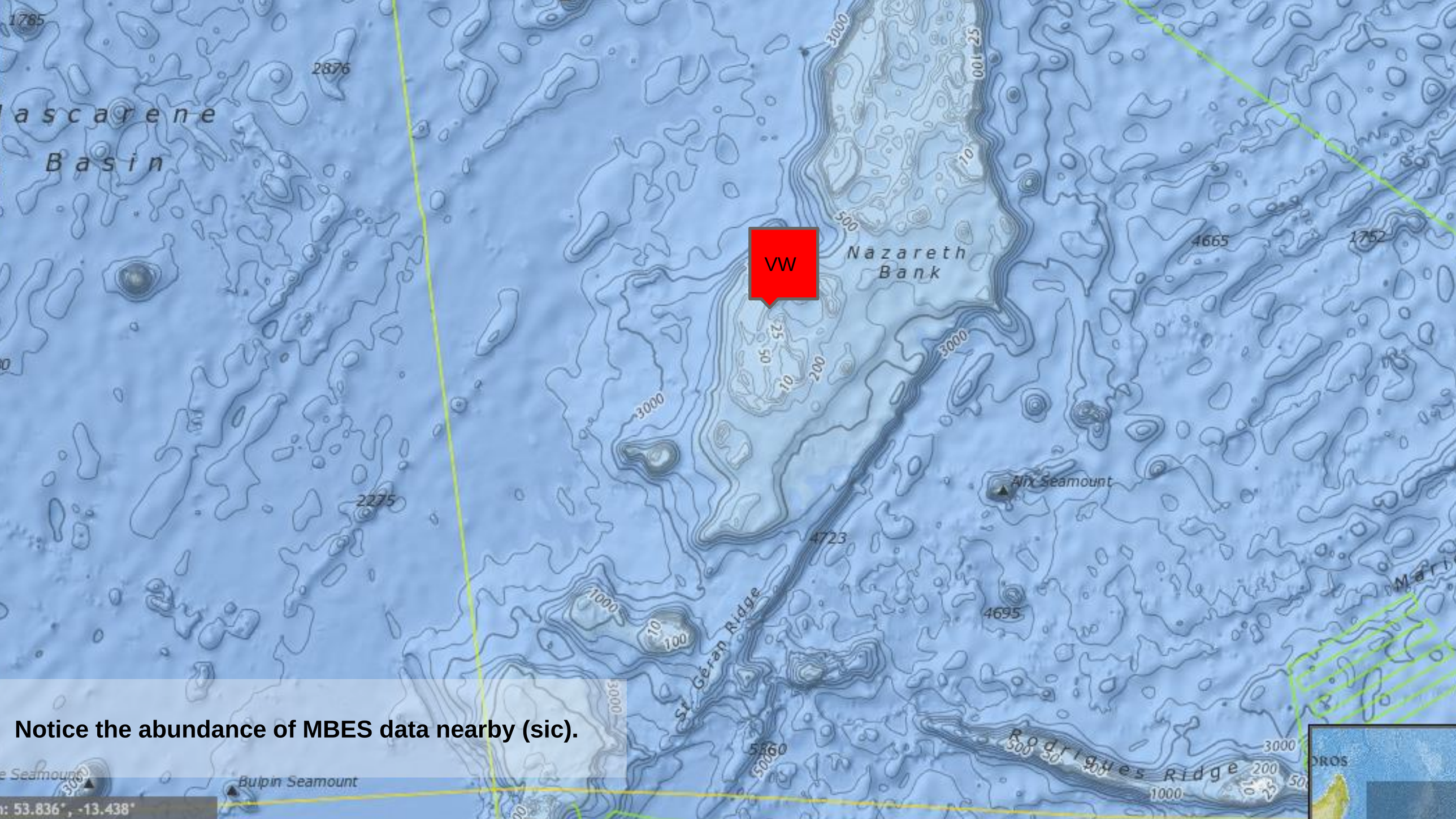
Mars. 1 meter DTM! $2-3 billion spent.

Crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call.

Jeff Howe, Wired, 2005

But surely what we've got is good enough, right?

Grounding of VESTAS WIND during the 2014 Volvo Ocean Race (2014-11-29).



Notice the abundance of MBES data nearby (sic).

So what can Crowd Sourcing deliver?

Sea ID

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$SDDBT,   25.9,f,  7.88,M,   4.3,F
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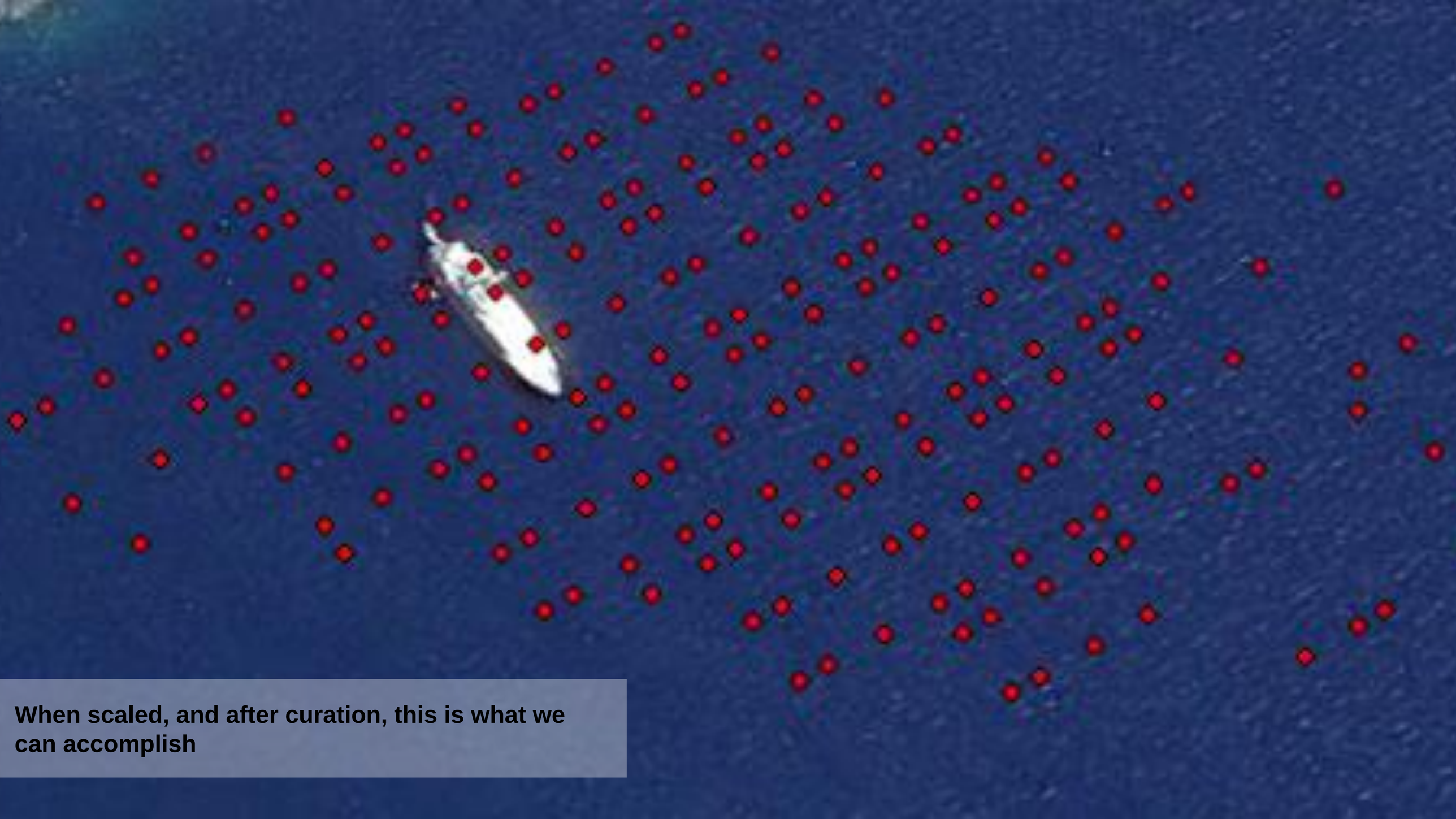
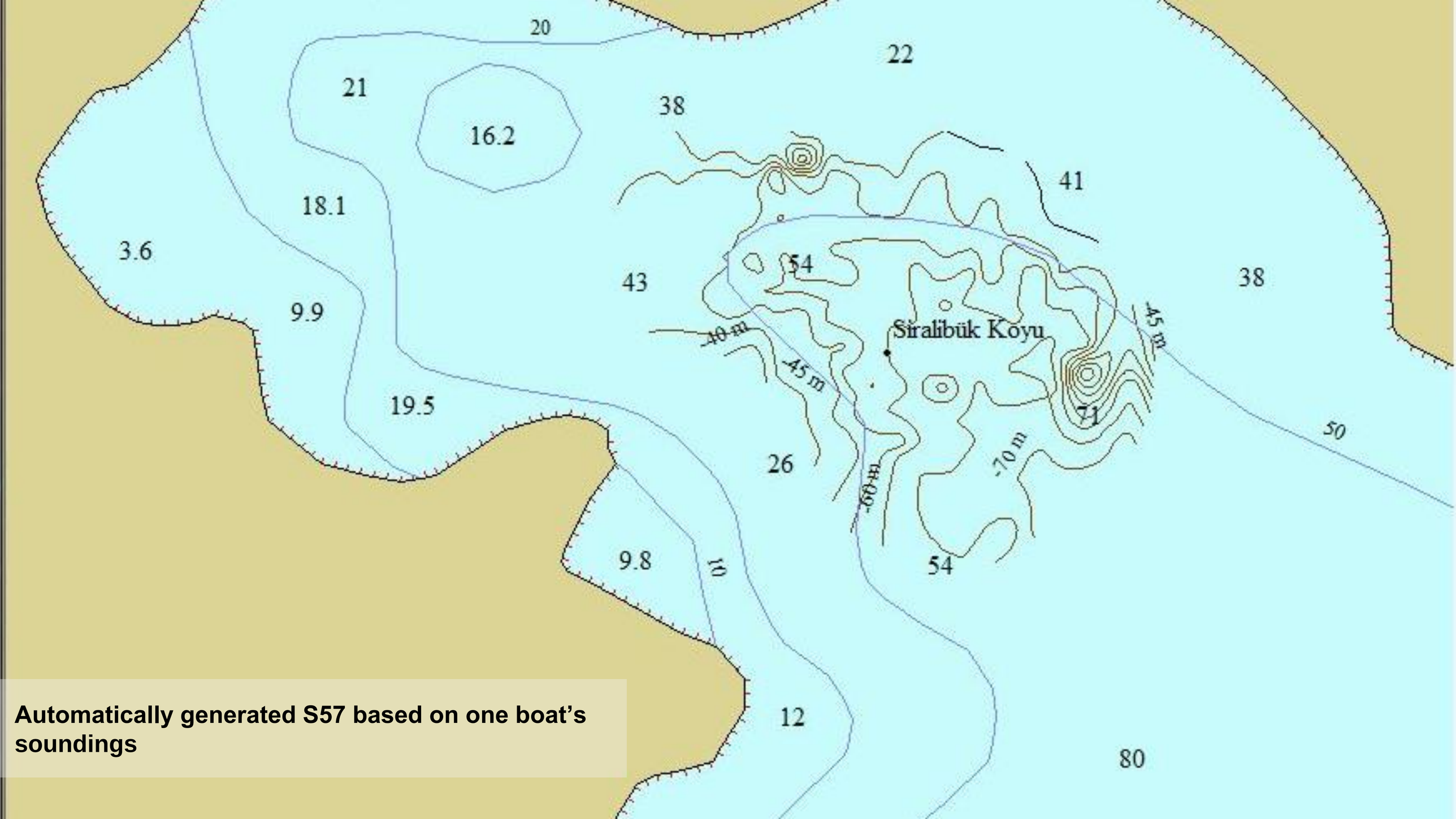
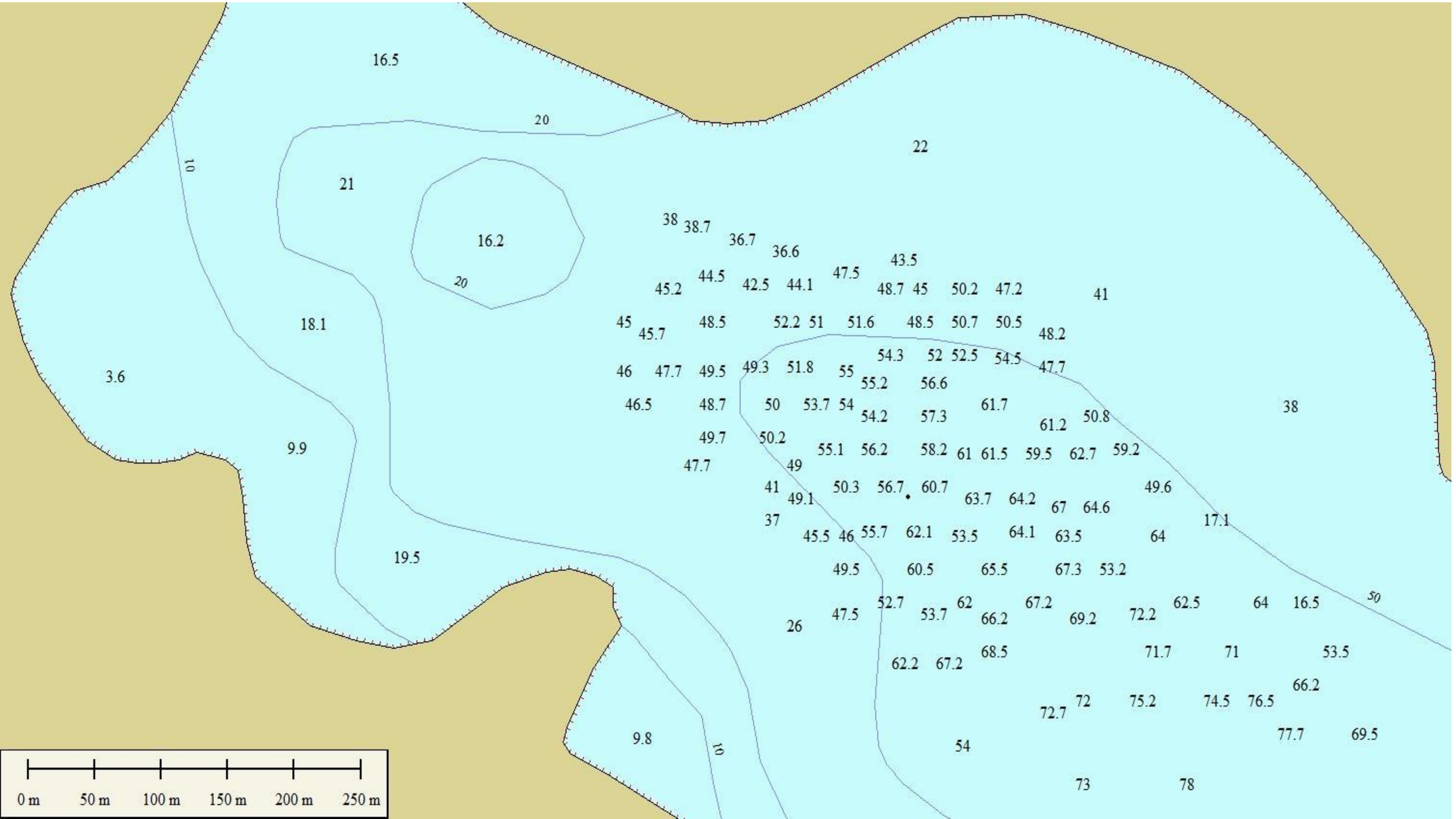
Example of collected data
Tomb Bay, Turkey



When scaled, and after curation, this is what we can accomplish



Automatically generated S57 based on one boat's soundings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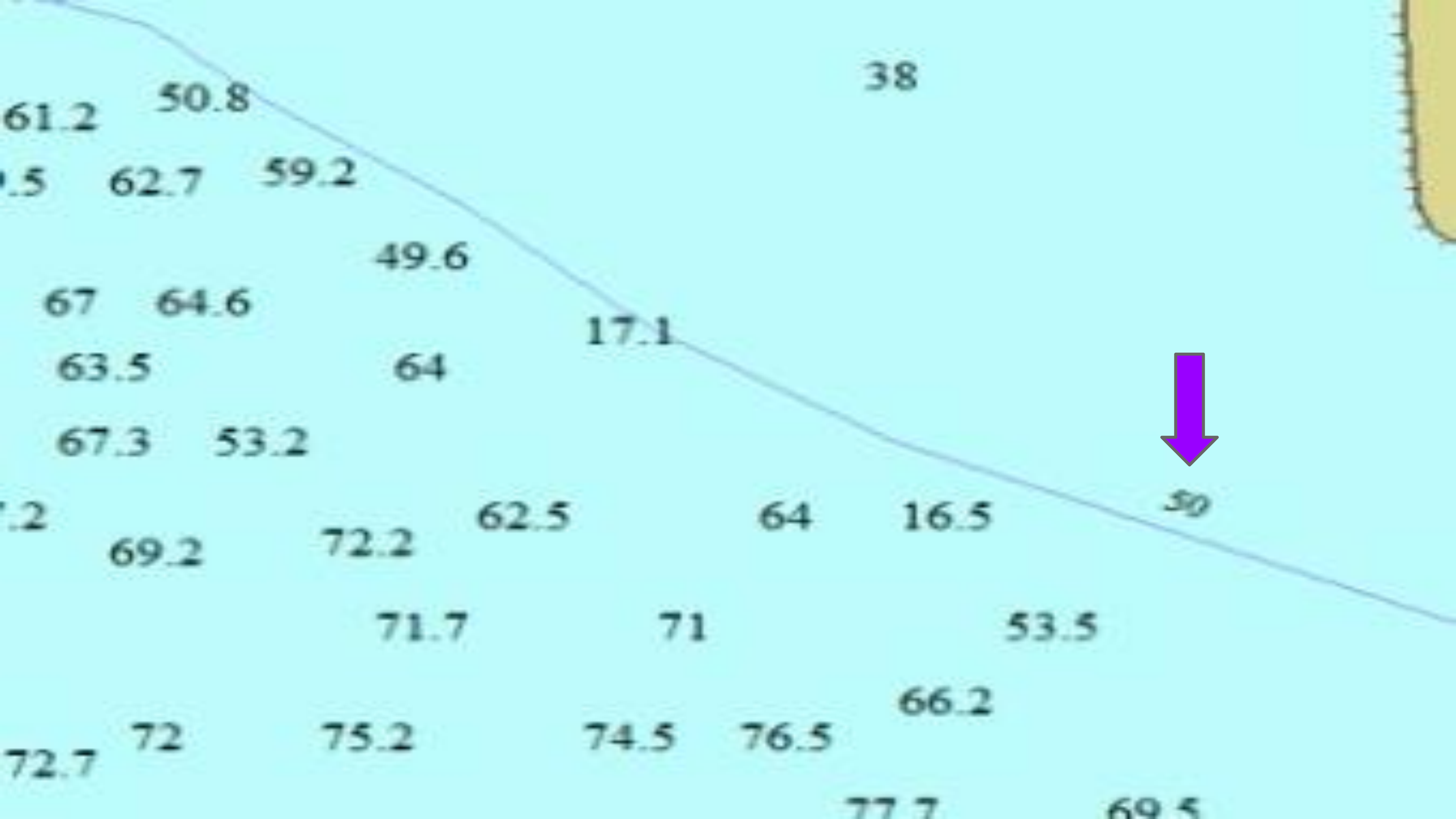
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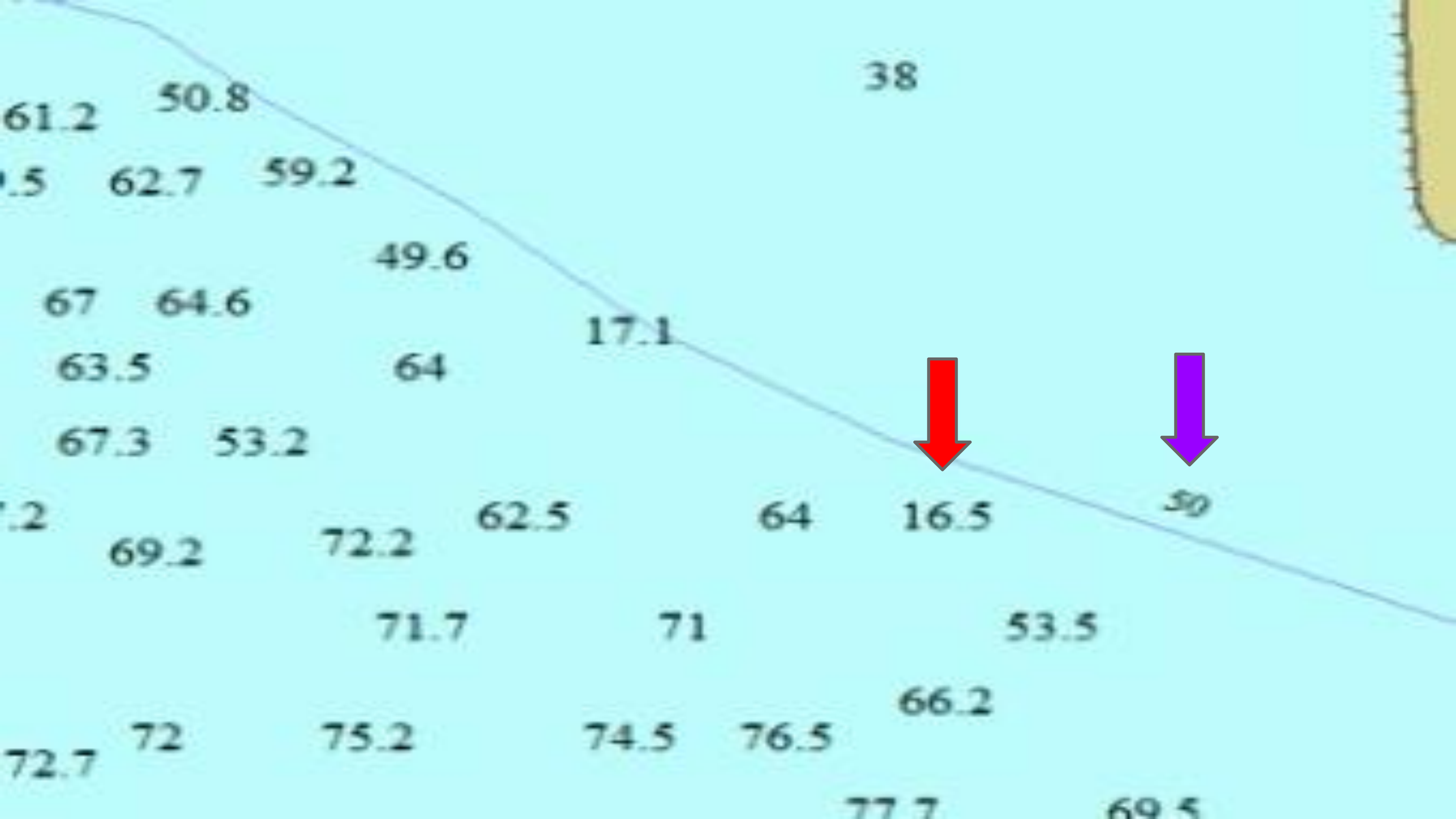
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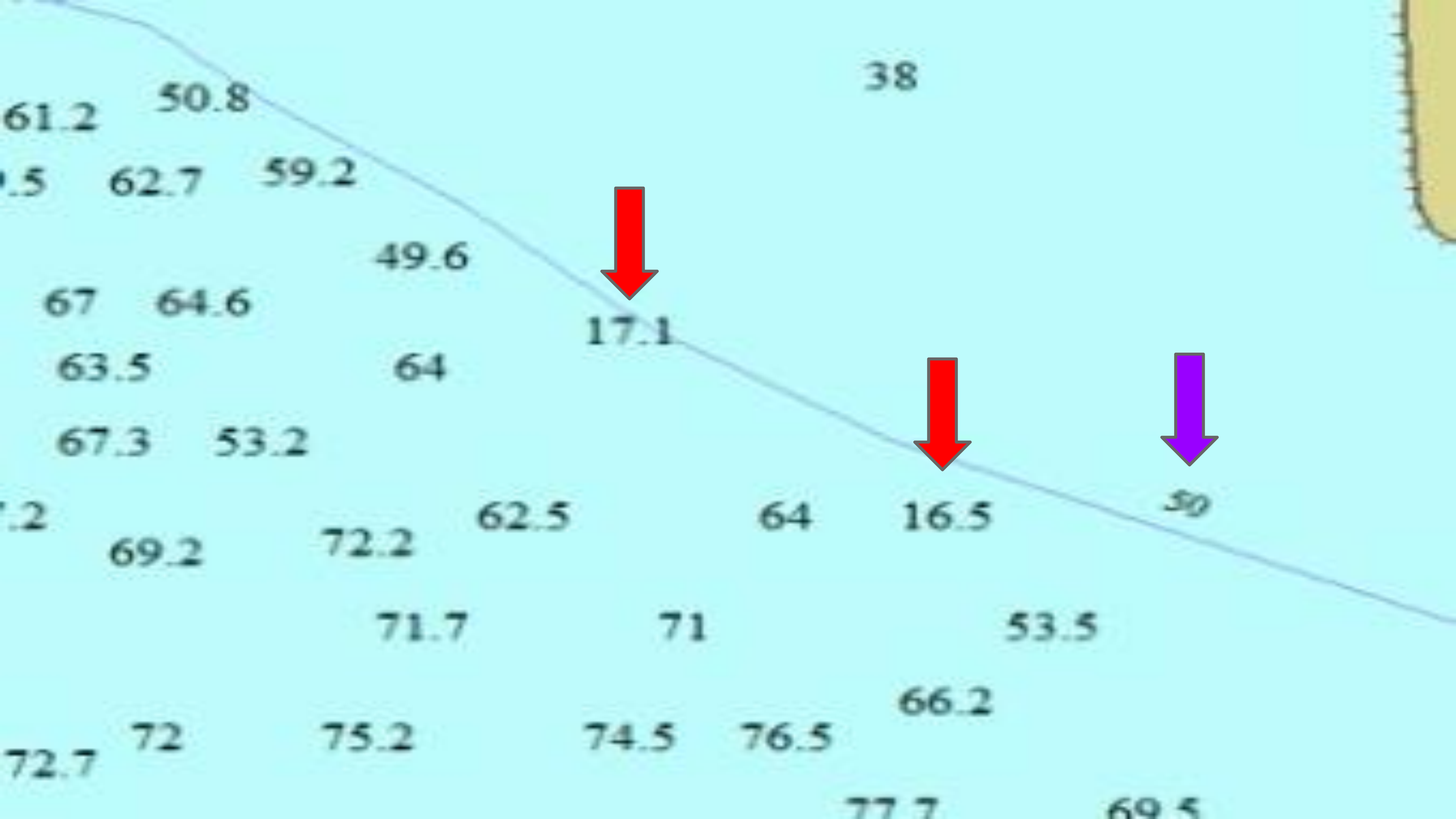
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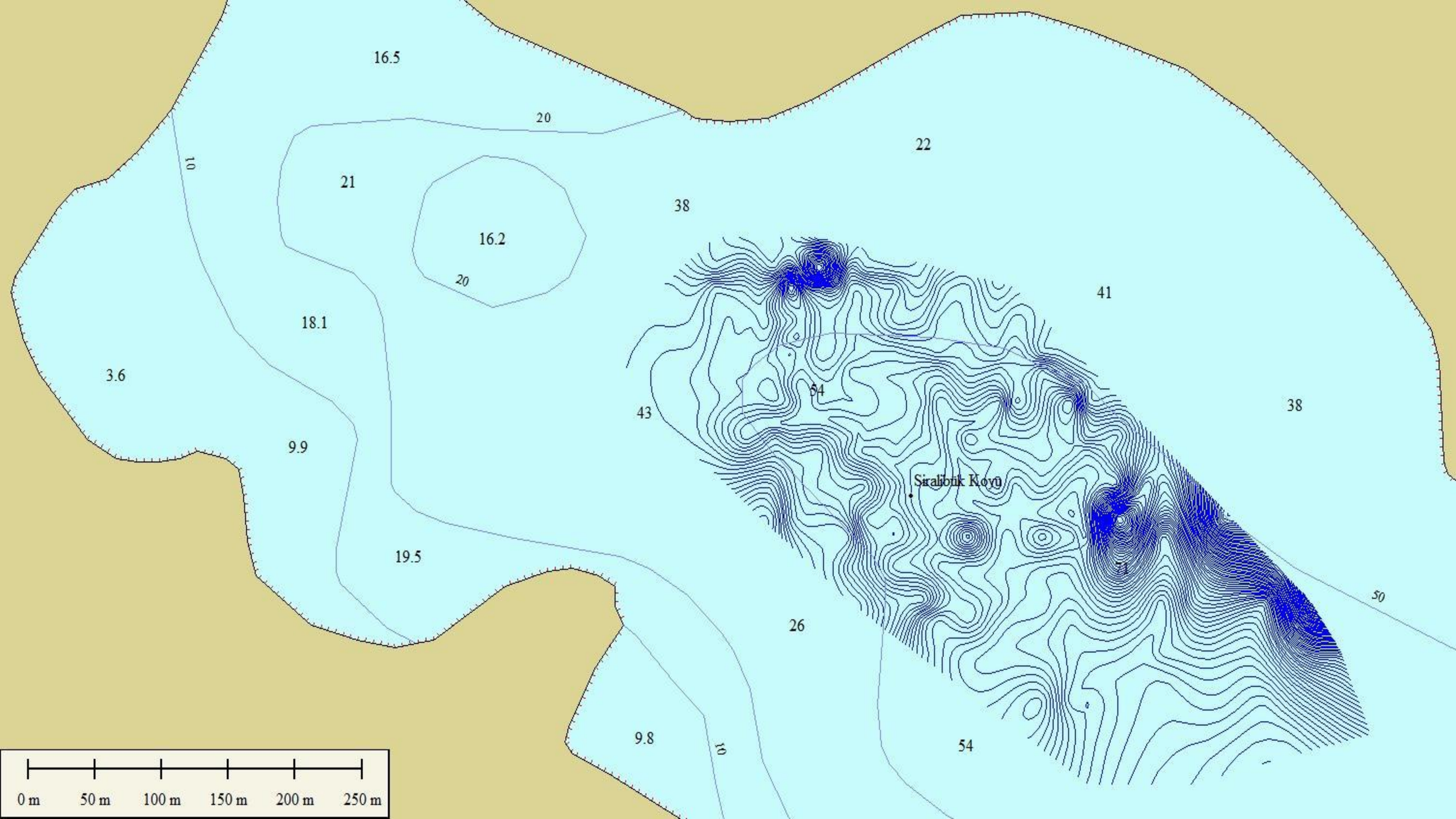
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16.2
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41
18.1
3.6
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43
38
9.9
Siralibük Koyu
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26
9.8
10
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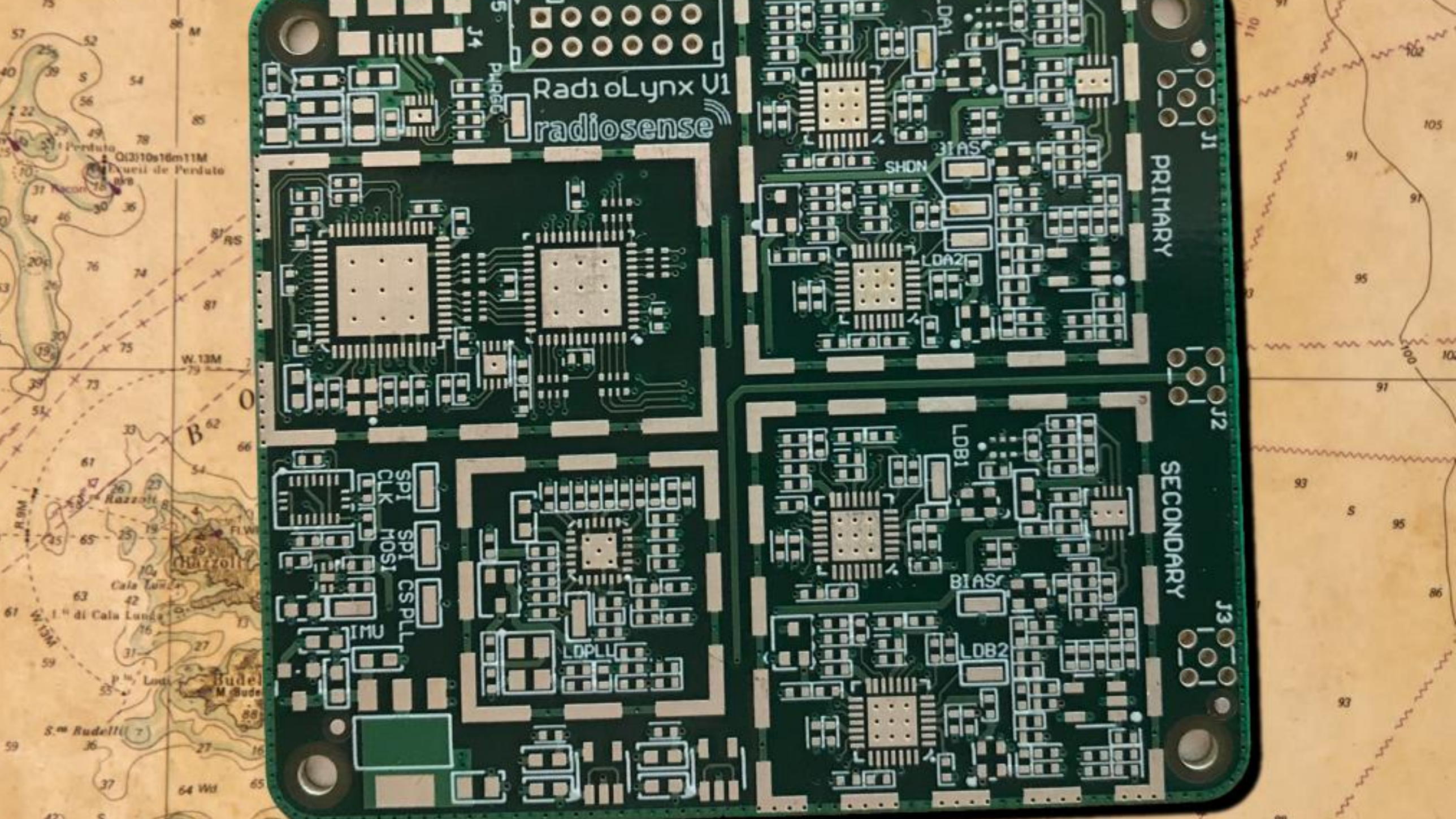
0 m
50 m
100 m
150 m
200 m
250 m

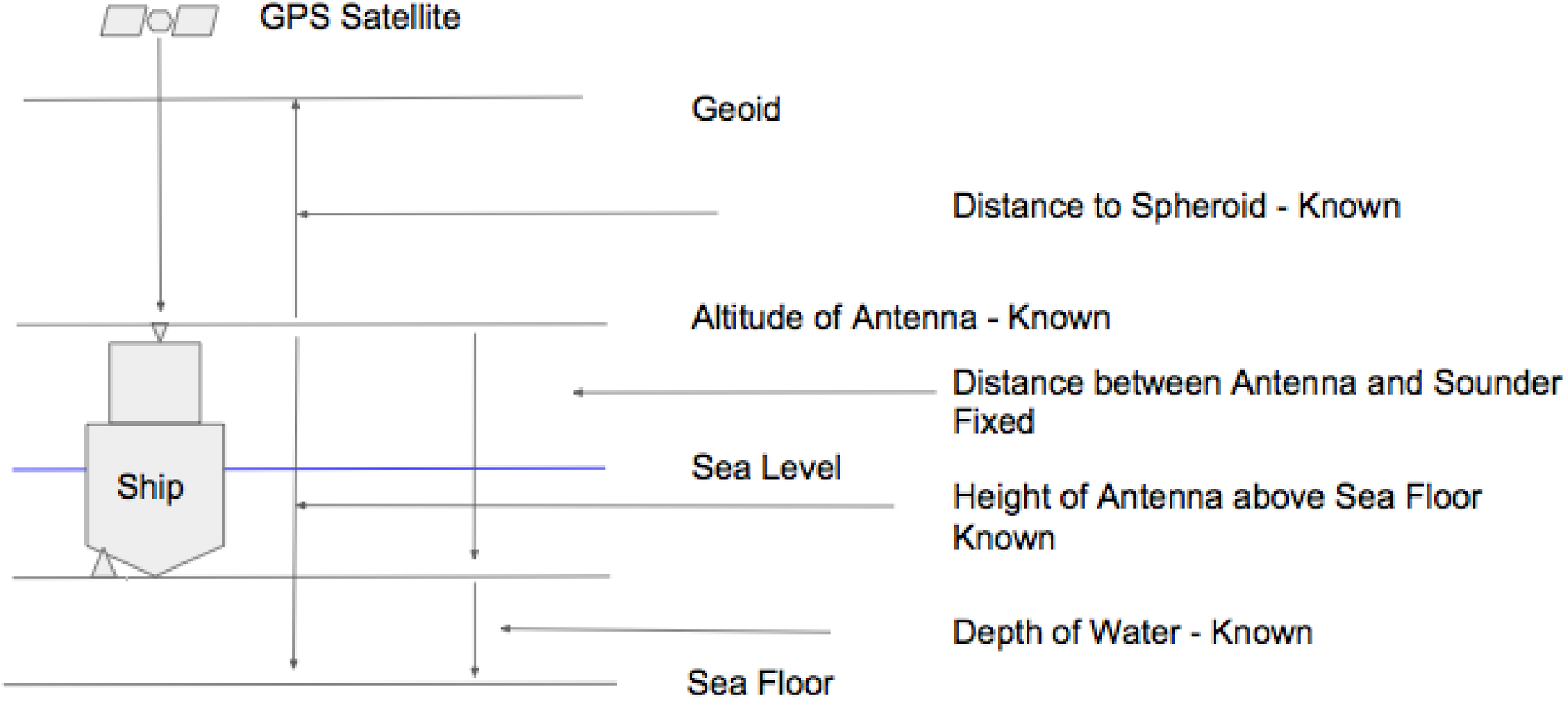
6 Yachts
34 million soundings
26000 nautical miles traveled

The Next Step

Precise Point Positioning

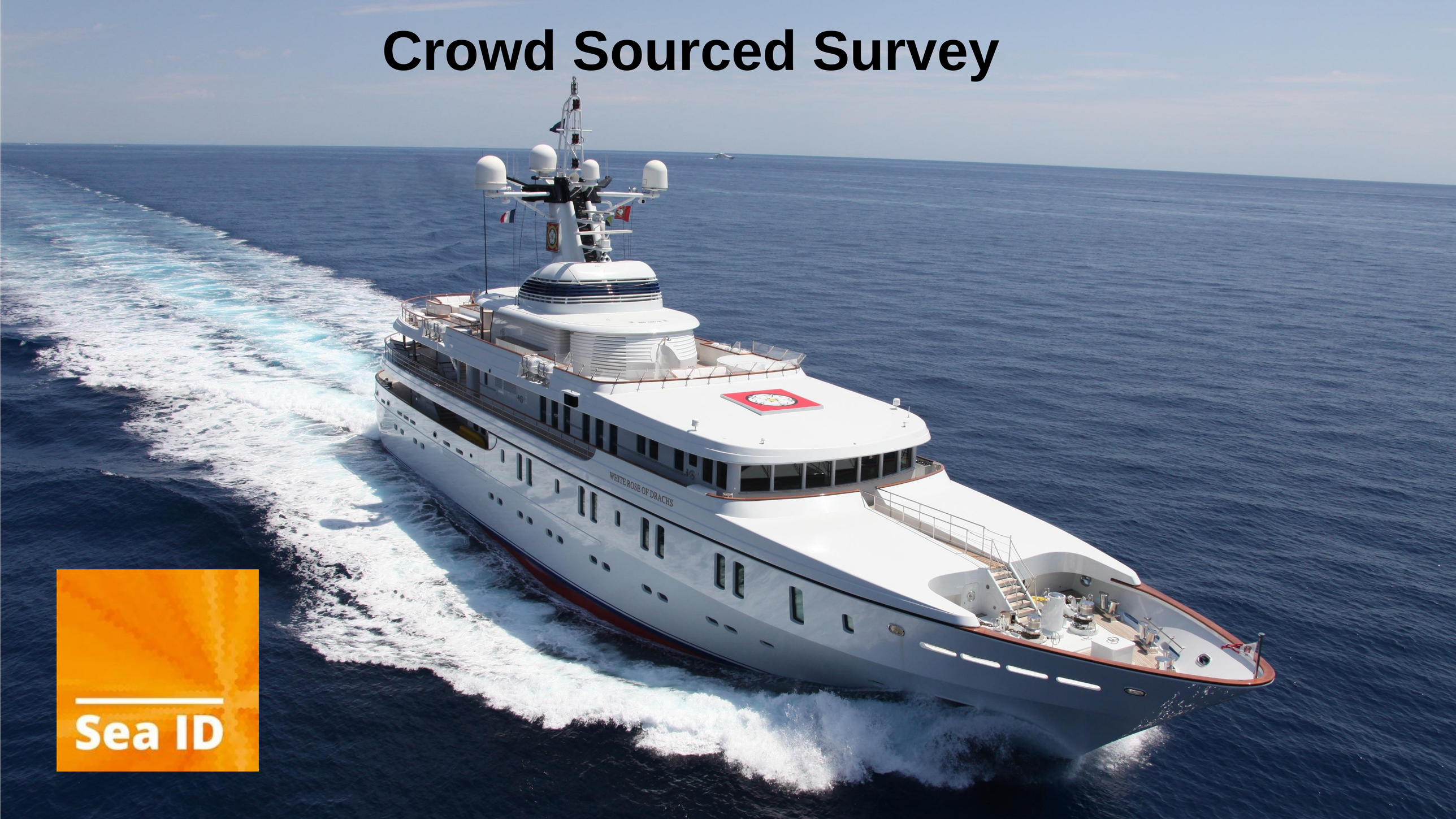

RadioLynx V1
radiosense
PRIMARY
SECONDARY
J1
J2
J3
J4
SHDN
BIAS
LDA1
LDA2
LDB1
LDB2
LDPLL
SPI
CLK
MOSI
CS PLL
IMU
Cala Lunga
Razzoli
Budelli
Perduto
W.13M

Precise Point Positioning



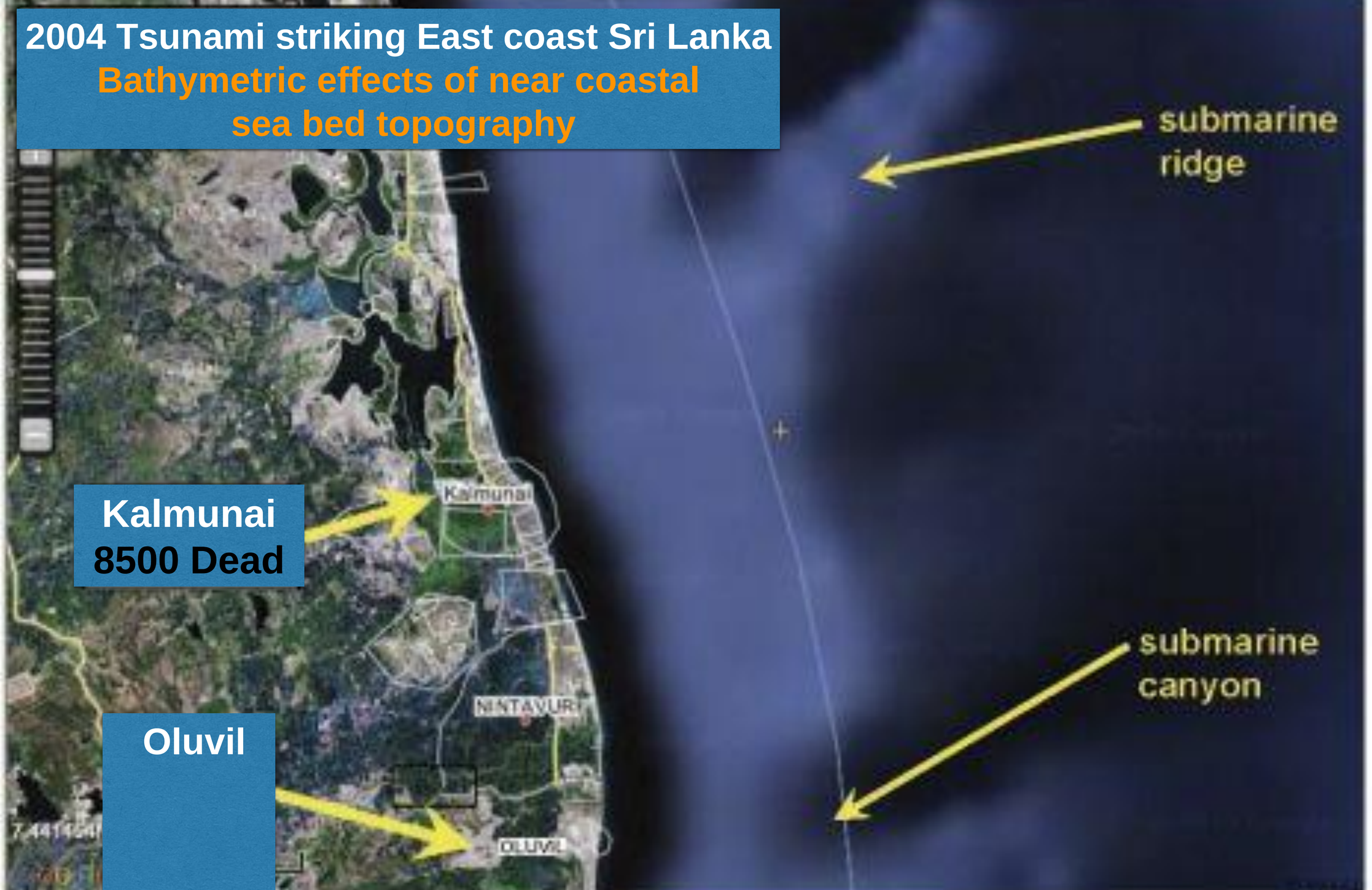
Get one of these!

Crowd Sourced Survey



Sea ID

2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography
submarine ridge
Kalmunai
submarine canyon
Oluvil
Kalmunai
NINTAVUR
OLUVIL


2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography
submarine ridge
Kalmunai
8500 Dead
submarine canyon
Oluvil
KALMUNAI
NINTAVUR
OLUVIL

2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography
submarine ridge
Kalmunai
8500 Dead
submarine canyon
Oluvil
2 Dead
Kalmunai
NINTAVUR
OLUVIL

Navigational Note or Ilegal Survey?

Crowd Sourced Bathymetry

Environmental
Ocean Resource Management
Blue Economy
Moral Imperative

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