



Crowd Sourced Bathymetry

Andrew Schofield



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.

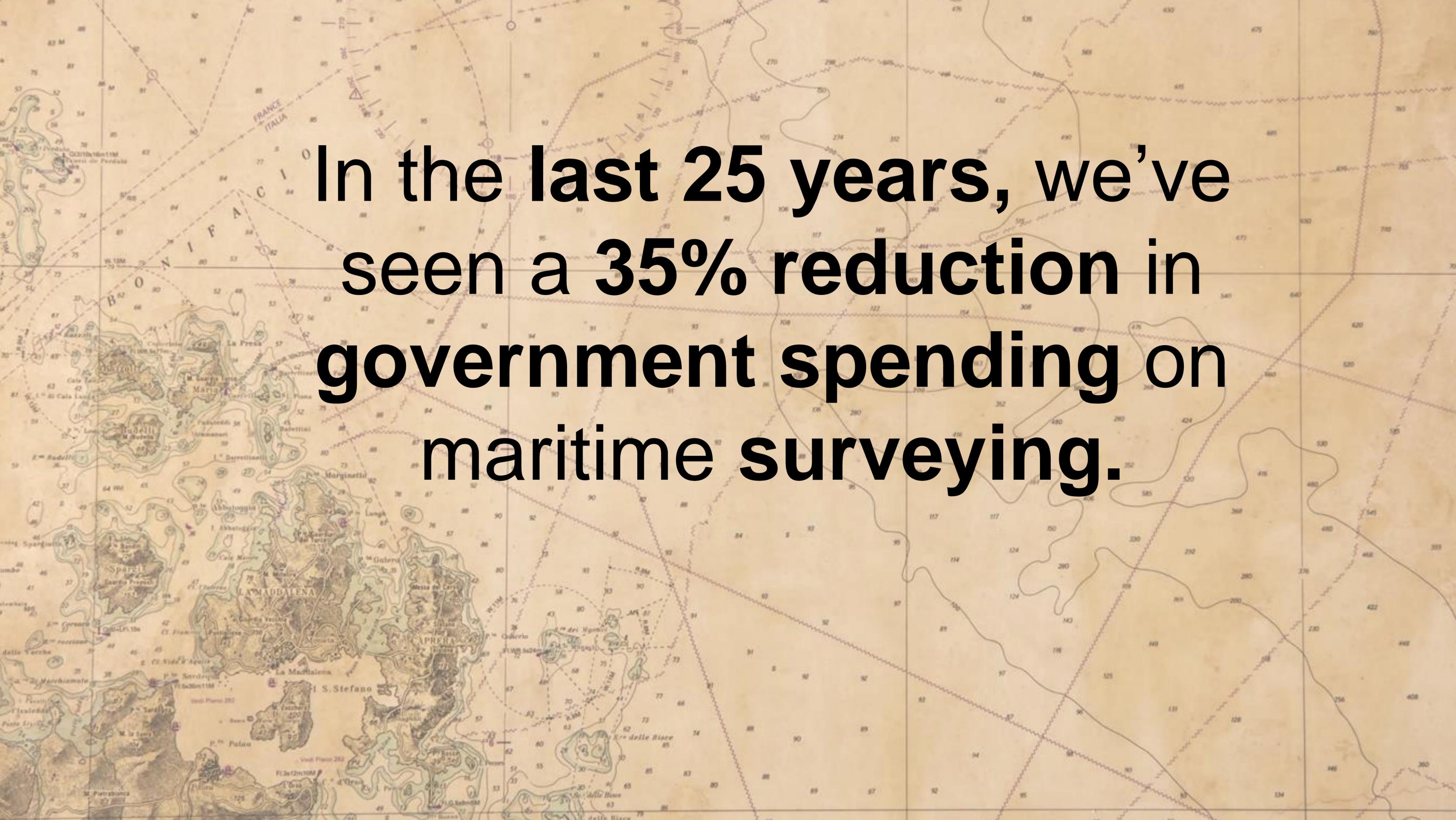
Ernest Shackleton 4 Burlington st.

MEN—Neat-appearing young men of pleasing personality and



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.

A stylized map of New Zealand is centered on a grid of latitude and longitude lines. The map is rendered in shades of brown and tan, with a compass rose at the top center. In the bottom left corner, there are two seagulls and a compass rose. In the bottom right corner, there is a three-masted sailing ship. The text "Captain Cook" is written in a large, bold, black font, and "leadline soundings!" is written in a slightly smaller, bold, black font below it, both centered over the map.

Captain Cook
leadline soundings!



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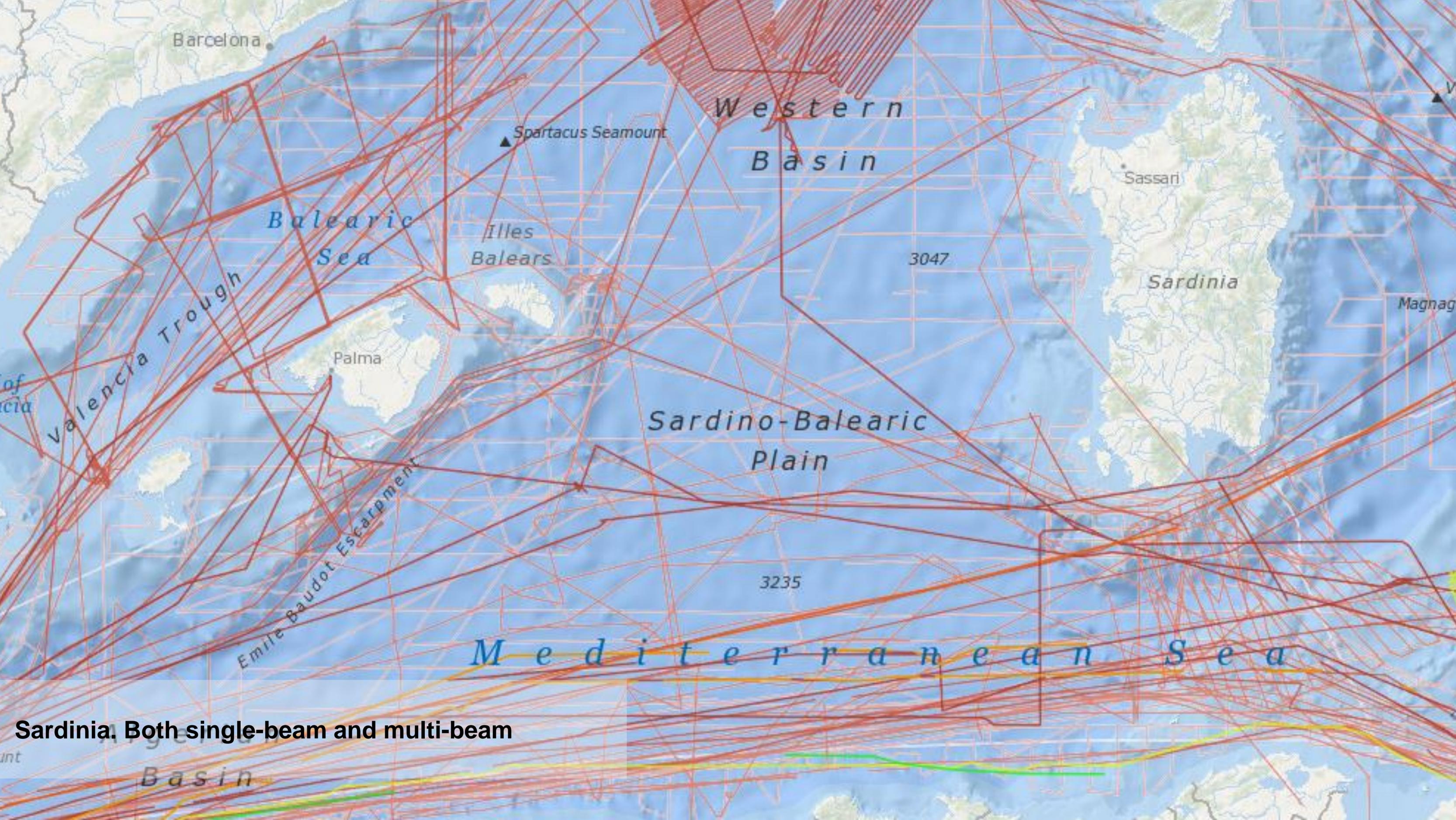
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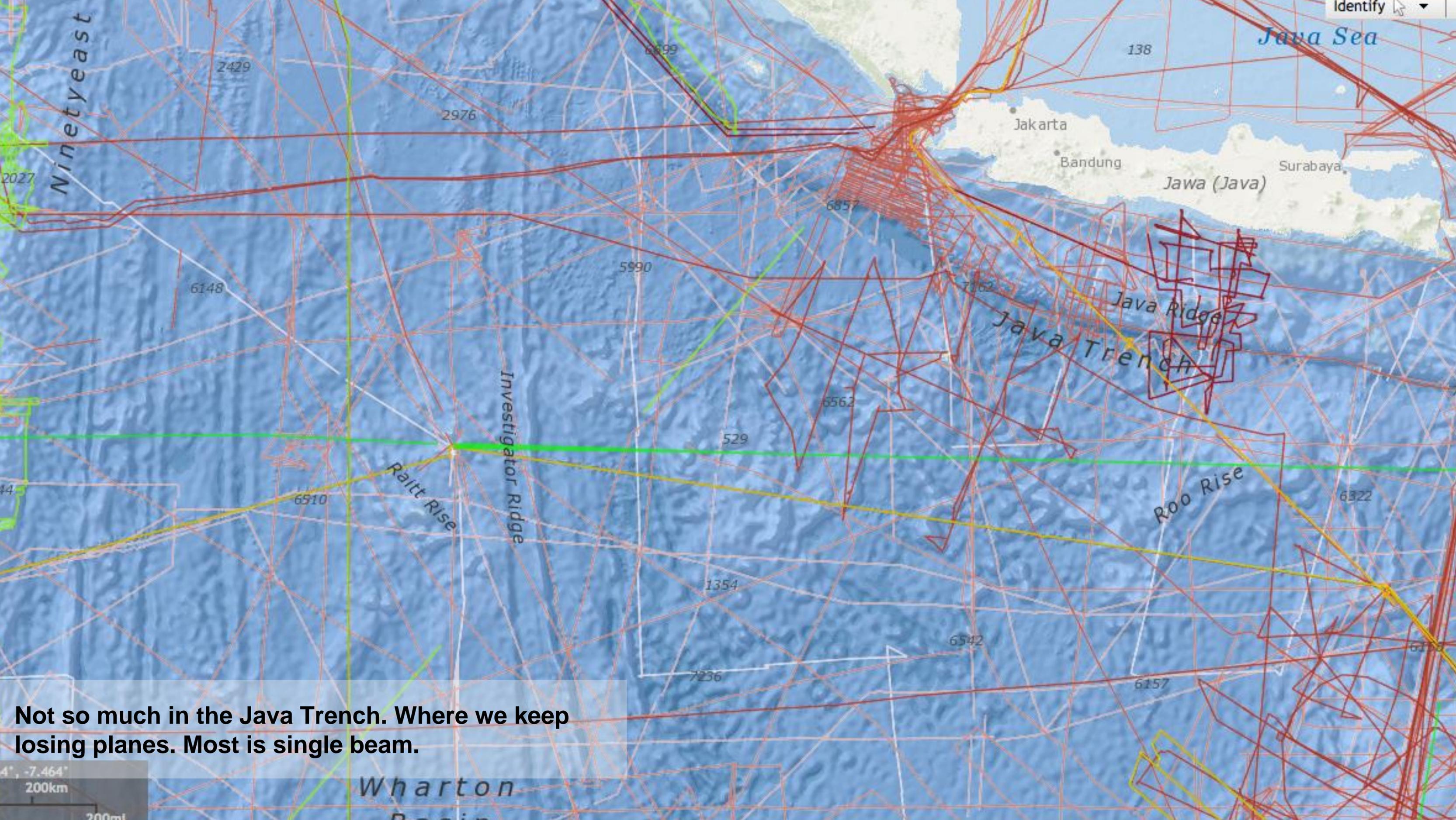
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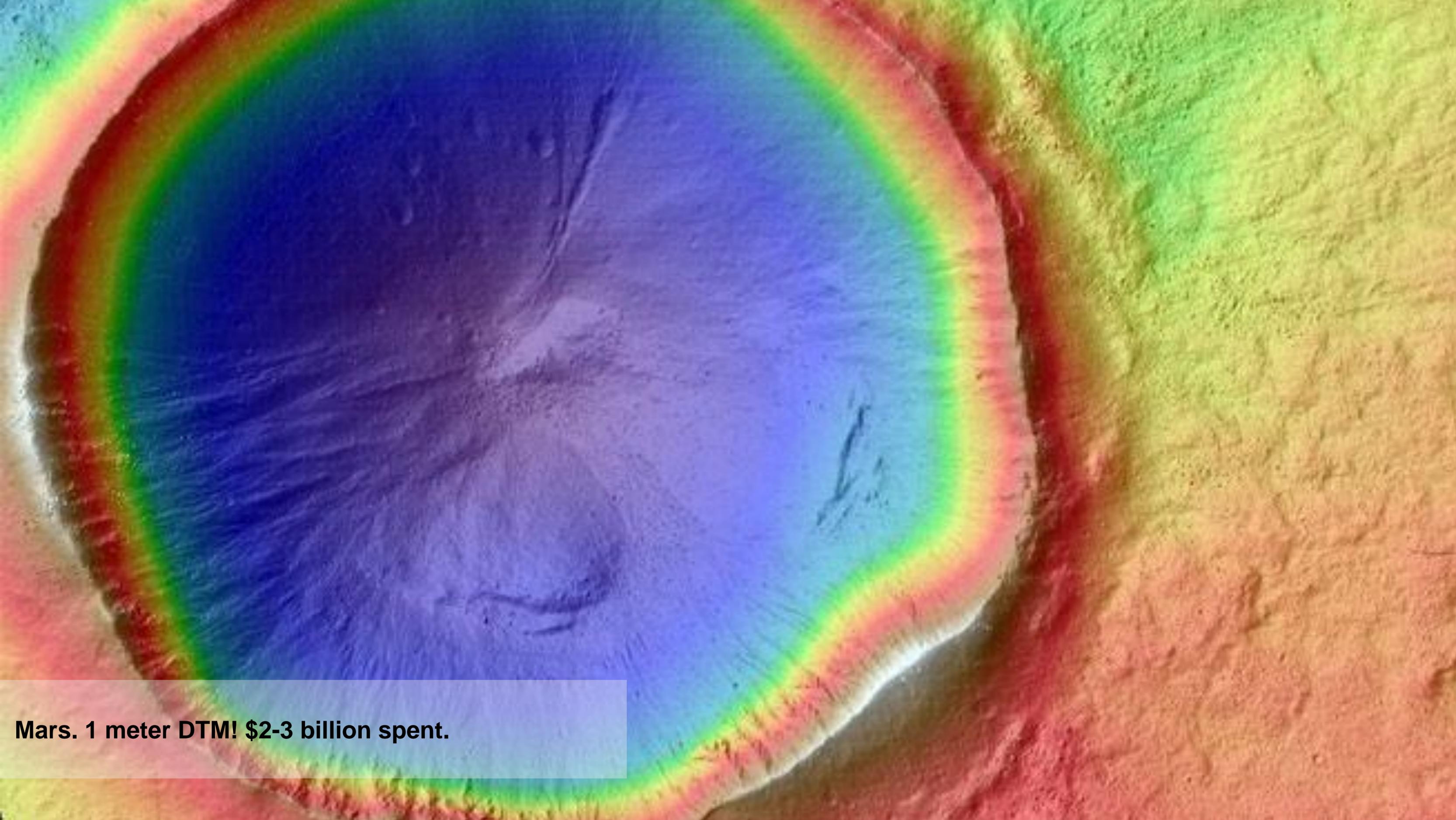
Sardinia. Both single-beam and multi-beam



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

4°, -7.464°
200km
200mi

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



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

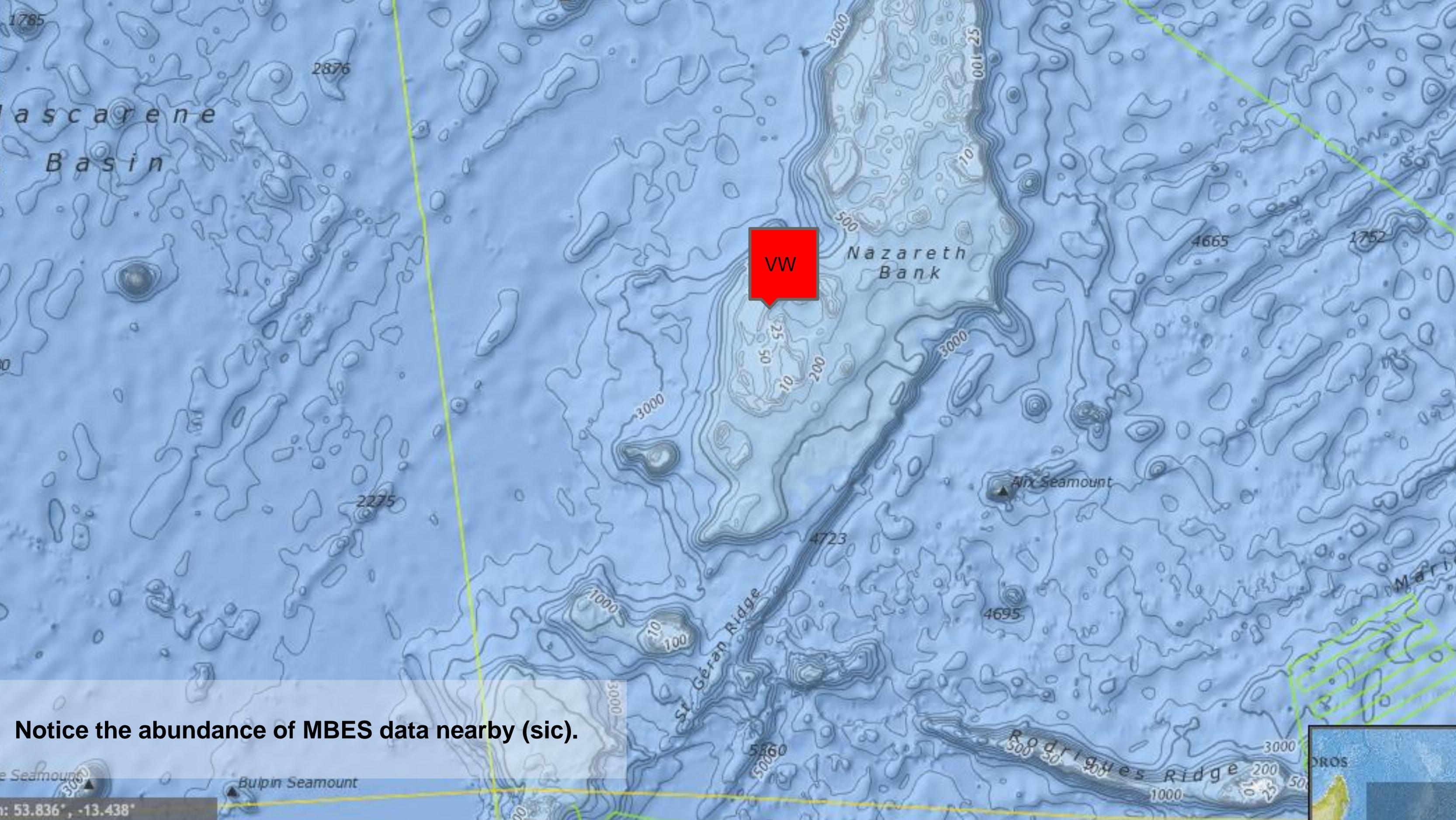
Crowdsourcing represents the act of a company or institution taking a function once performed by employees and outsourcing it to an undefined (and generally large) network of people in the form of an open call.

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).



VW

Notice the abundance of MBES data nearby (sic).

53.836°, -13.438°

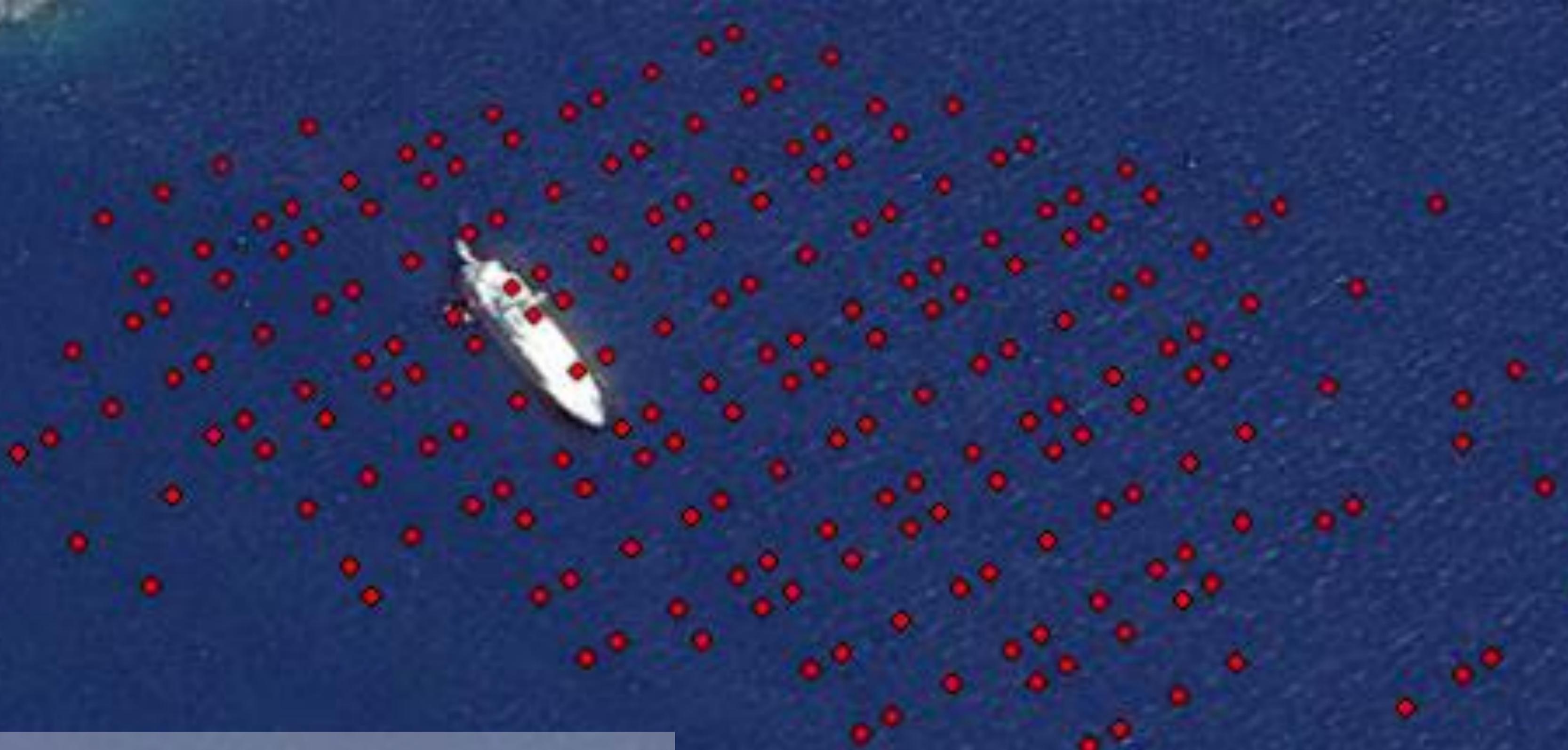
**So what can Crowd
Sourcing deliver?**



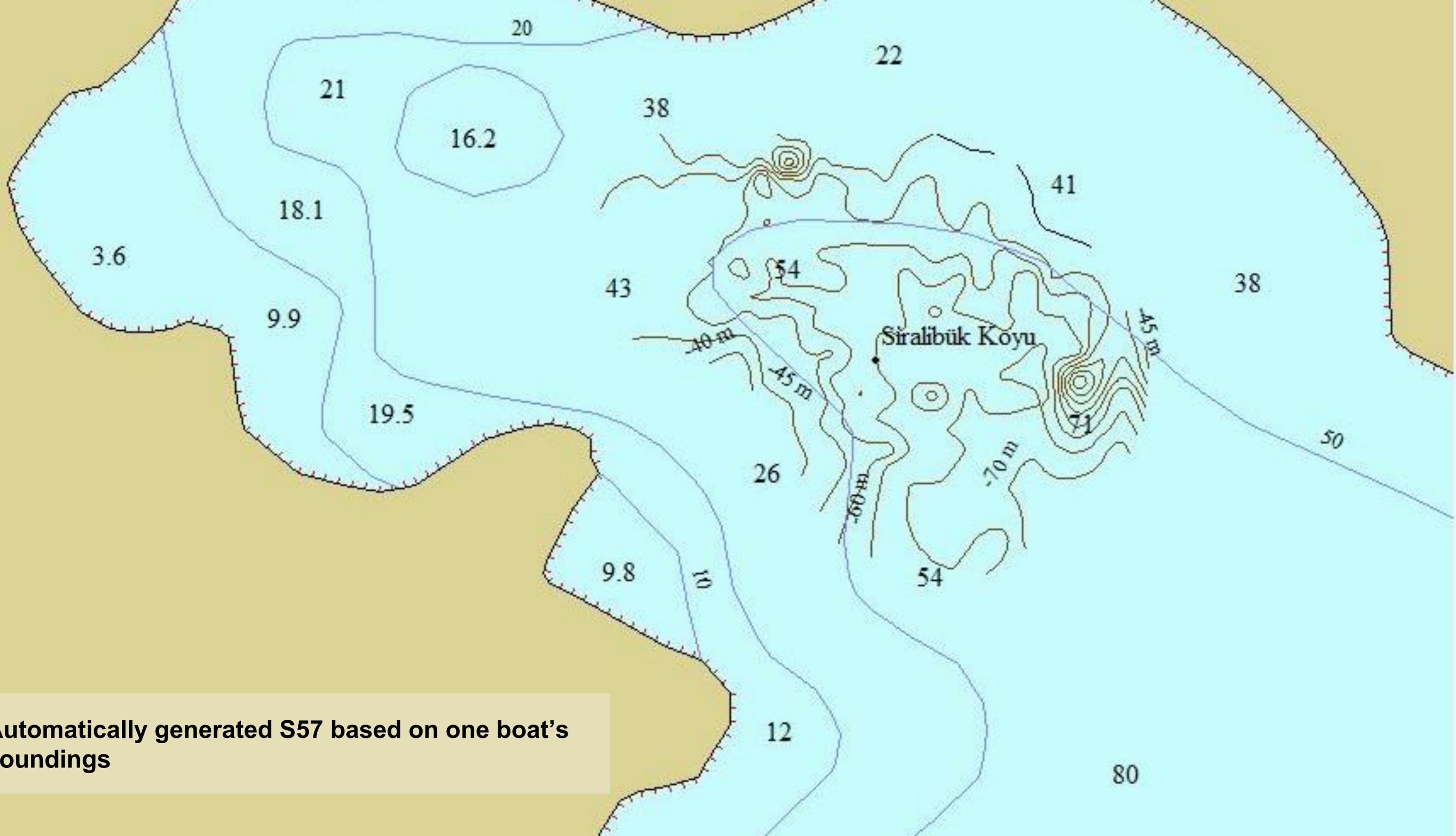
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SSDDBT,	25.9, f,	7.88, M,	4.3, F
SSDDBT,	26.1, f,	7.96, M,	4.4, F
SSDDBT,	25.9, f,	7.88, M,	4.3, F
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SSDDBT,	26.1, f,	7.96, M,	4.4, F
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SSDDBT,	26.2, f,	8.00, M,	4.4, F
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SSDDBT,	26.0, f,	7.92, M,	4.3, F
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SSDDBT,	25.6, f,	7.81, M,	4.3, F
SSDDBT,	25.6, f,	7.81, M,	4.3, F
SSDDBT,	25.8, f,	7.85, M,	4.3, F
SSDDBT,	26.0, f,	7.92, M,	4.3, F
SSDDBT,	26.0, f,	7.92, M,	4.3, F
SSDDBT,	26.1, f,	7.96, M,	4.4, F
SSDDBT,	26.0, f,	7.92, M,	4.3, F
SSDDBT,	26.1, f,	7.96, M,	4.4, F
SSDDBT,	26.0, f,	7.92, M,	4.3, F
SSDDBT,	26.1, f,	7.96, M,	4.4, F
SSDDBT,	26.1, f,	7.96, M,	4.4, F
SSDDBT,	26.2, f,	8.00, M,	4.4, F



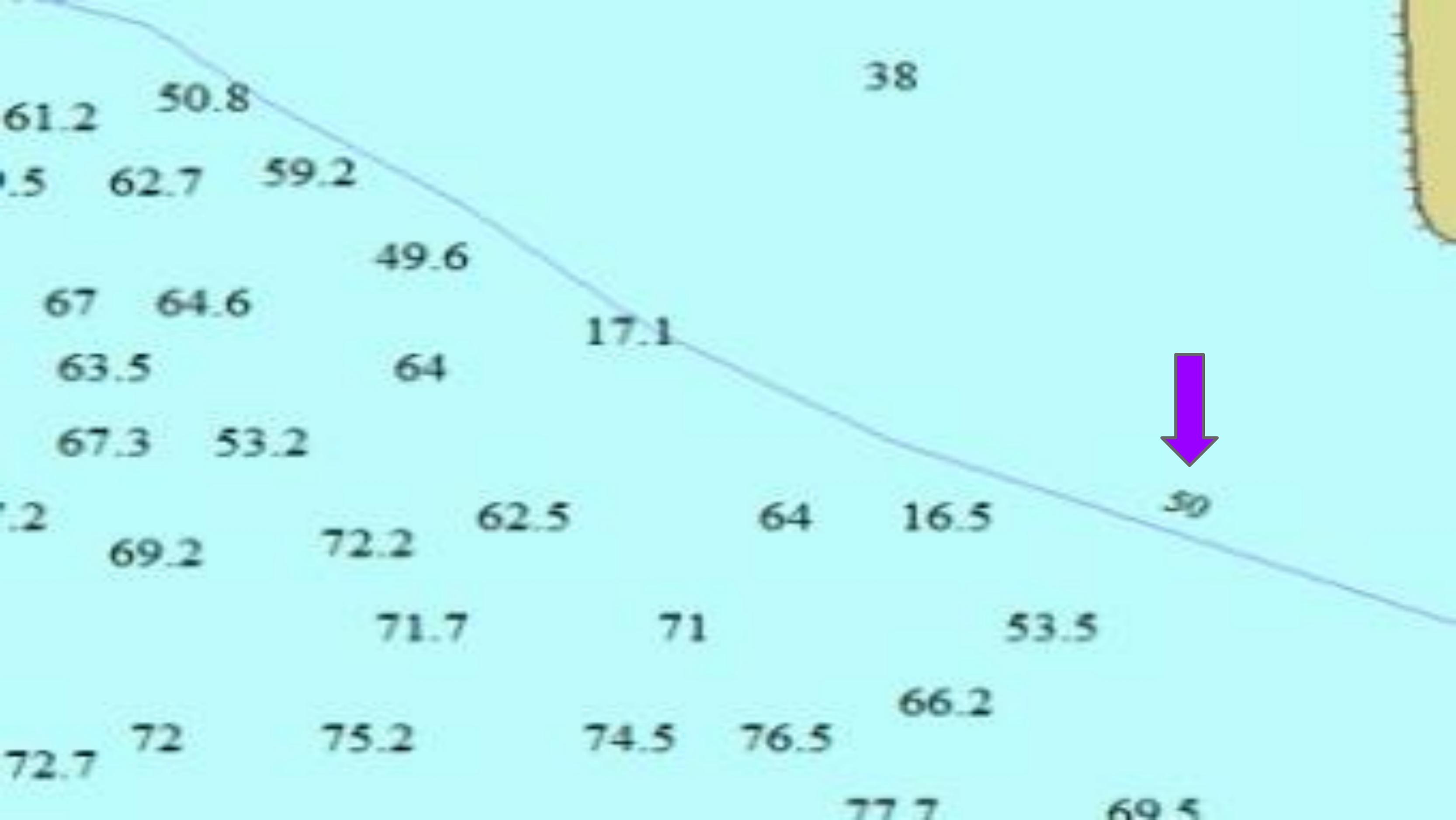
Example of collected data
Tomb Bay, Turkey

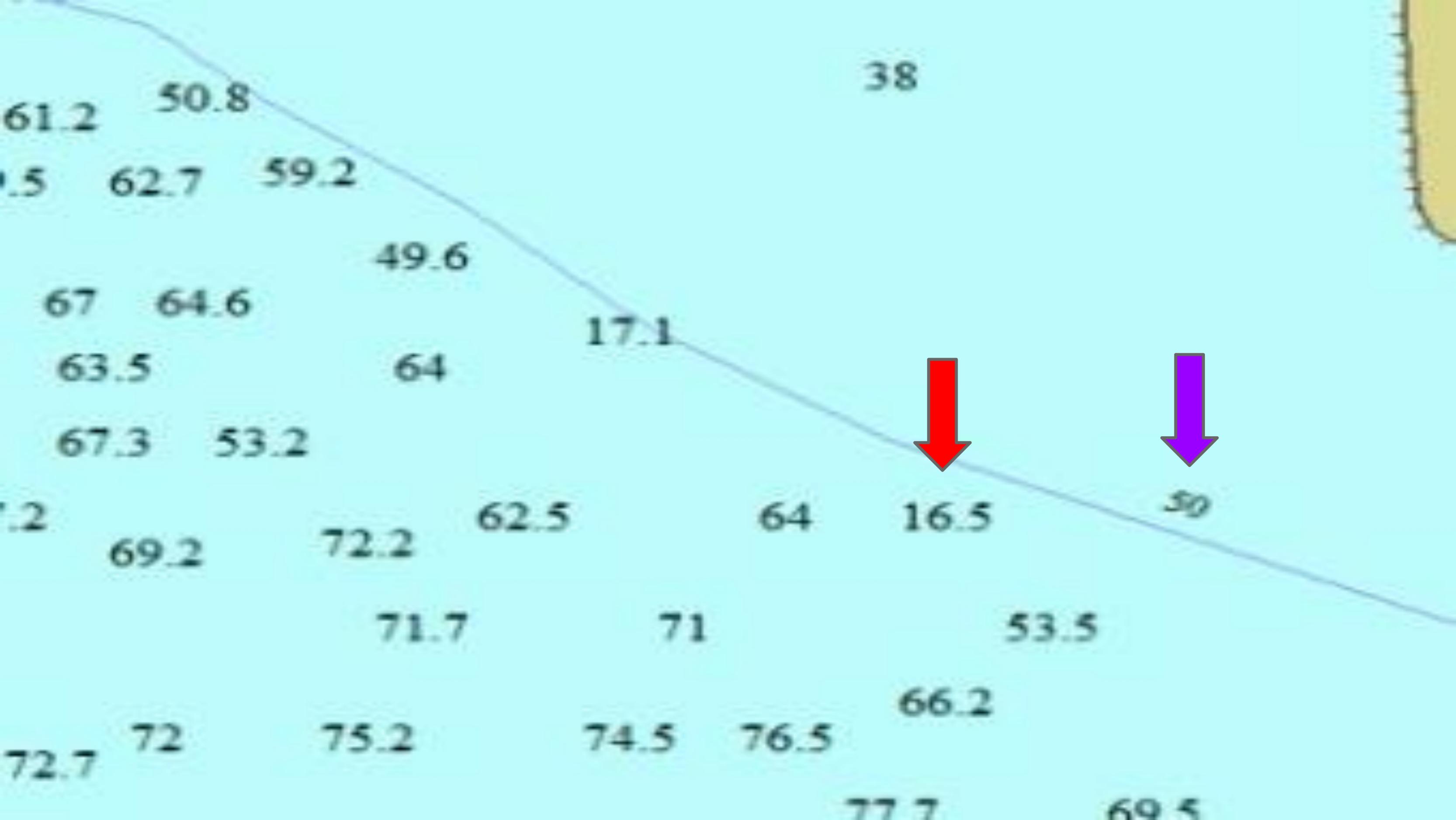


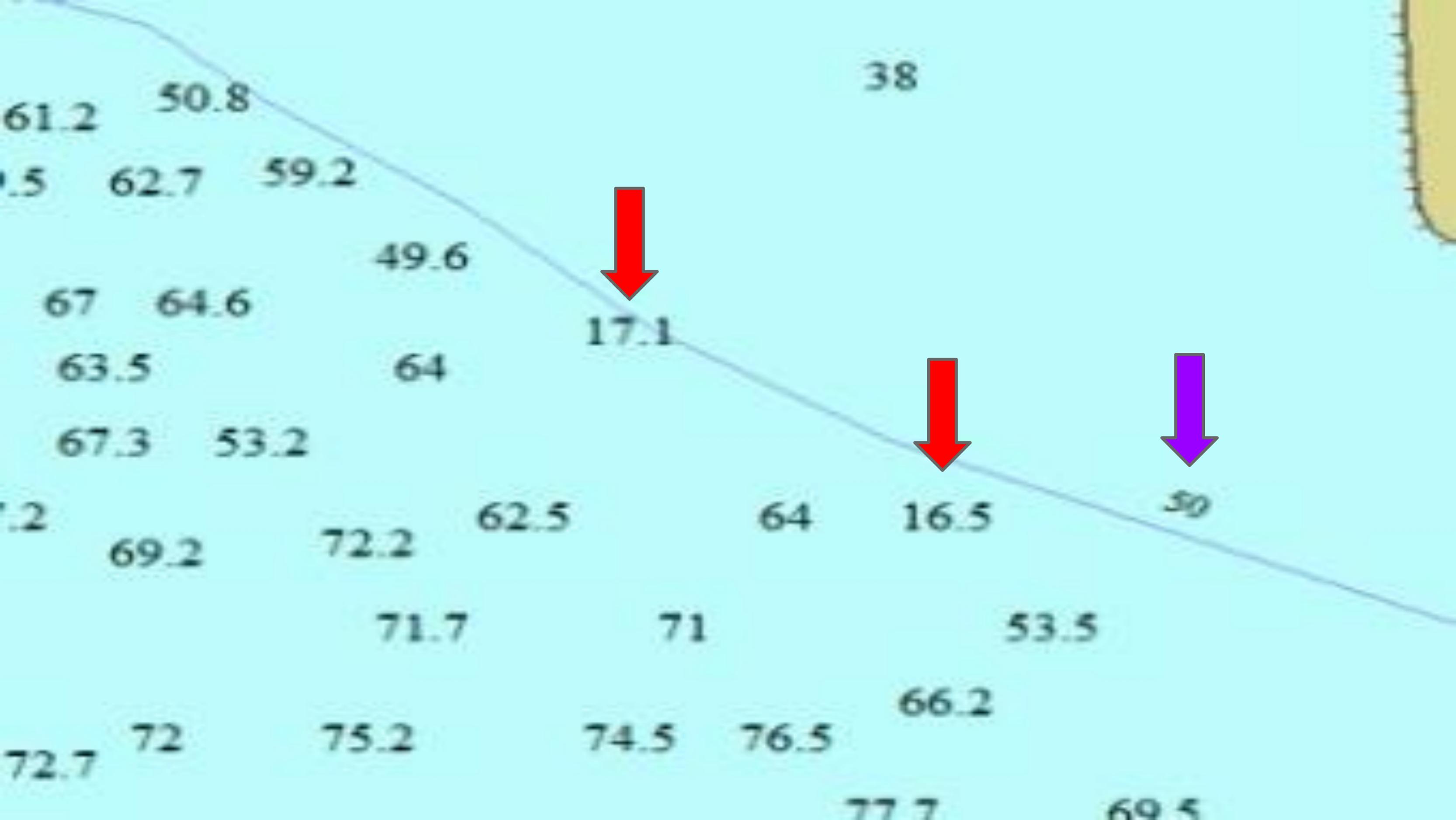
When scaled, and after curation, this is what we can accomplish

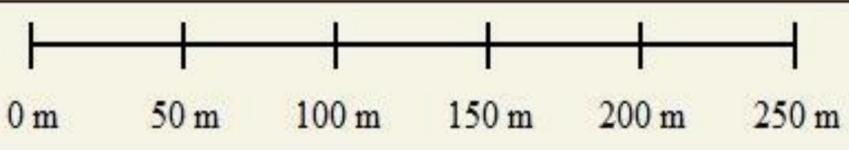
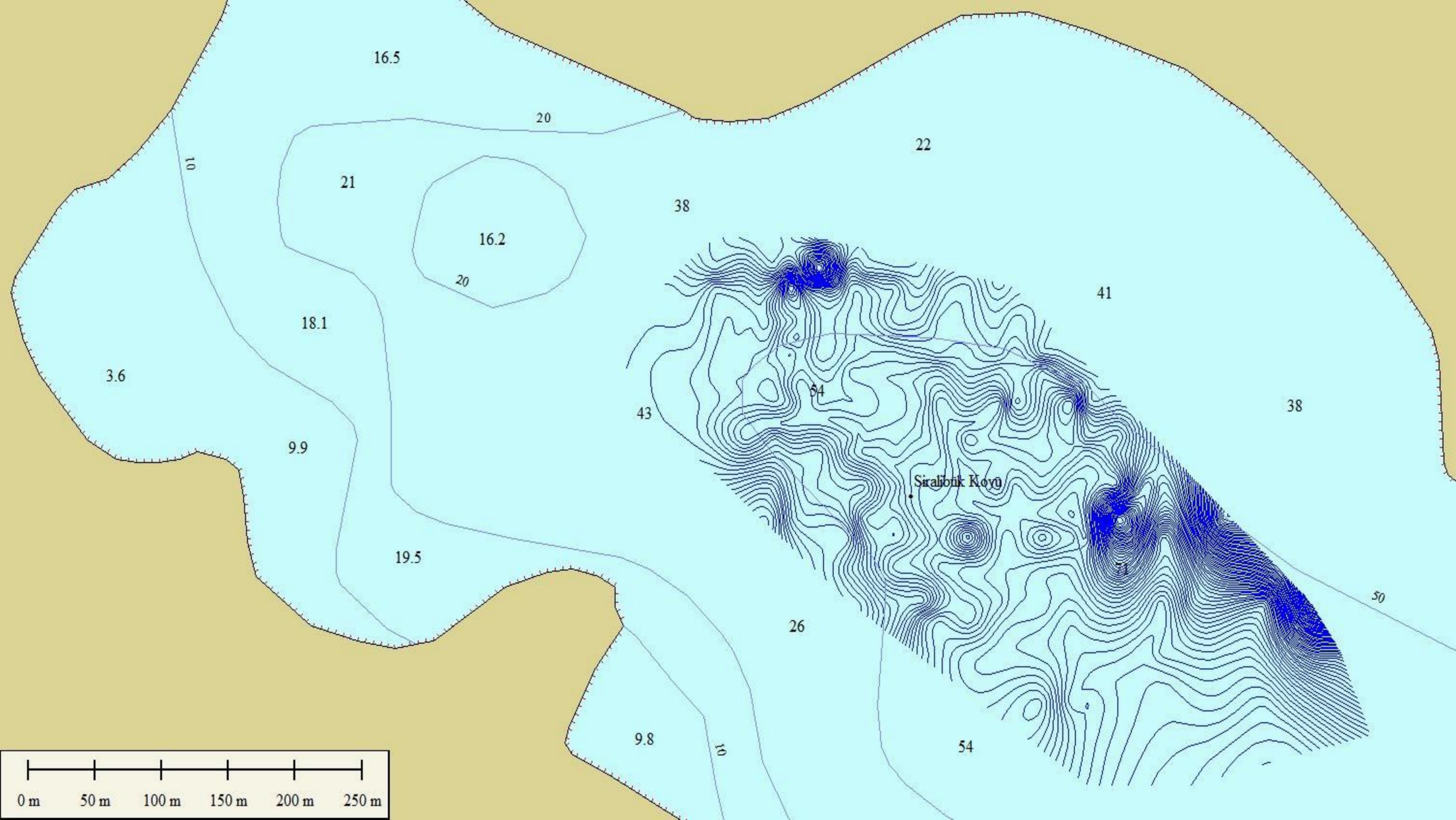


Automatically generated S57 based on one boat's soundings









6 Yachts

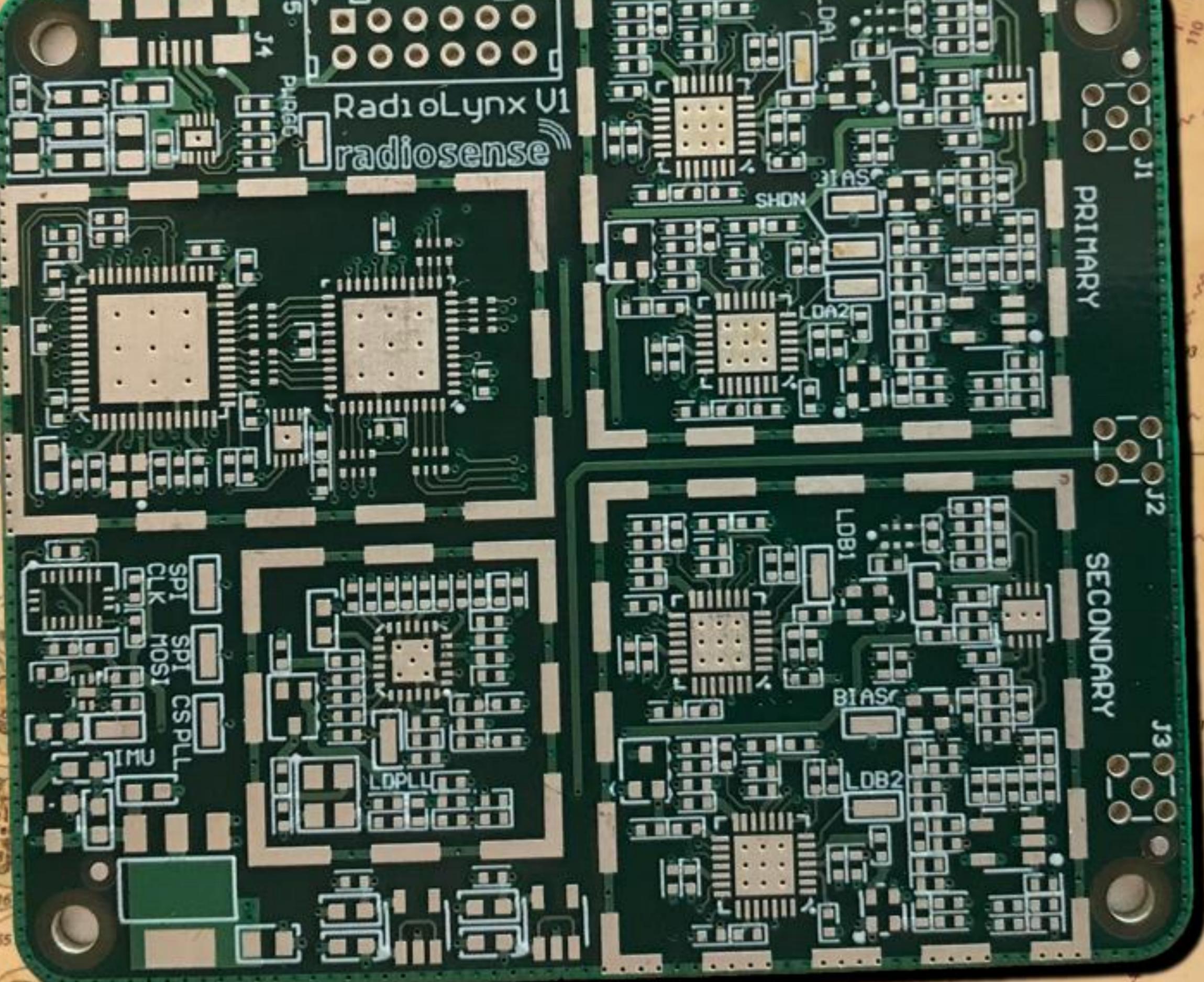
34 million soundings

26000 nautical miles traveled

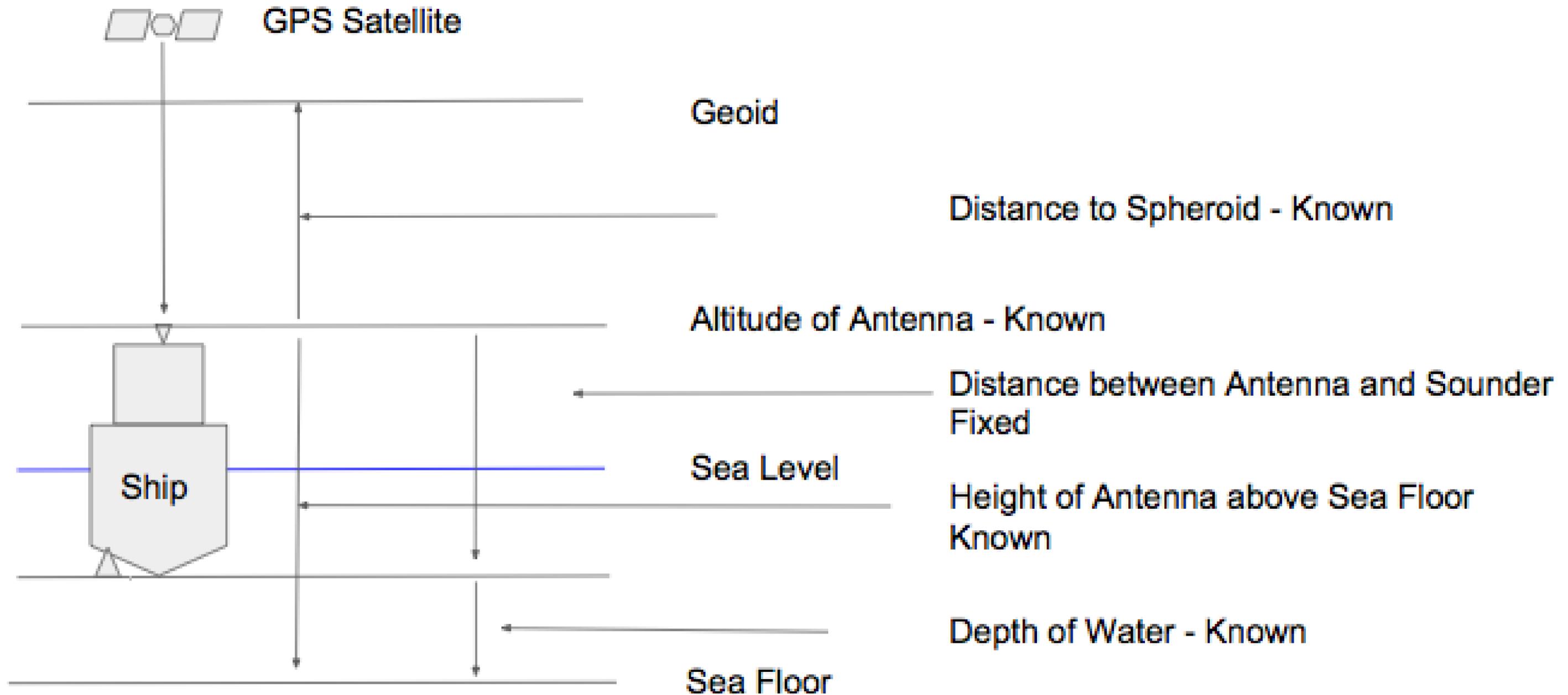
The Next Step

Precise
Point
Positioning

RadioLynx V1
radiosense



Precise Point Positioning



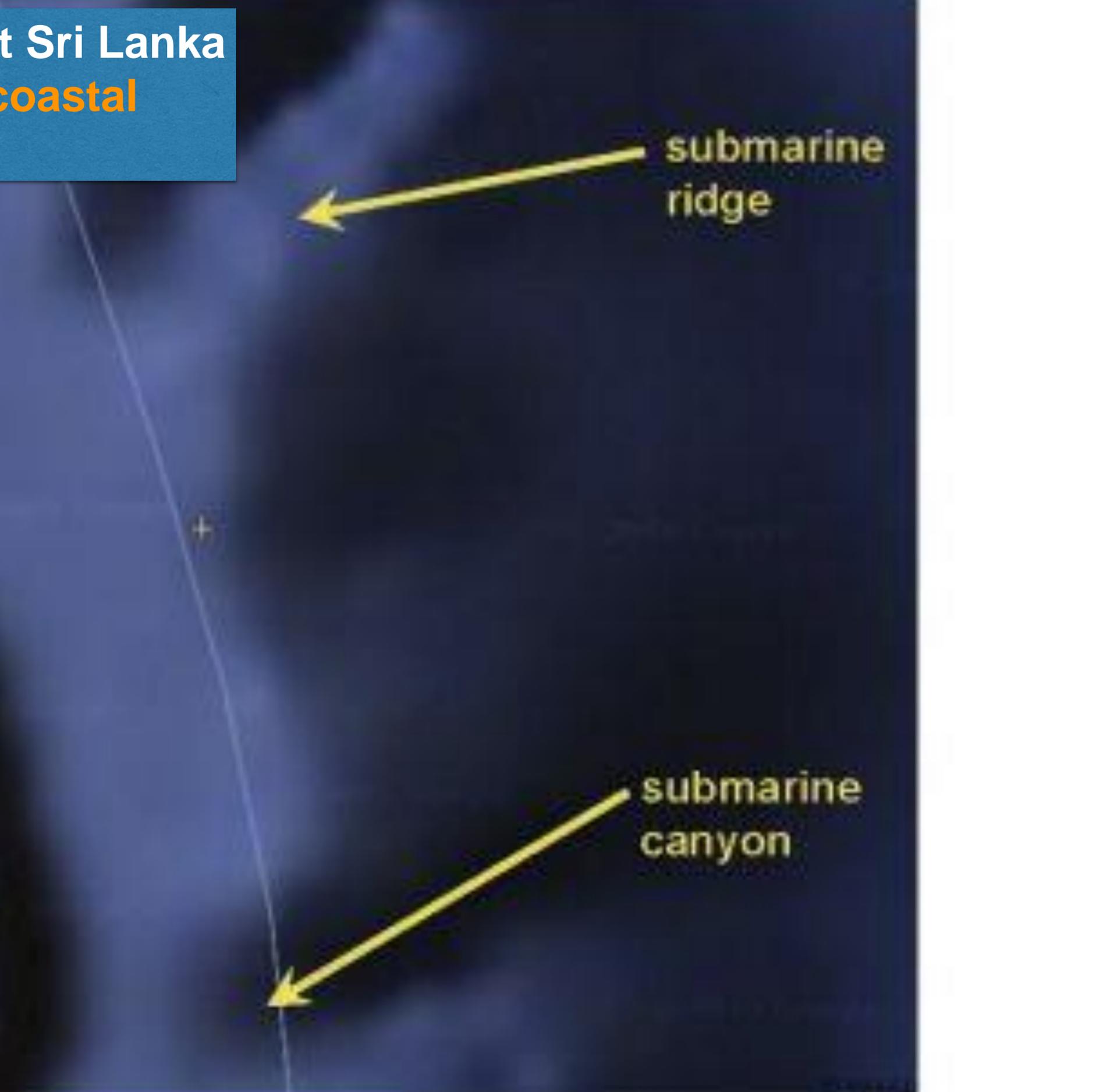
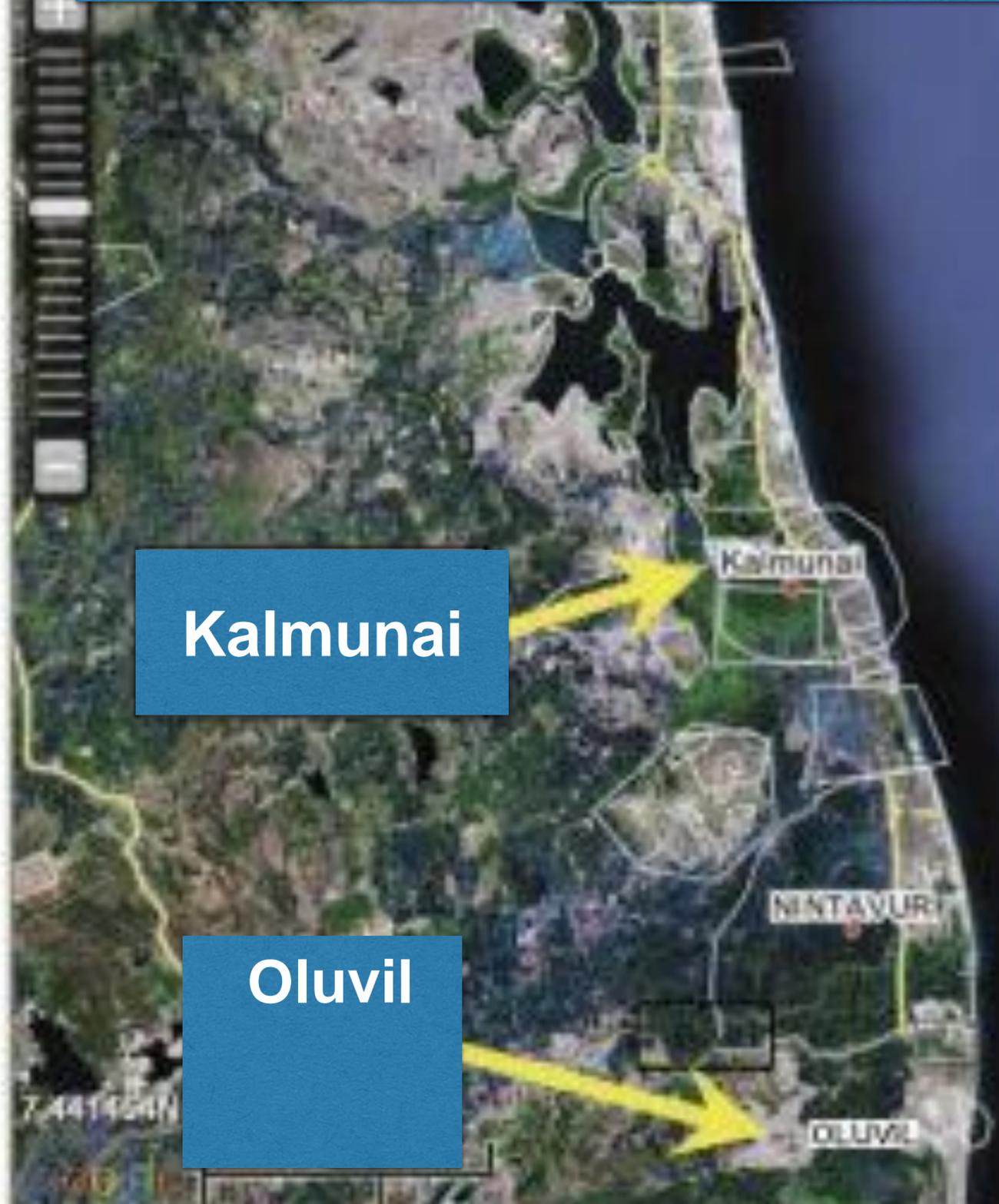
Get one of these!



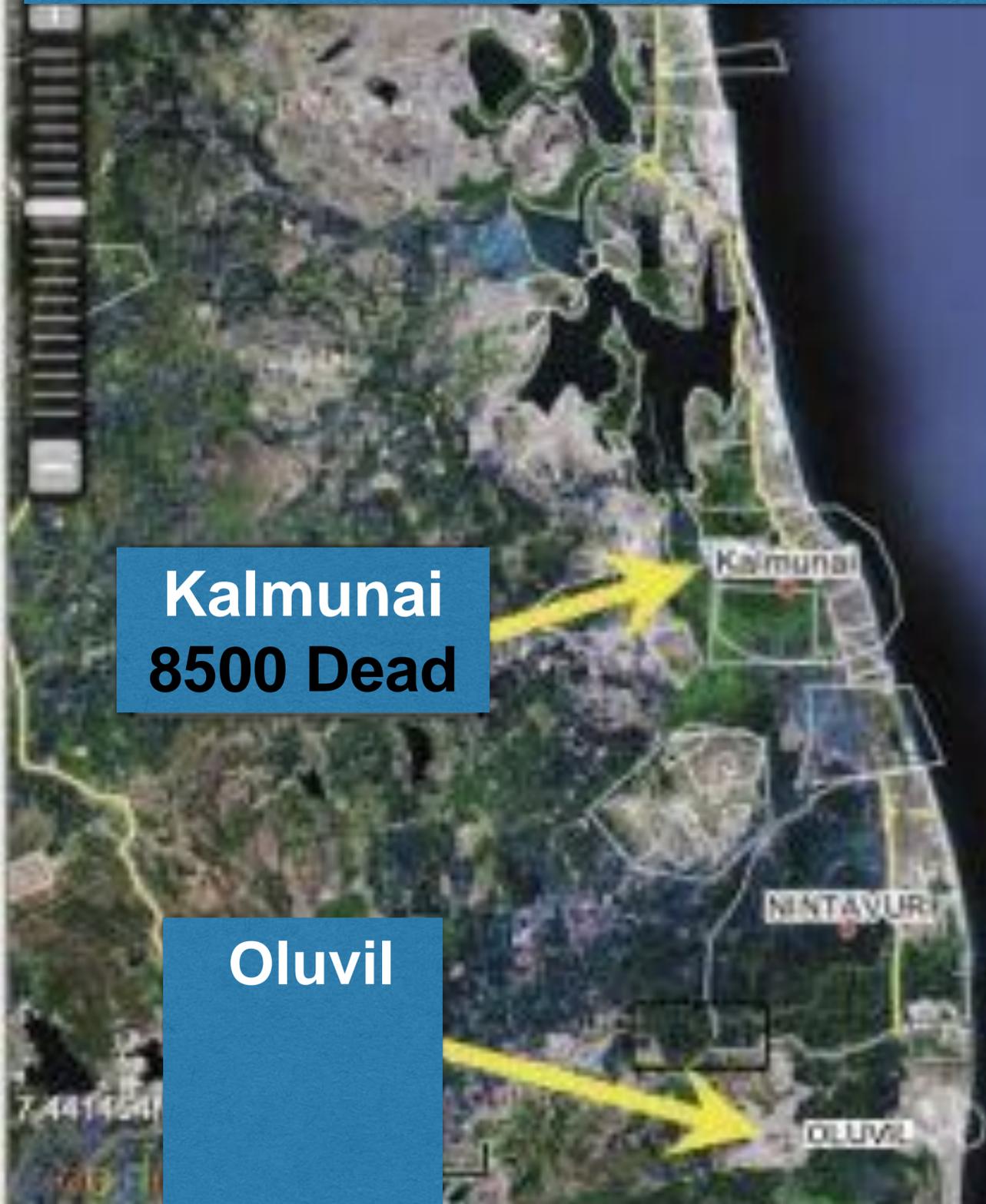
Crowd Sourced Survey



2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography

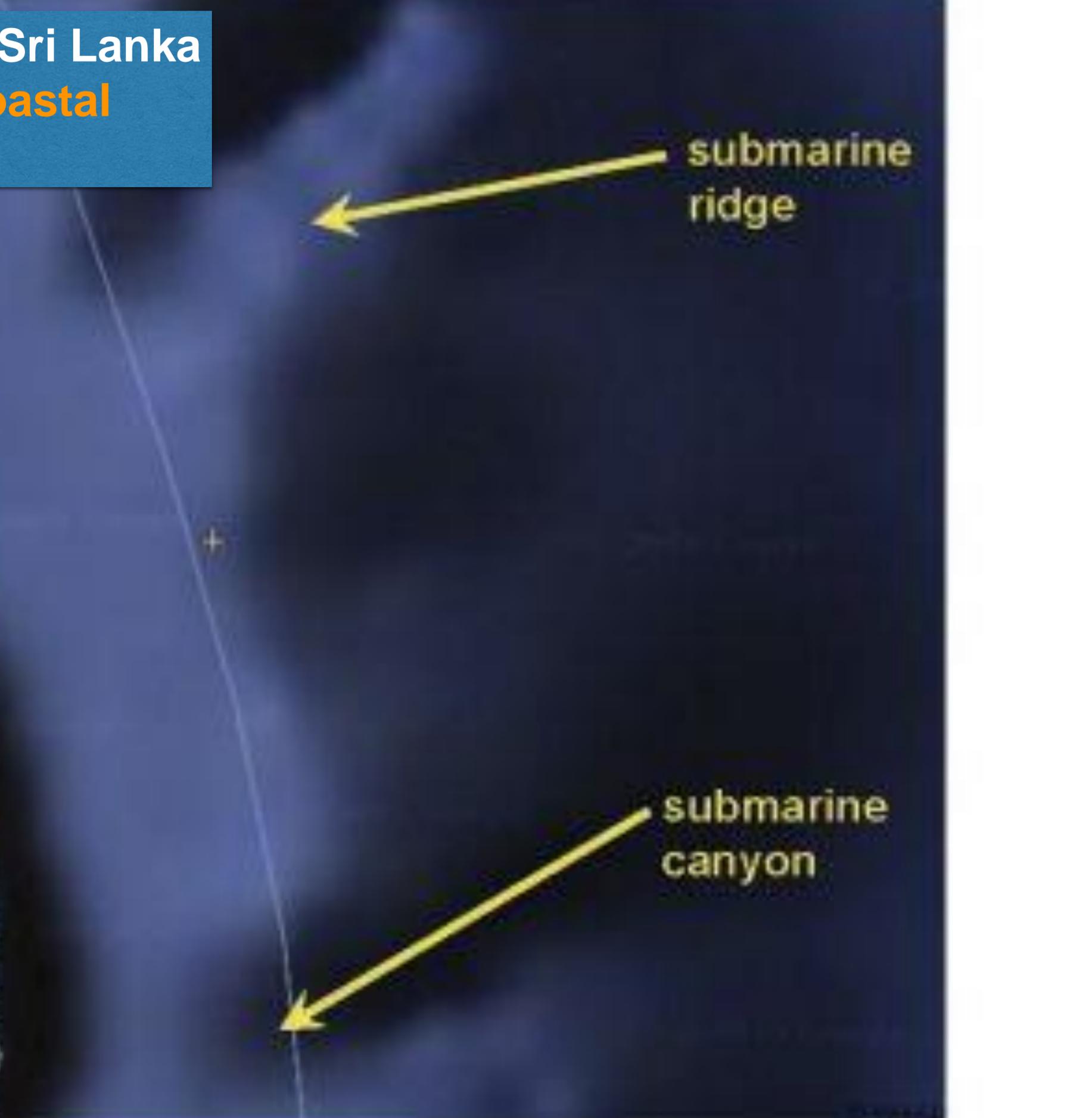


2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography



Kalmunai
8500 Dead

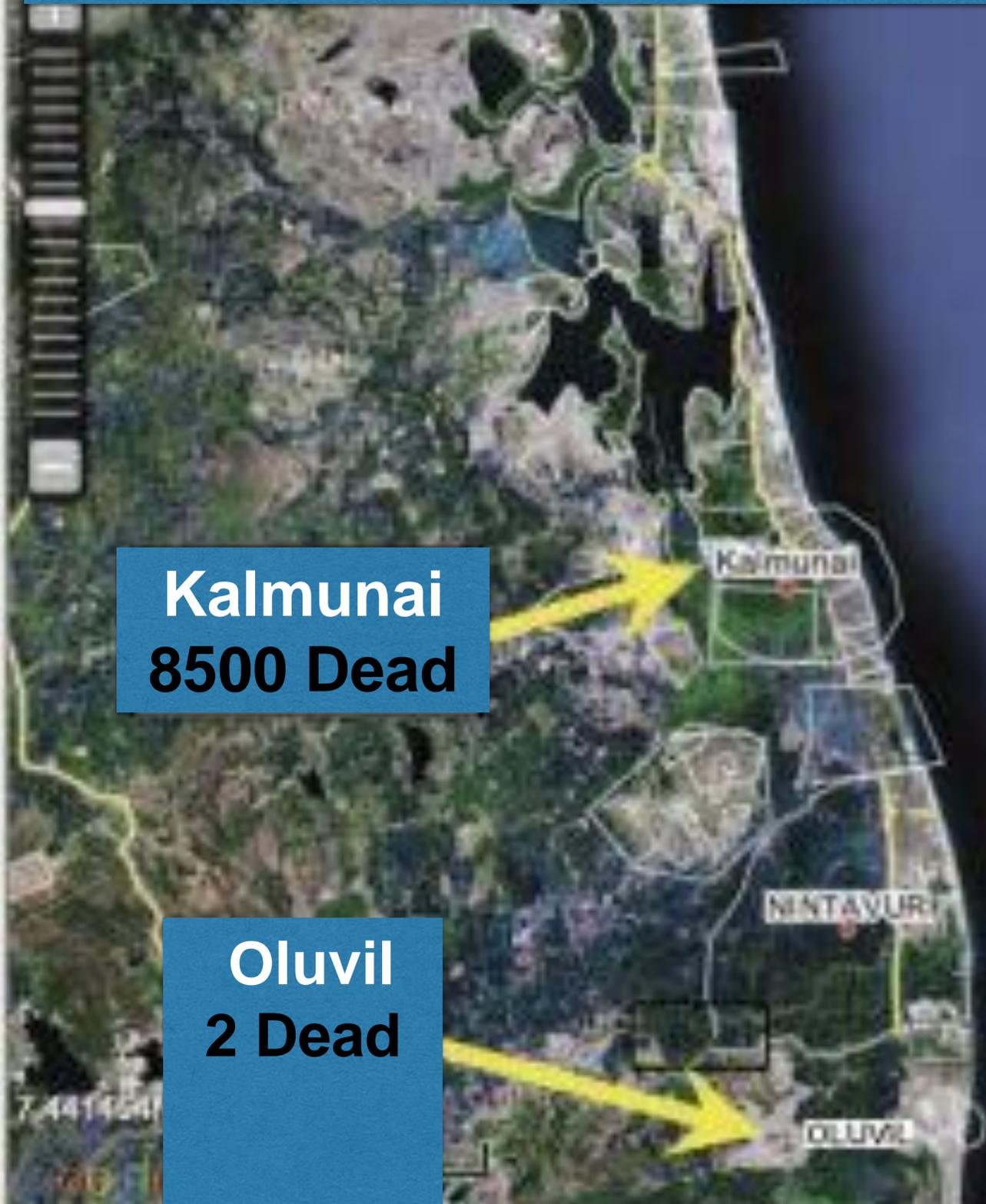
Oluvil



submarine
ridge

submarine
canyon

2004 Tsunami striking East coast Sri Lanka
Bathymetric effects of near coastal sea bed topography



Kalmunai
8500 Dead

Oluvil
2 Dead

submarine ridge

submarine canyon

Navigationnal Note

or

Illegal Survey?

Crowd Sourced Bathymetry



**Environmental
Ocean Resource Management
Blue Economy
Moral Imperative**

