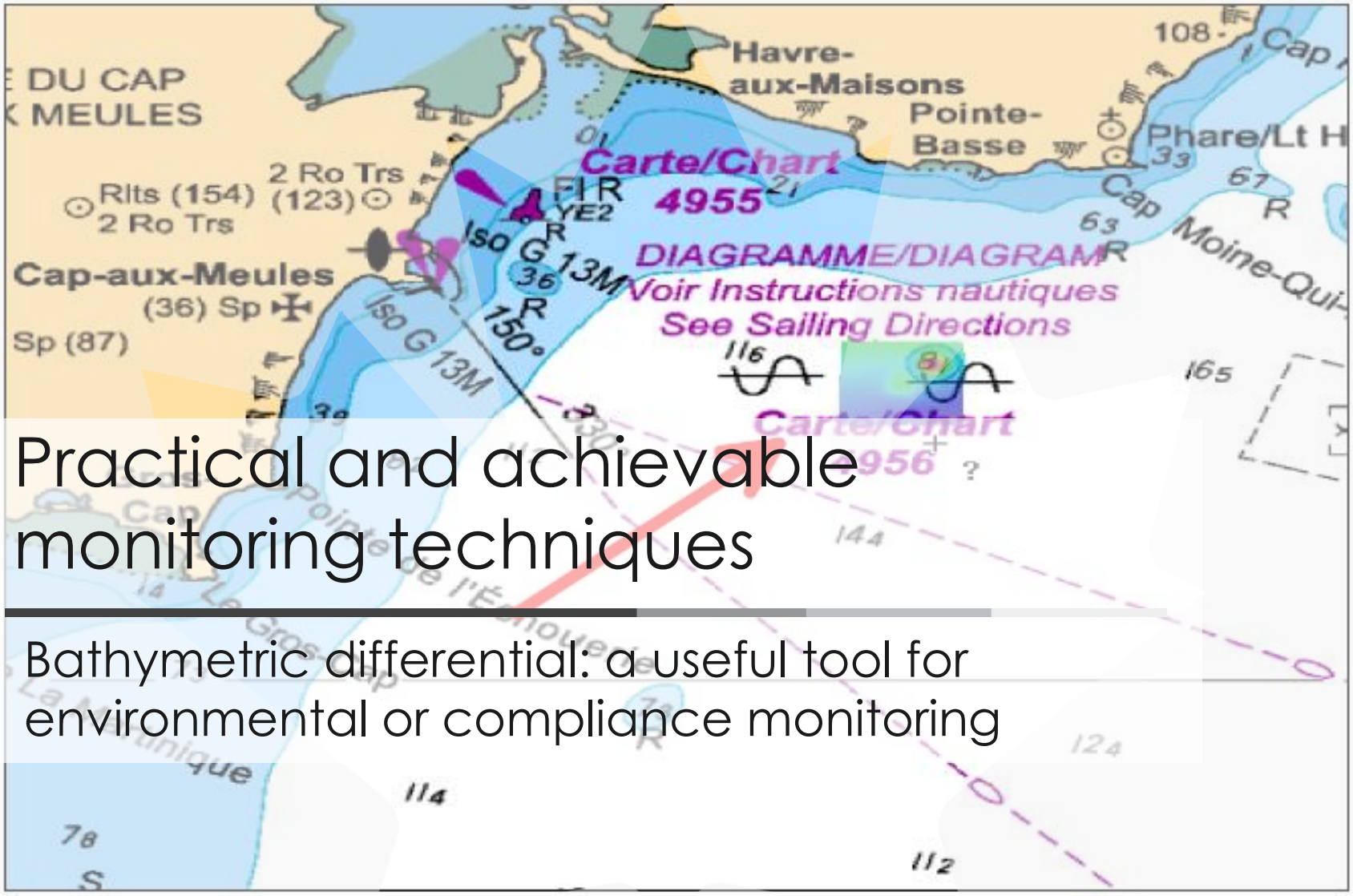
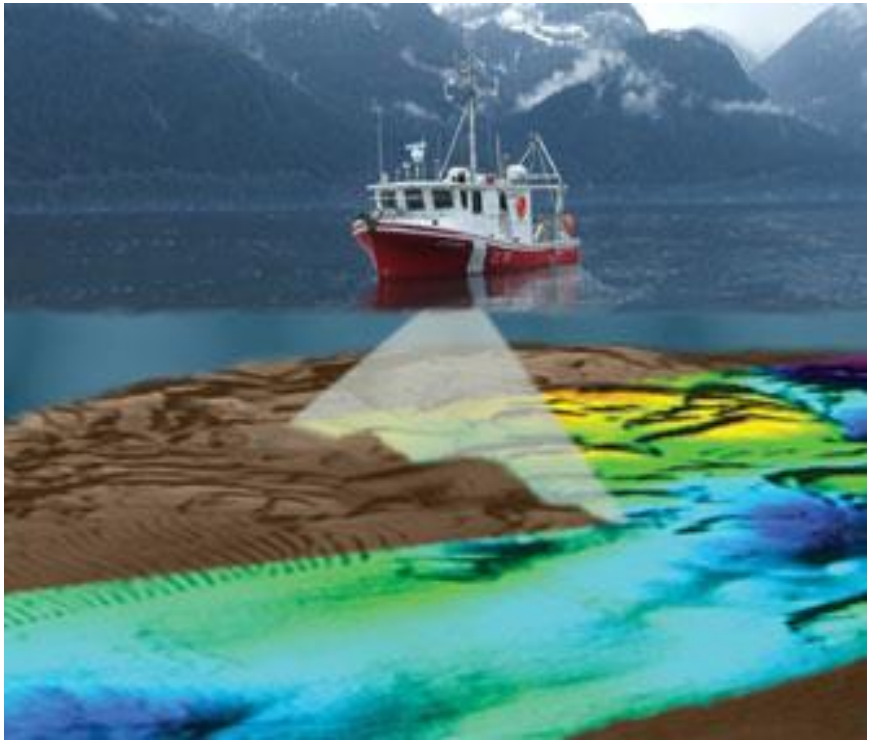


Practical and achievable monitoring techniques

Bathymetric differential: a useful tool for environmental or compliance monitoring

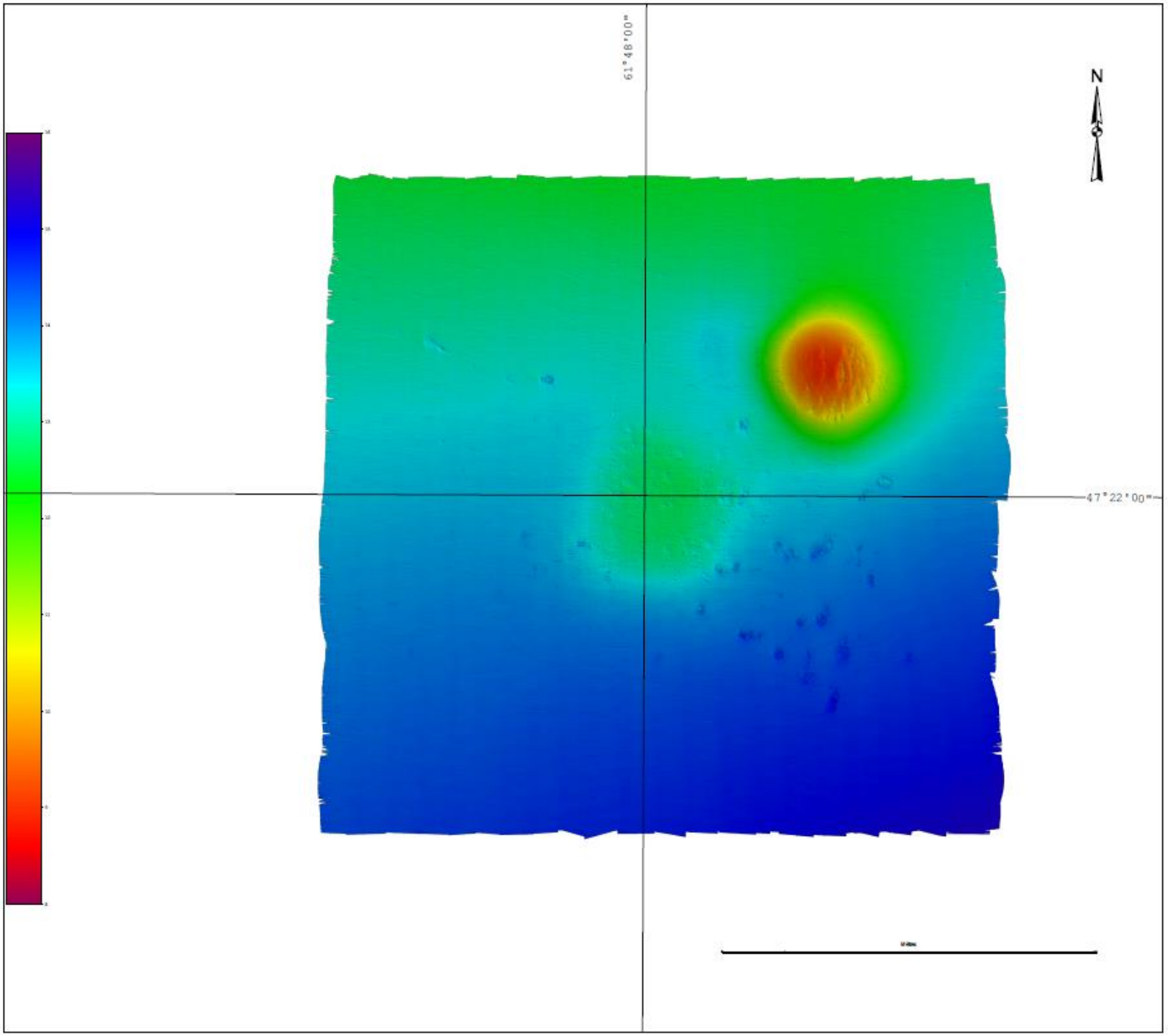
Hydrographic surveys



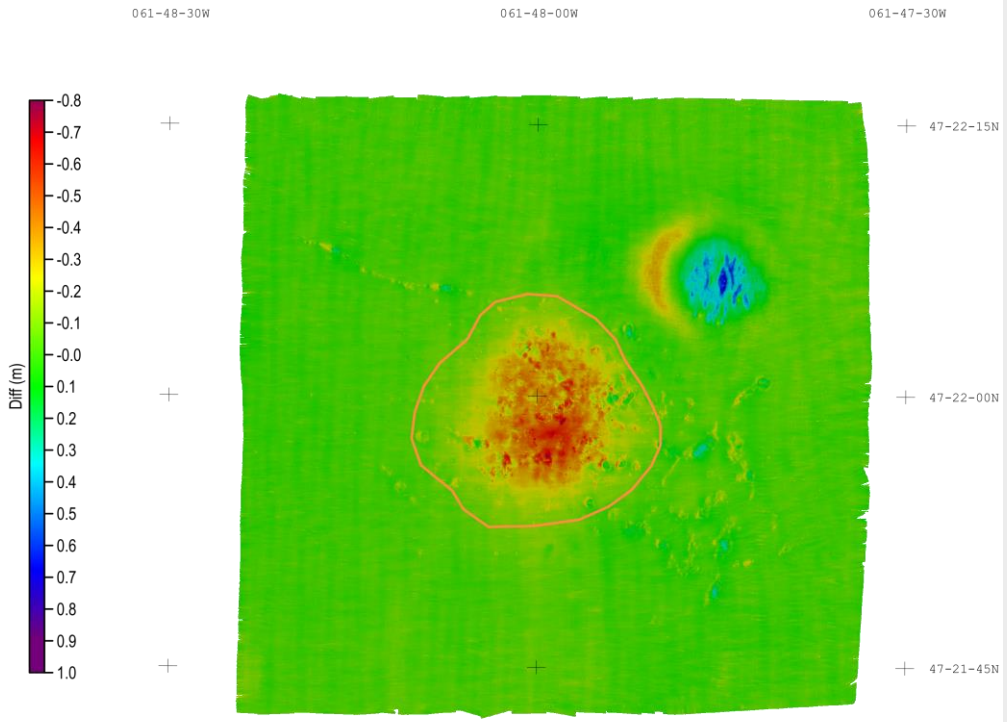
Monitoring of

disposal at sea sites using

hydrographic surveys.


61°48'00"
N
47°22'00"

Bathymetric differential



Bathymetric differential at each disposal at sea site:

- *to estimate volume of sediments*
- *to estimate impacted area*

Results

Surv **7**

PB

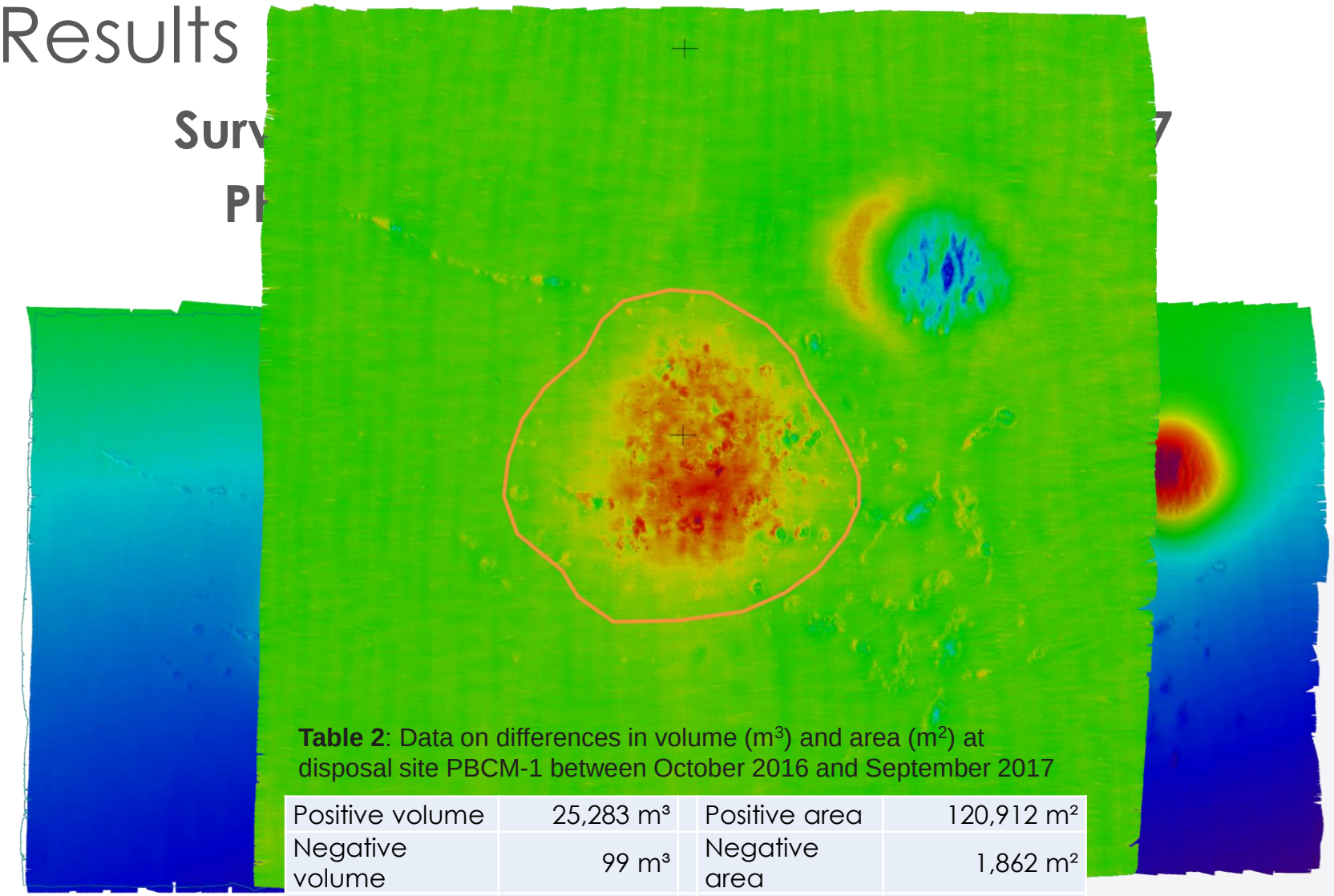


Table 2: Data on differences in volume (m^3) and area (m^2) at disposal site PBCM-1 between October 2016 and September 2017

Positive volume	25,283 m^3	Positive area	120,912 m^2
Negative volume	99 m^3	Negative area	1,862 m^2
Absolute total	25,184 m^3	Total area	122,774 m^2

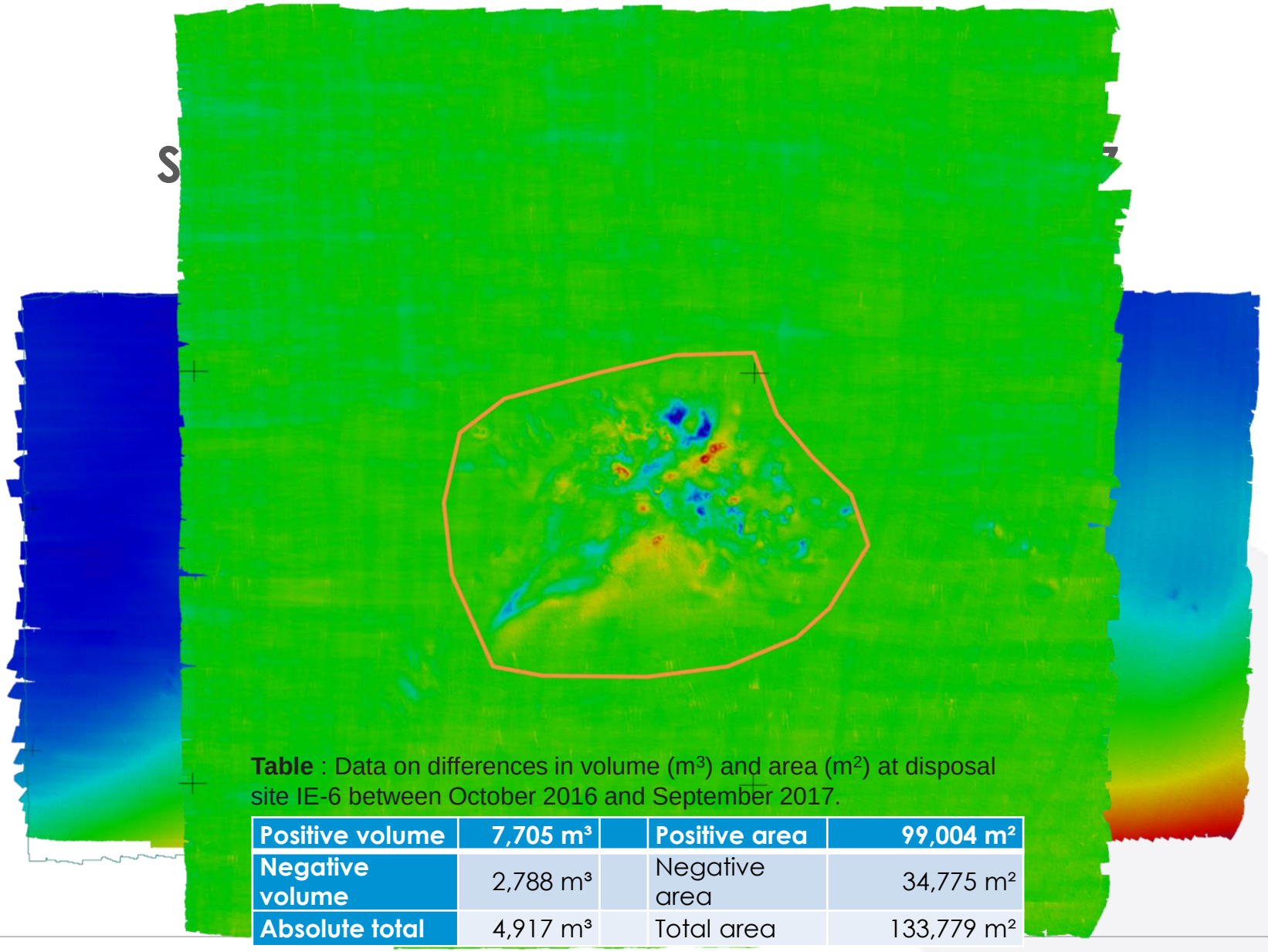
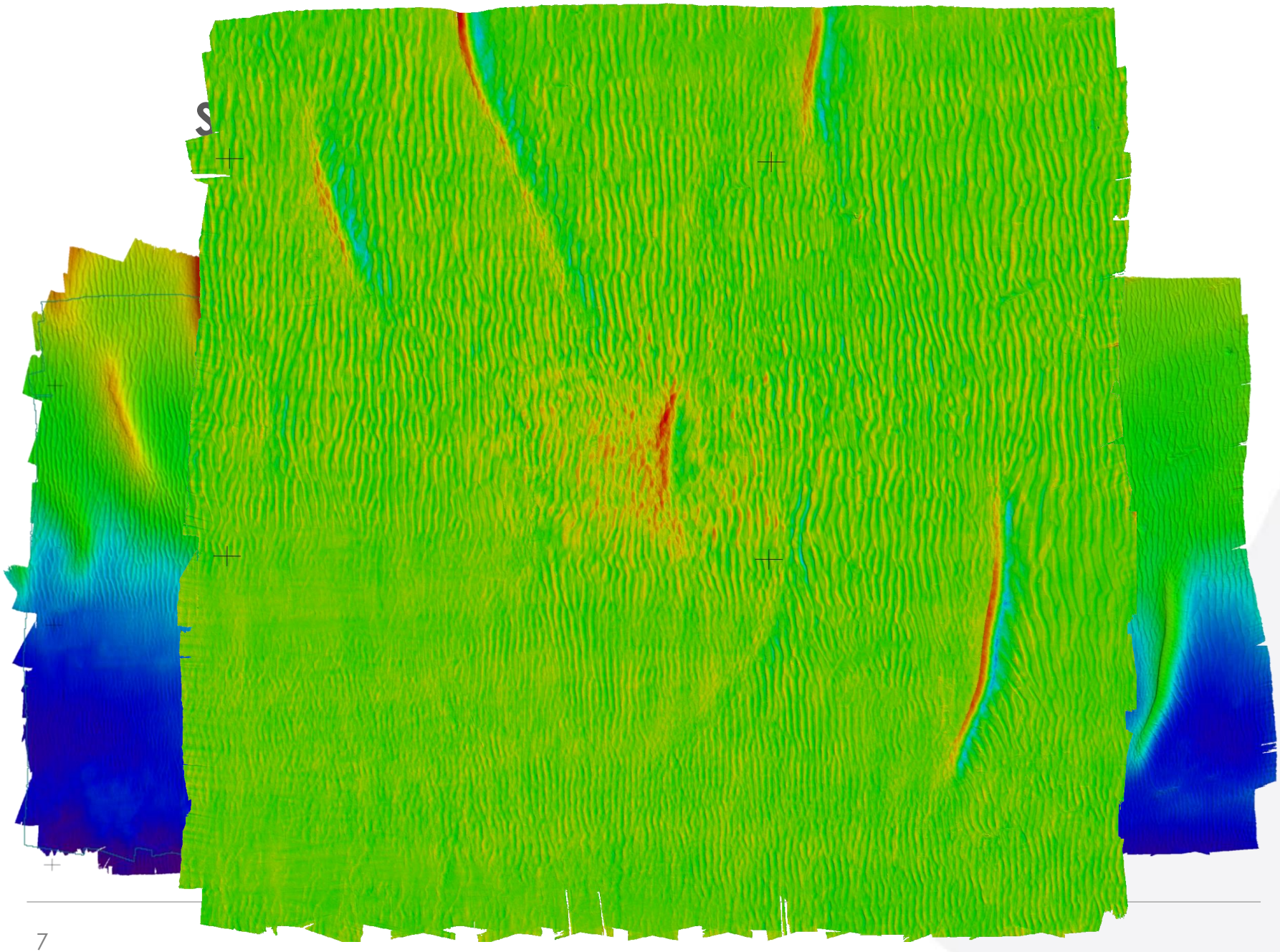
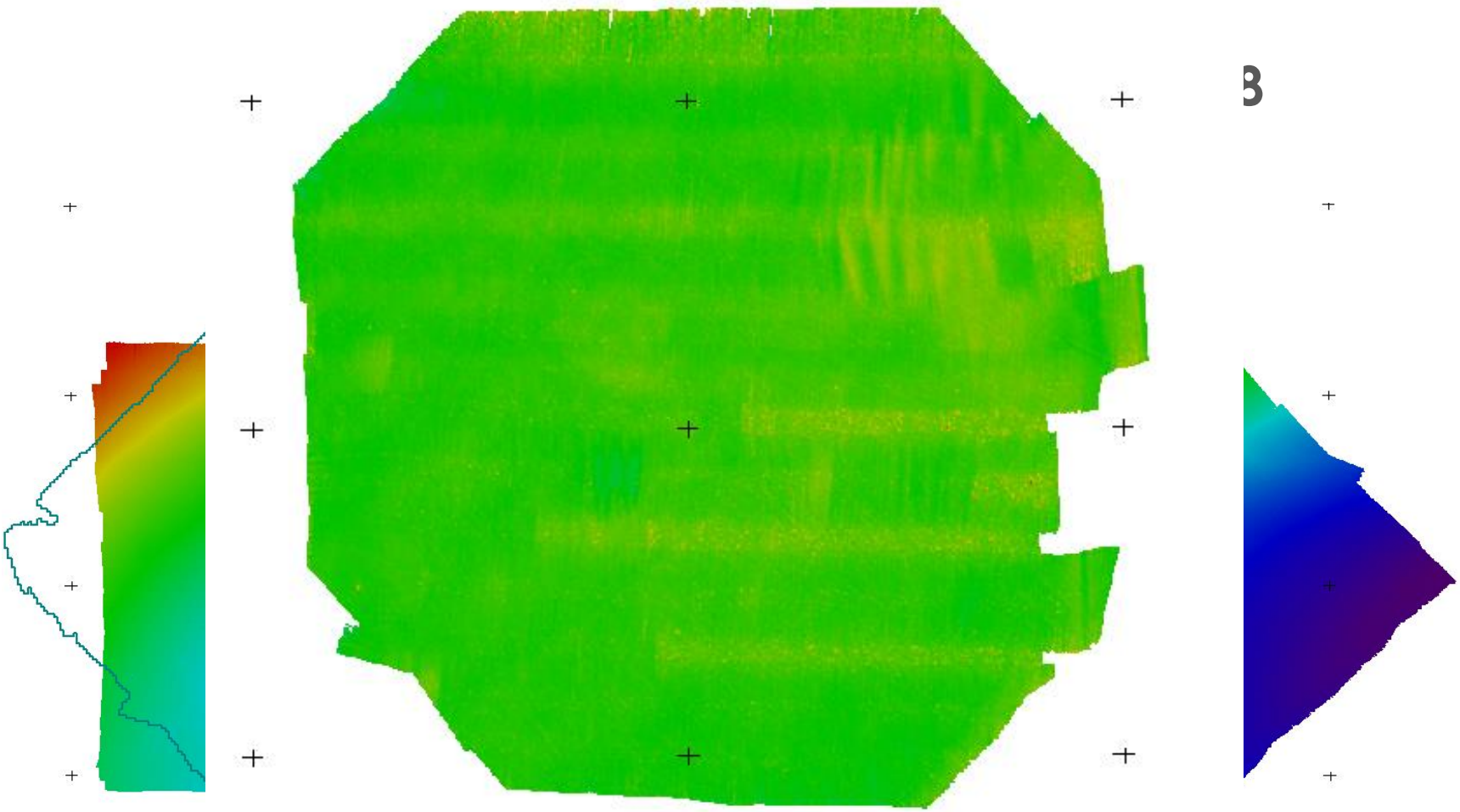


Table : Data on differences in volume (m^3) and area (m^2) at disposal site IE-6 between October 2016 and September 2017.

Positive volume	**7,705 m^3**		**Positive area**	**99,004 m^2**
Negative volume	2,788 m^3		Negative area	34,775 m^2
Absolute total	4,917 m^3		Total area	133,779 m^2

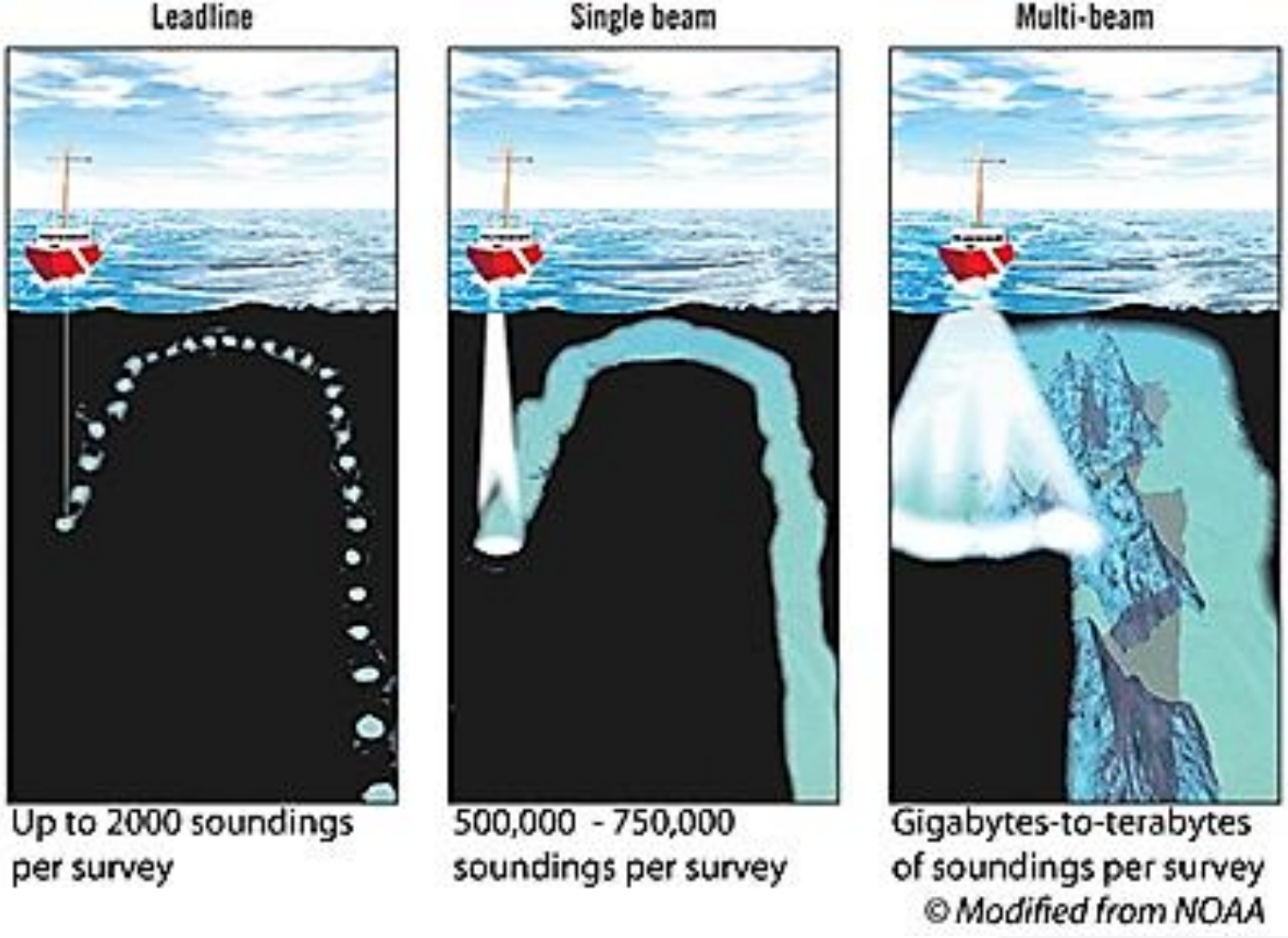




High-tech method

- Soundings done with a multibeam echosounder
- Area covered = 1 km^2
- Area centered along coordinates of disposal at sea sites

Low-tech method can lead to similar results


Leadline
Single beam
Multi-beam
Up to 2000 soundings per survey
500,000 - 750,000 soundings per survey
Gigabytes-to-terabytes of soundings per survey
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Thank you