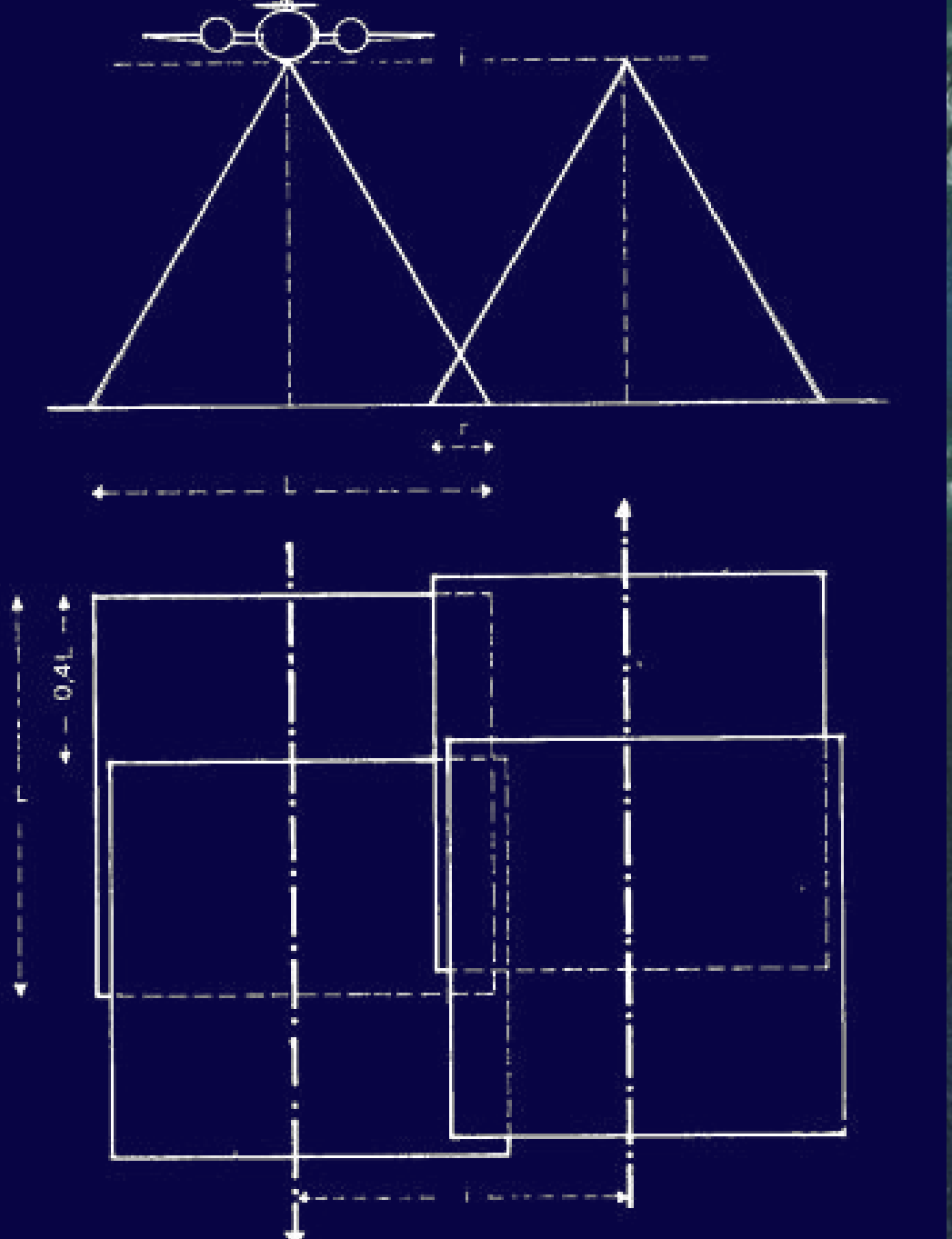
ISPRA
Istituto Superiore per la Protezione
e la Ricerca Ambientale
Dipartimento Difesa del Suolo
Servizio CARG - Geologia e Geomorfologia
REGIONE AUTONOMA DELLA SARDEG

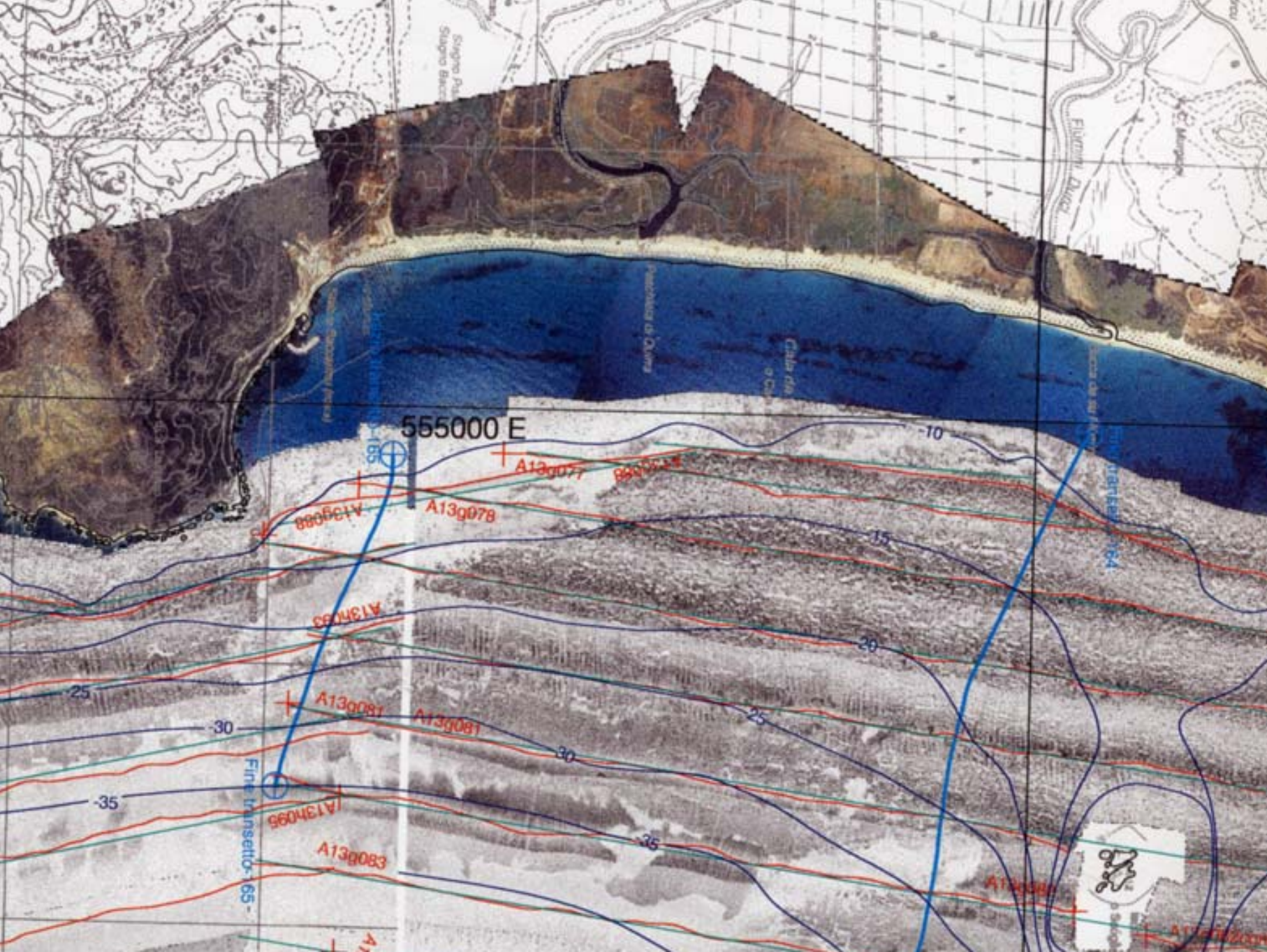
Il rilevamento geologico subacqueo nella realizzazione della Carta Geologica d'Italia

Paolo E. Orrù

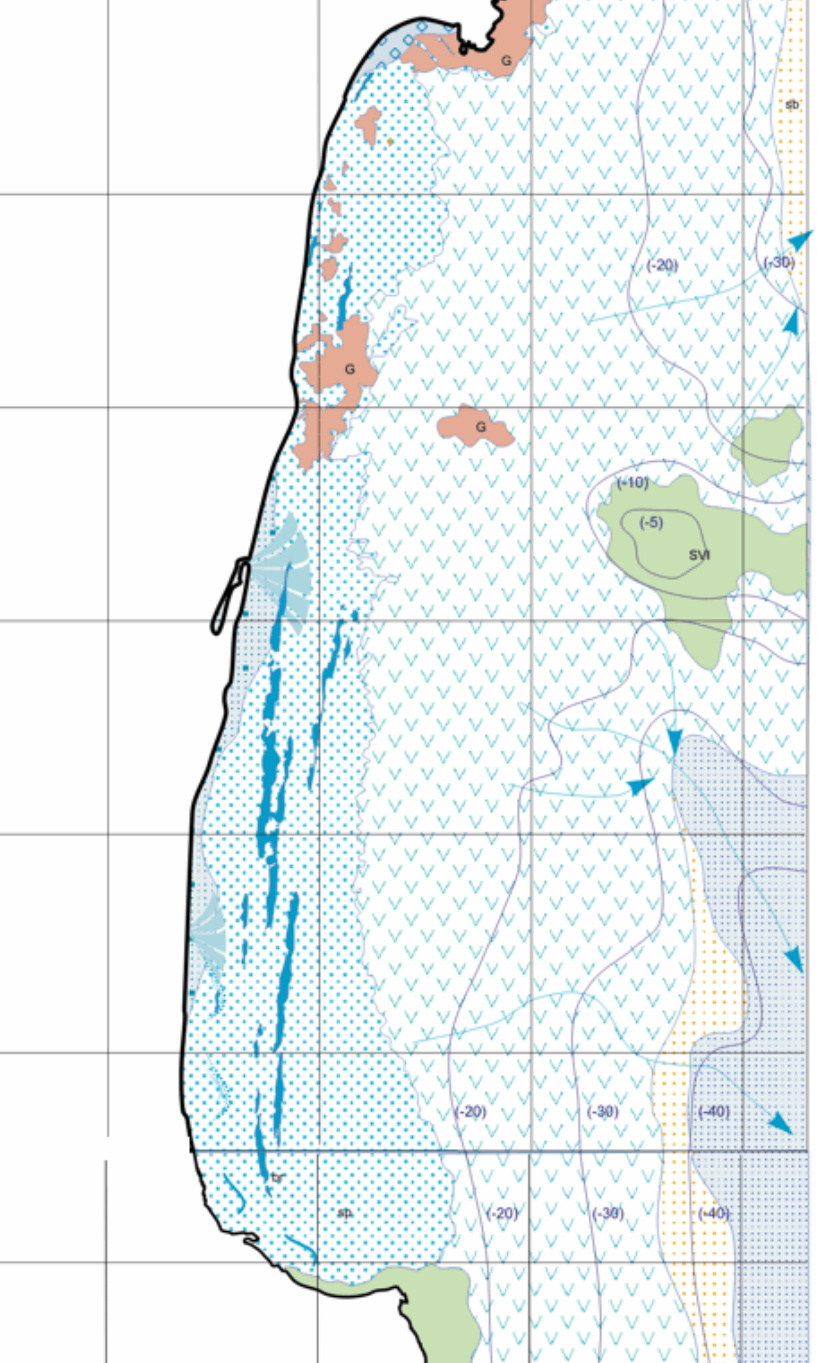
Integrazione delle tecniche di rilevamento geologico diretto e indiretto dei fondali pericostieri


r
L
0,4L
r
L


Foglio 549
“Muravera”


555000 E
A13g077
A13g078
A13g081
A13g083
-10
-15
-20
-25
-30
-35
Fine transetto 165

Foglio 549
“Muravera”



AREA MARINA

DEPOSITI DELTIZI

sd — Sabbie limose e limi deltizi
OLOCENE SUP.

DEPOSITI LITORALI

sg — Ghiaie poligeniche

sp — Sabbie silicoclastiche
OLOCENE SUP.

br — Arenarie e conglomerati di spiaggia sommersa
OLOCENE MEDIO

DEPOSITI DI PIATTAFORMA

Sb — Sabbie bioclastiche

sl — Sabbie limose

OLOCENE SUP.

FORMAZIONE DEL SUBSTRATO

G — Granitoidi
CARBONIFERO SUP.-PERMIANO

SGR — Scisti a graptoliti
SILURIANO - DEVONIANO MEDIO

SVI — Rocce silicoclastiche debolmente cementate
CAMBRO - ORDOVICIANO

S — Substrato roccioso indifferenziato

SIMBOLI

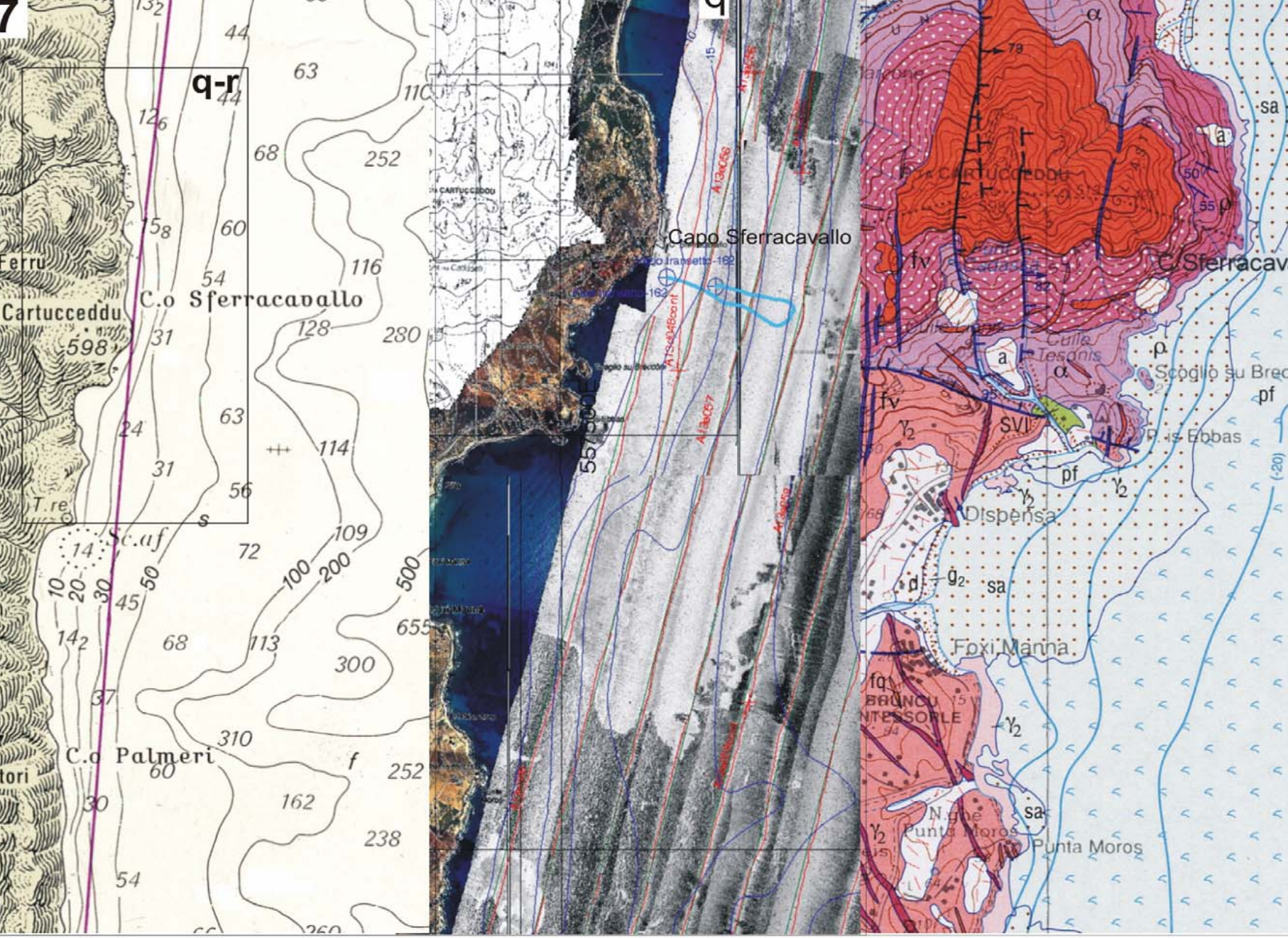
Delta sommerso

Barre sommerse

Conoide alluvionale somm

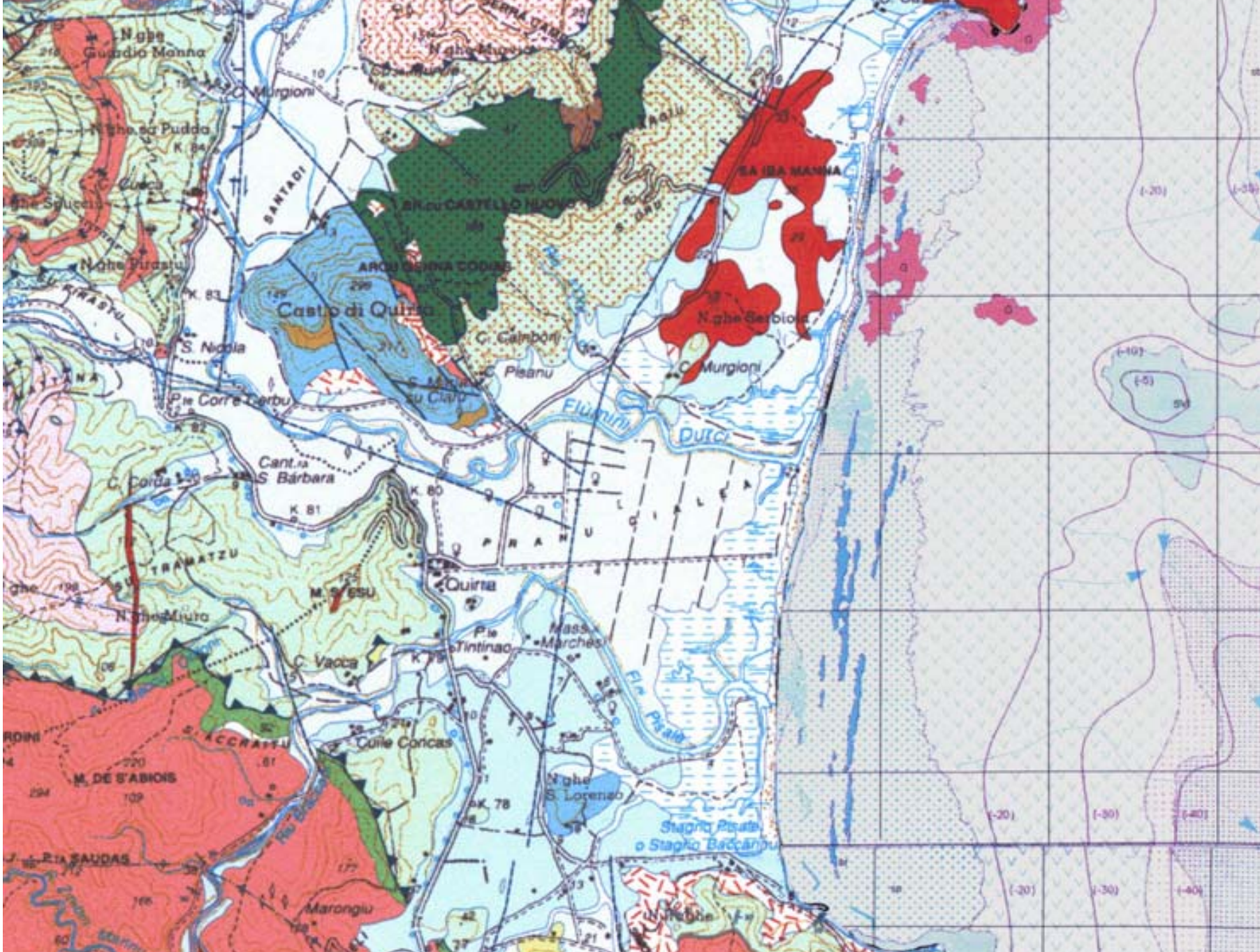
Linee di drenaggio

pf — F e a fanerogame



rta nautica I.I.M. 912 - 1:250.000 dati da telerilevamento aereo e

Foglio Geologico 541"JERZU"


N.ghe Guardia Manna
C. Murgioni
N.ghe sa Pudda
SANTADI
Castello di Quirra
N.ghe Serbiola
C. Murgioni
S. Nicola
C. Pisanu
Fluminimi Duci
Cant.na S. Barbara
C. Corda
TRAMATZU
Quirra
N.ghe Miura
C. Vacca
Tintinao
Mass. Marches
Fiu Pisanu
Culle Concas
M. DE S'ABIONI
N.ghe S. Lorenzo
Stagno Pisanu o Stagno Baccanau
Marongiu
Nuraghe

Ministero dell'Ambiente

prese Ipe... Spedaletto San PIETRO

Strisciate N° 1 - 2 - 3 - 4 - 5 - 6

IN ELABORAZIONE

CISIG

Consorzio per l'Innovazione dei Sistemi Informativi Geografici dei Grandi Bacini Fluviali

Università degli Studi di Parma

Consiglio Nazionale delle Ricerche Consorzio Compagnie Aeronautiche

APAT

Progetto CARG

TELERILEVAMENTO MULTISPETTRALE

Fondi marini

REGIONE AUTONOMA DELLA SARDEGNA

ASSESSORATO ALL' INDUSTRIA

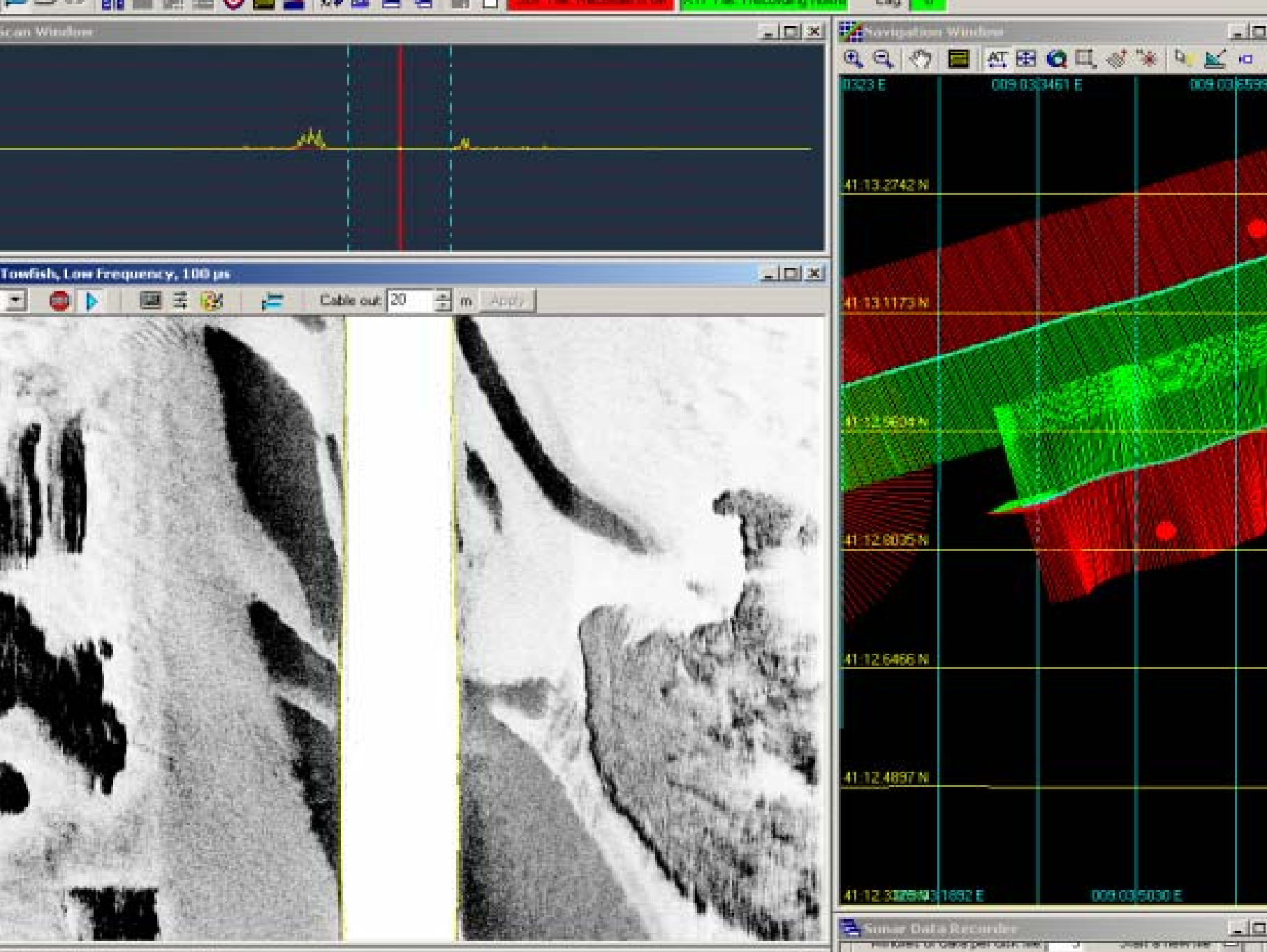
Dipartimento Scienze della Terra

UNIVERSITA' DI CAGLIARI

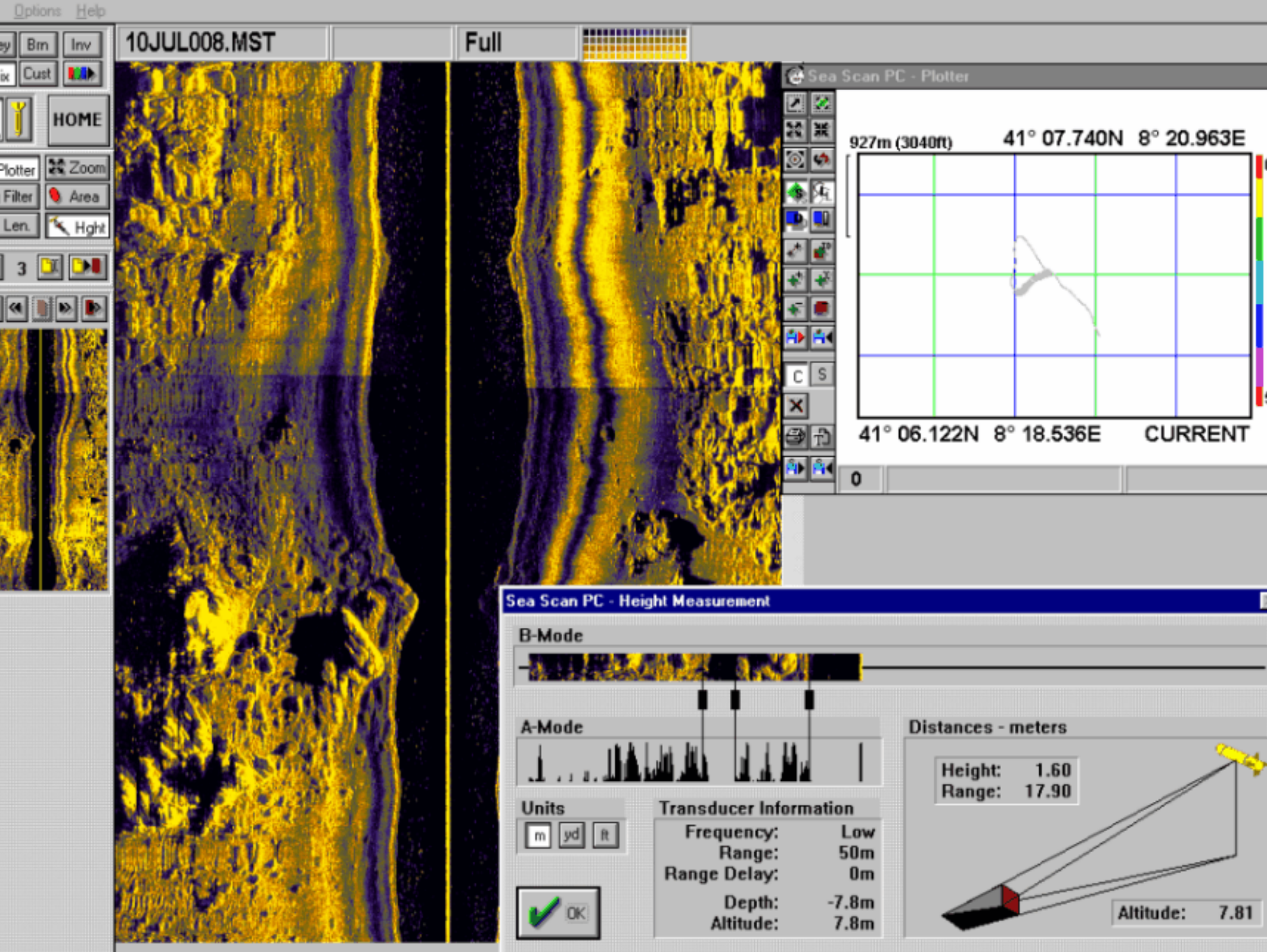
PROGEMISA

EG&G 272T – 150-500 kh

Klein 3000 – 100-500 khz

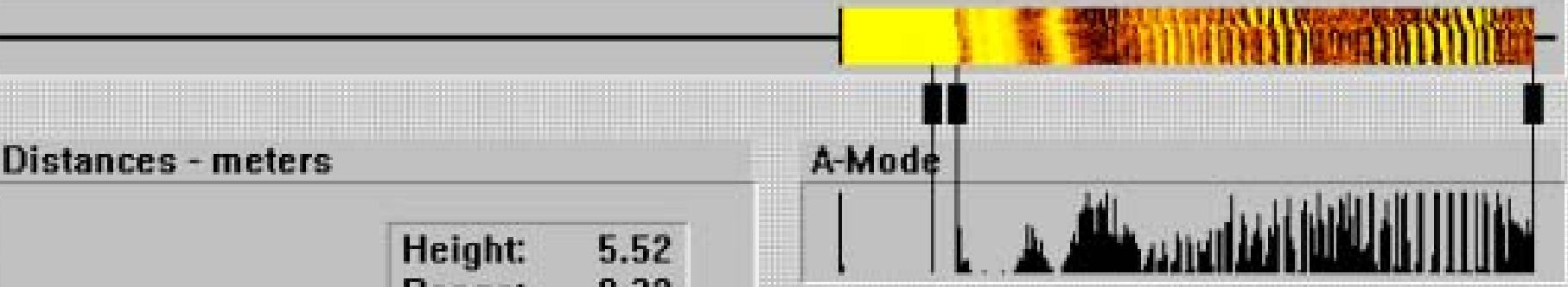

Towfish, Low Frequency, 100 µs
Cable out: 20 m
Apply
41:13.2742 N
41:13.1173 N
41:12.9604 N
41:12.8035 N
41:12.6466 N
41:12.4897 N

MSTL Sea Scan – 500 khz


Options Help
10JUL008.MST
Full
HOME
Zoom
Area
Hght
Sea Scan PC - Plotter
927m (3040ft)
41° 07.740N 8° 20.963E
41° 06.122N 8° 18.536E
CURRENT
Sea Scan PC - Height Measurement
B-Mode
A-Mode
Units
m
yd
ft
Transducer Information
Frequency: Low
Range: 50m
Range Delay: 0m
Depth: -7.8m
Altitude: 7.8m
OK
Distances - meters
Height: 1.60
Range: 17.90
Altitude: 7.81

ea Scan PC - Height Measurement

B-Mode



A-Mode

Distances - meters

Height: 5.52
Range: 8.32

Altitude: 6.64

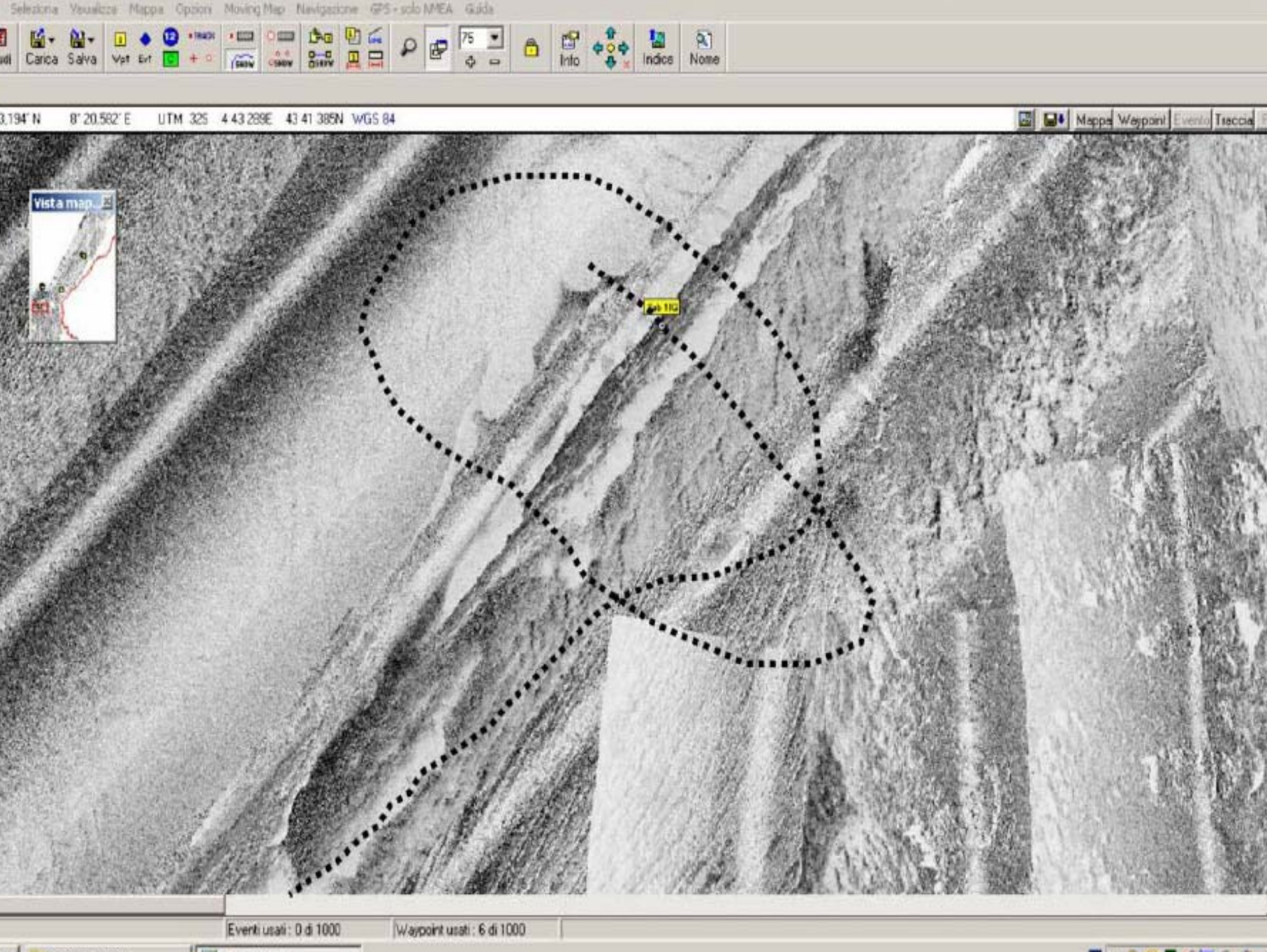
Transducer Information

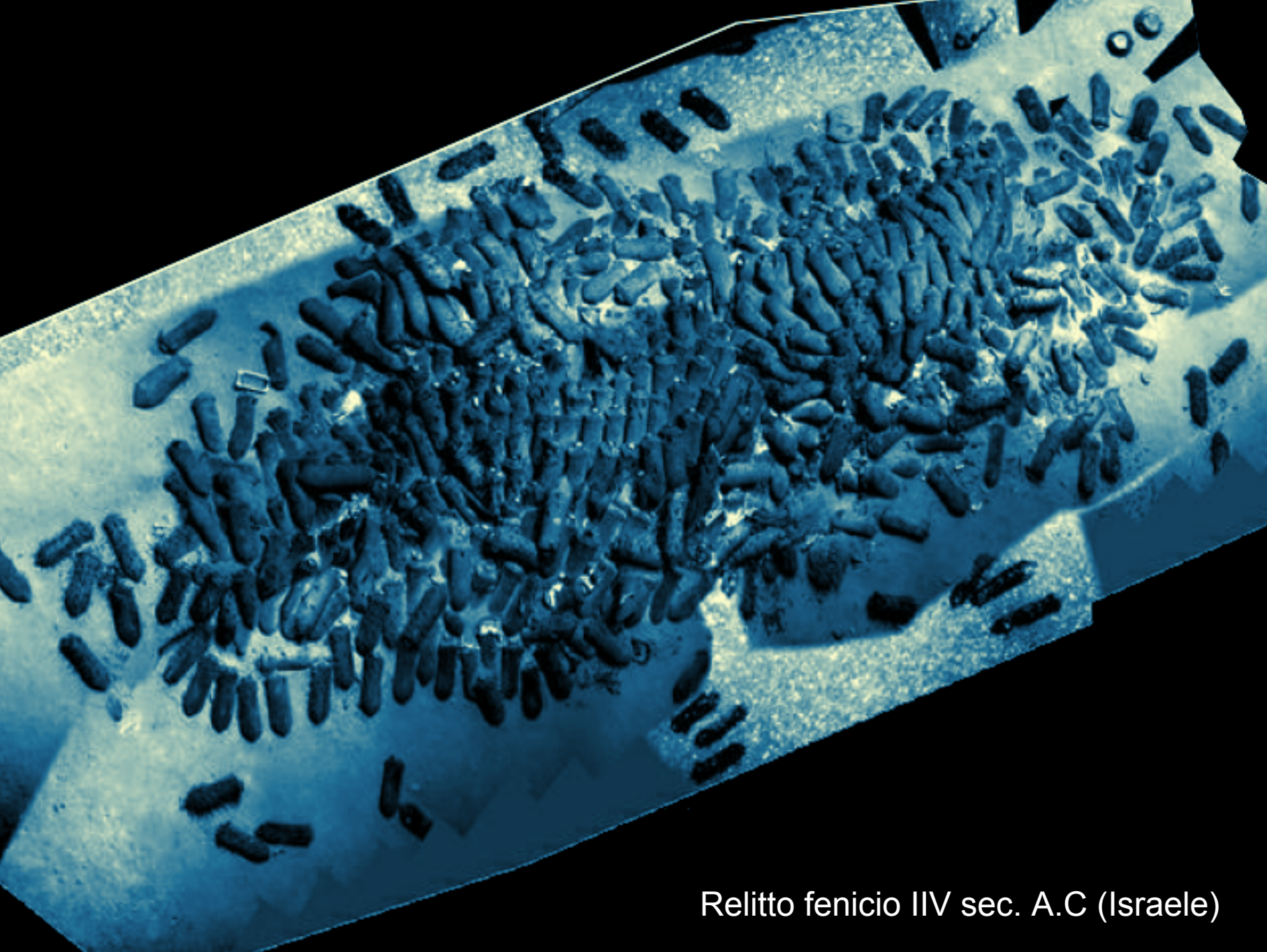
Frequency:	Low
Range:	50m
Range Delay:	0m
Depth:	-6.6m
Altitude:	6.6m

Units

m yd ft

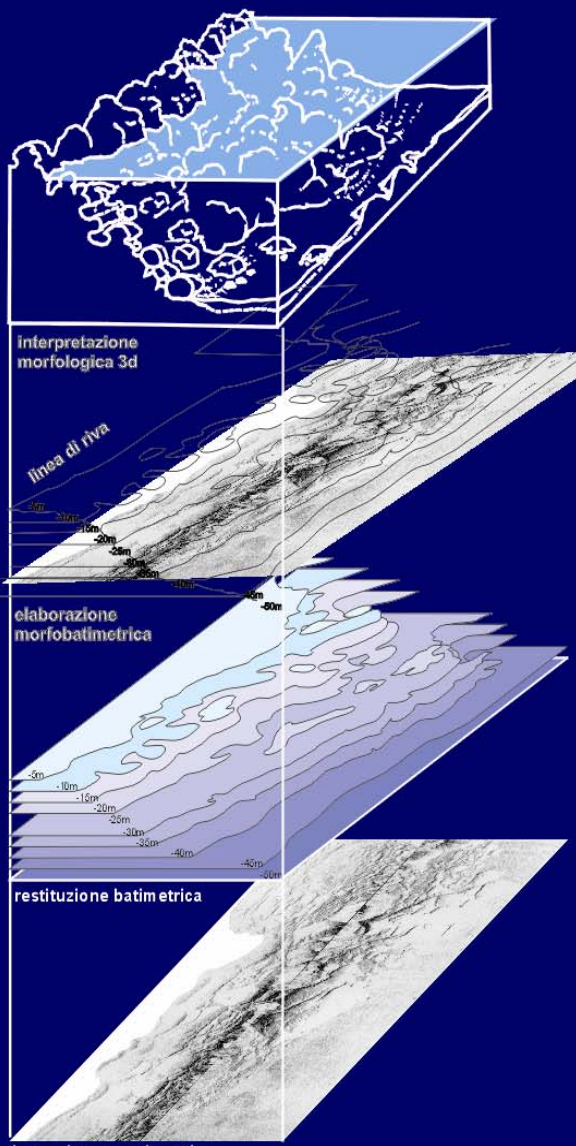
OK


Seleziona Visualizza Mappa Opzioni Moving Map Navigazione GPS - solo NMEA Guida
Carica Salva
Vpt Evt
Info
Indice
Nome
3.194' N 8° 20.582' E UTM 32S 443 289E 4341 385N WGS 84
Mappe Waypoint Eventi Traccia
Vista map...
Eventi usati : 0 di 1000
Waypoint usati : 6 di 1000



Relitto fenicio IIV sec. A.C (Israele)

RAPPRESENTAZIONI 3D



fasi di restituzione da telerilevamento acustico

Schema operativo di acquisizione dei dati geofisici

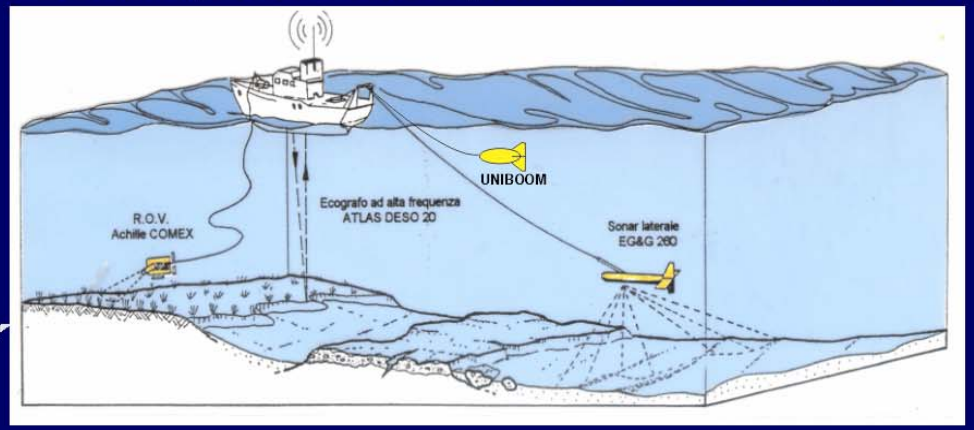
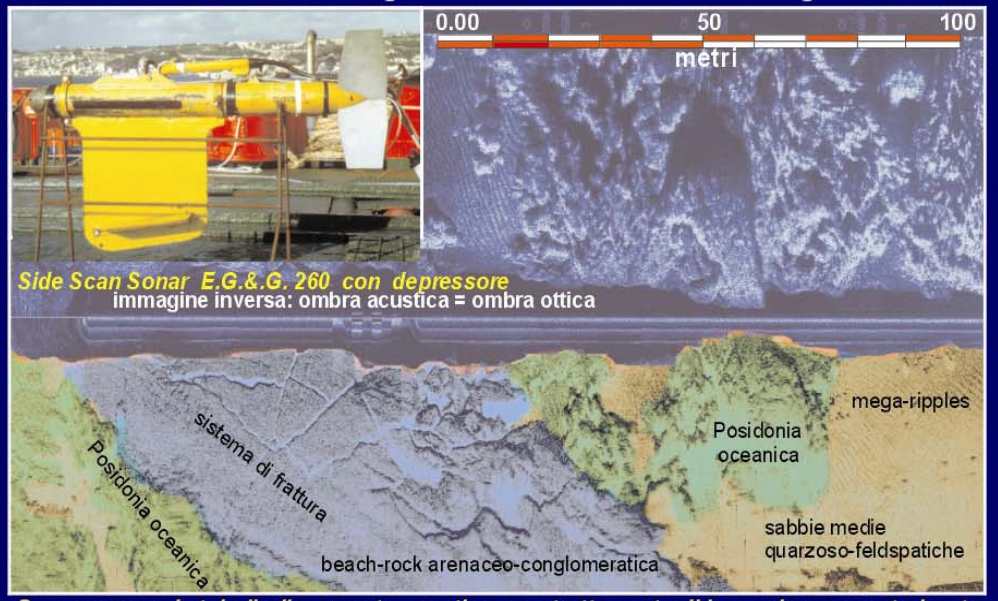
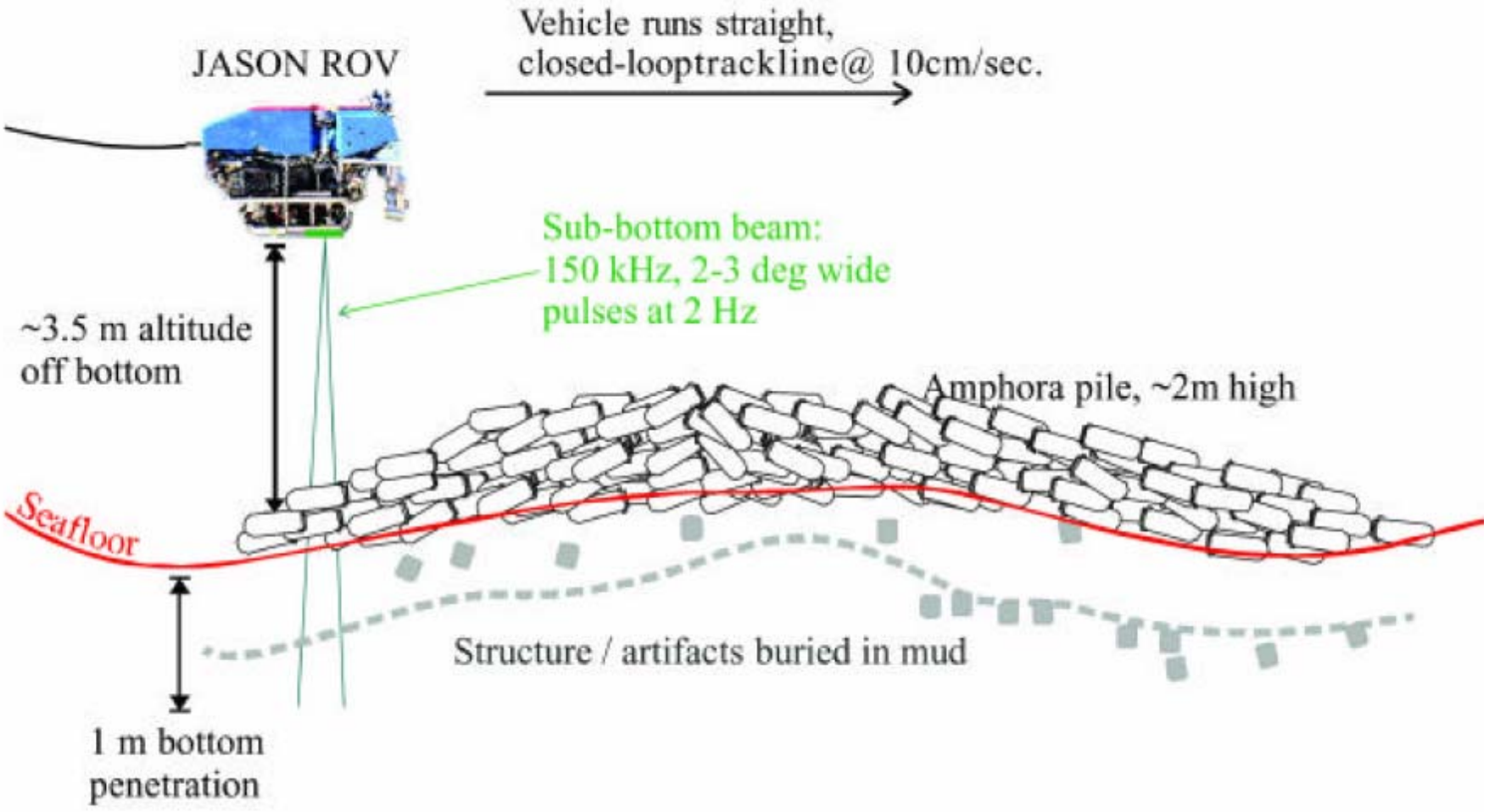


IMMAGINE AREALE

Registrazione sonar scansione laterale digitale - 100 khz



Sonogramma da telerilerilevamento acustico con trattamento di immagine computerizzata


JASON ROV
Vehicle runs straight,
closed-looptrackline@ 10cm/sec.
Sub-bottom beam:
150 kHz, 2-3 deg wide
pulses at 2 Hz
~3.5 m altitude
off bottom
Amphora pile, ~2m high
Seafloor
Structure / artifacts buried in mud
1 m bottom
penetration


datascope

Trasduttore SUBBOTTOM

Sezione di una spiaggia ridotta con progradazioni

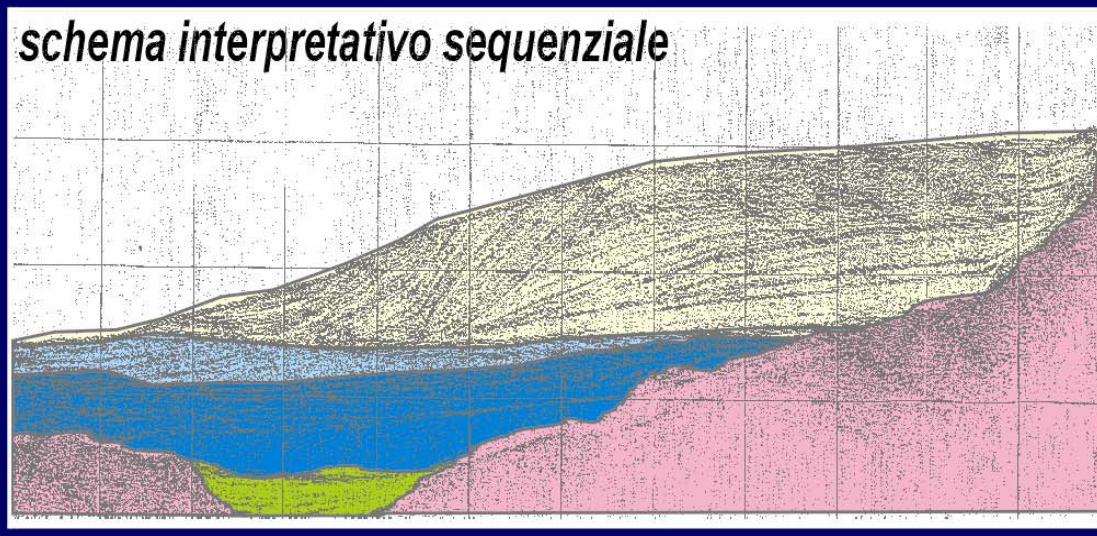
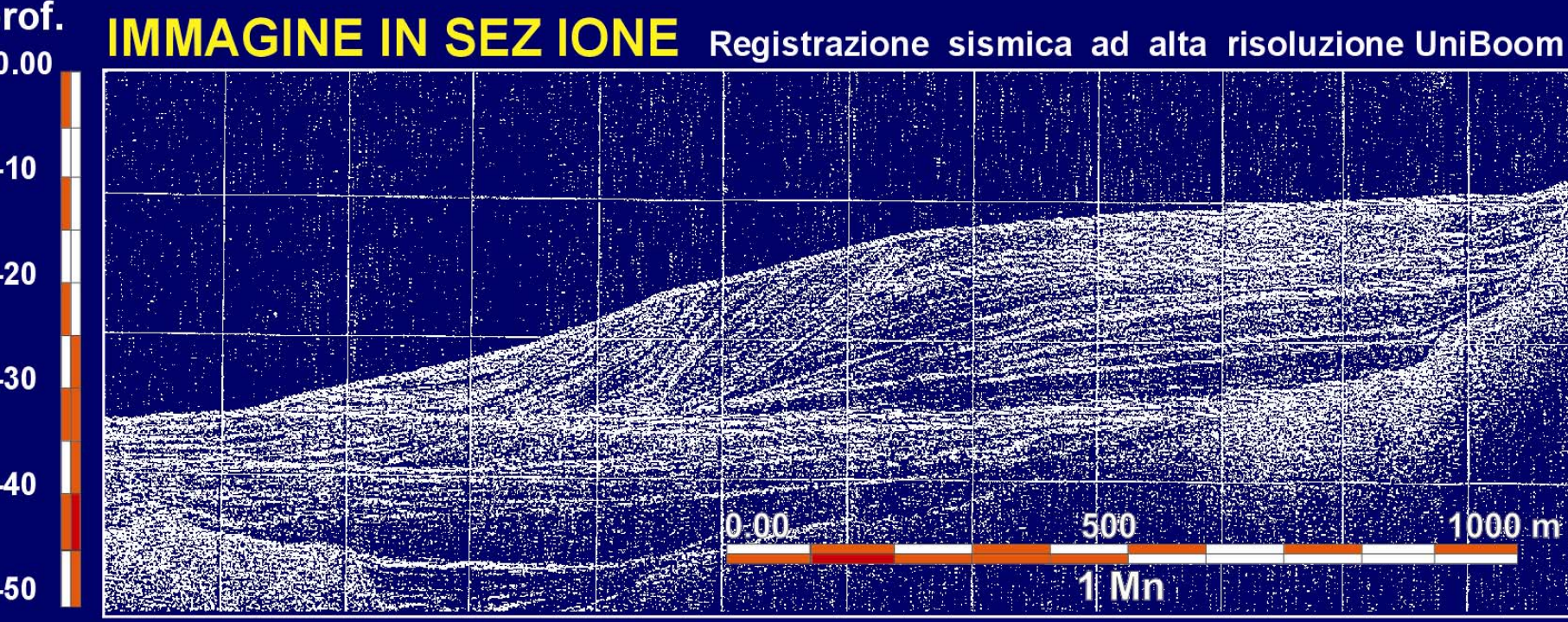


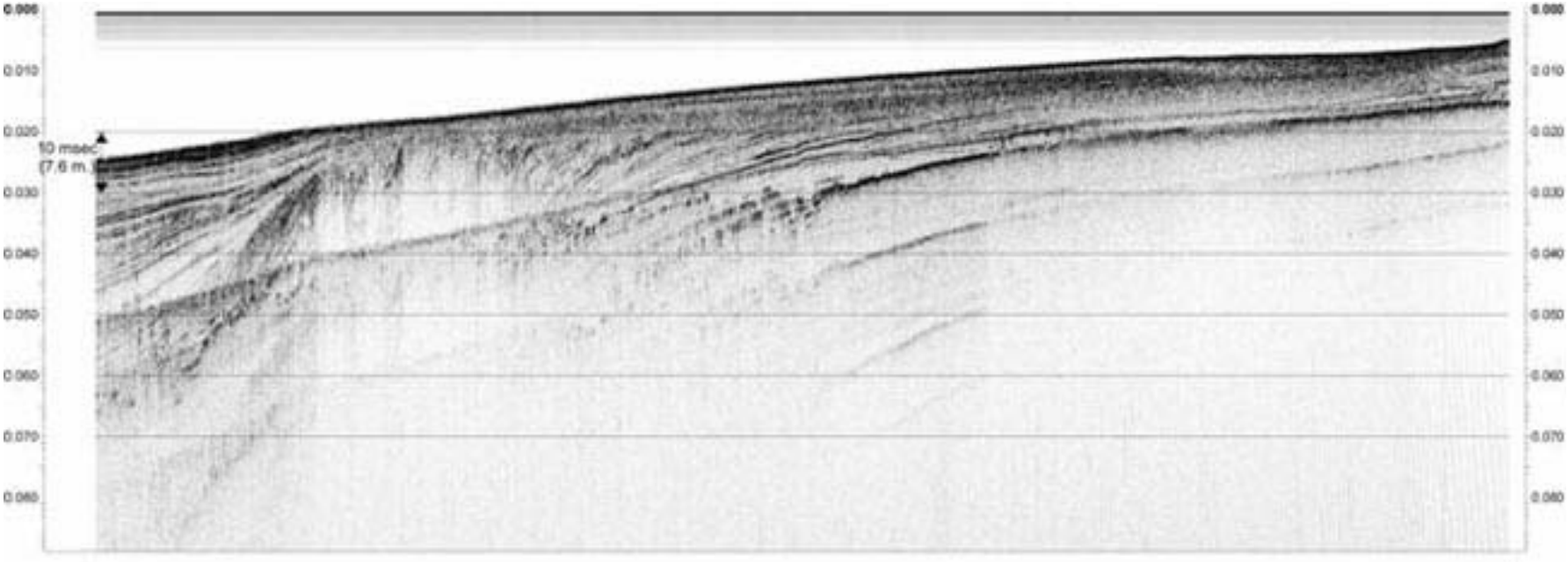
IMMAGINE IN SEZ IONE

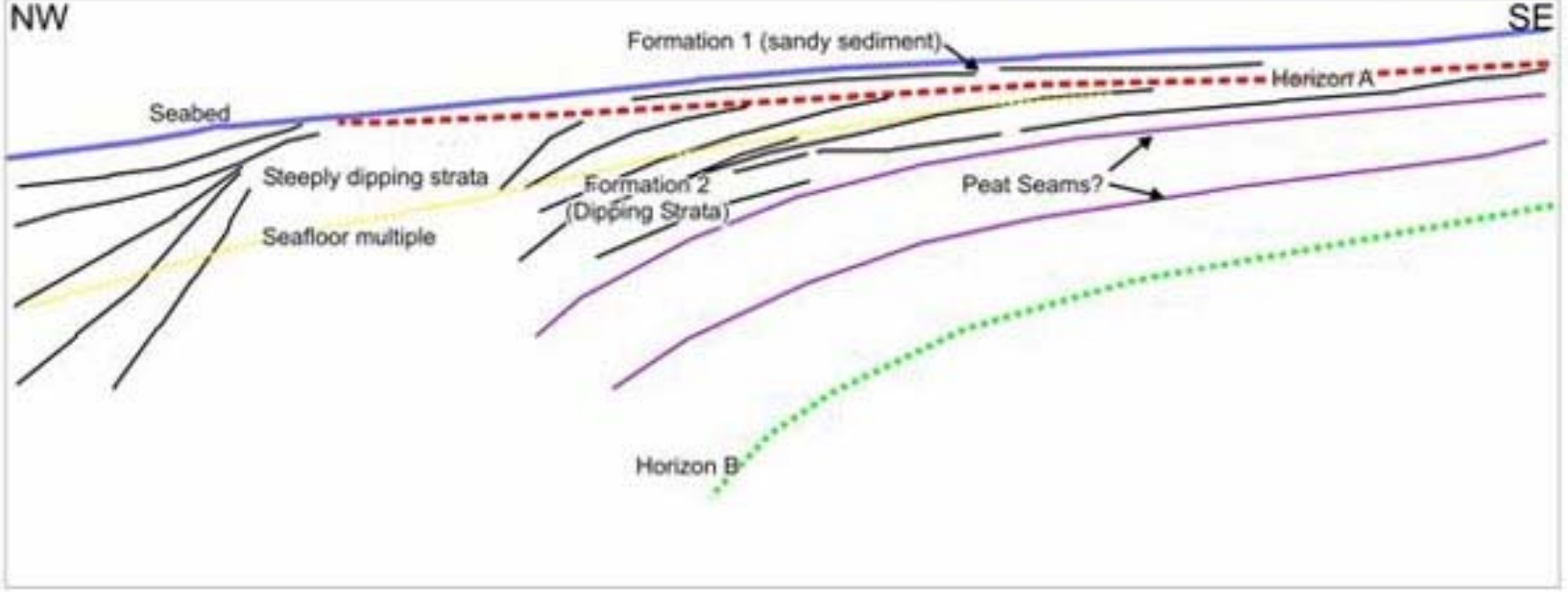
Registrazione sismica ad alta risoluzione UniBoom



Corpo deposizionale di una conoide sottomarina in progradazione


datasonics


0.000
0.010
0.020
0.030
0.040
0.050
0.060
0.070
0.080
10 msec
(7.6 m.)


NW
SE
Formation 1 (sandy sediment)
Horizon A
Seabed
Steeply dipping strata
Formation 2
(Dipping Strata)
Peat Seams?
Seafloor multiple
Horizon B

it View Tools Help

0/10 11:44:45 Ping: 1831

35.92200' N 027° 43.90800' E

E 150 165 S

Ch. 1 - 3.5 KHz

62.70

Y Start Time (ms)

anual 0

uto 0.0

Auto All

Gain Ch.2 Gain BT Gain

Auto 4.0 dB/m

Range Shift Range RNG: 40

47 10 (m)

Sensor: Playback

Control

ray Rainbow

cean Blue

vert Custom ...

Units

Meters

Feet

msec

Disk Free: 9355 MB

Disk Used: 44645 MB

Disk Free: 9355 MB

Disk Used: 44645 MB

06/10/10 11:35:00 40° 36.5340' N 027° 43.5300' E Spd: 4.2 Hdg: 139.7 Depth: 68.4

06/10/10 11:36:00 40° 36.4680' N 027° 43.5720' E Spd: 4.4 Hdg: 162.0 Depth: 60.9

06/10/10 11:37:00 40° 36.4020' N 027° 43.6080' E Spd: 4.4 Hdg: 167.6 Depth: 61.1

06/10/10 11:38:00 40° 36.3420' N 027° 43.6440' E Spd: 4.3 Hdg: 159.7 Depth: 70.1

06/10/10 11:39:00 40° 36.2760' N 027° 43.6920' E Spd: 4.3 Hdg: 146.5 Depth: 70.6

06/10/10 11:40:00 40° 36.2160' N 027° 43.7340' E Spd: 4.2 Hdg: 157.3 Depth: 68.7

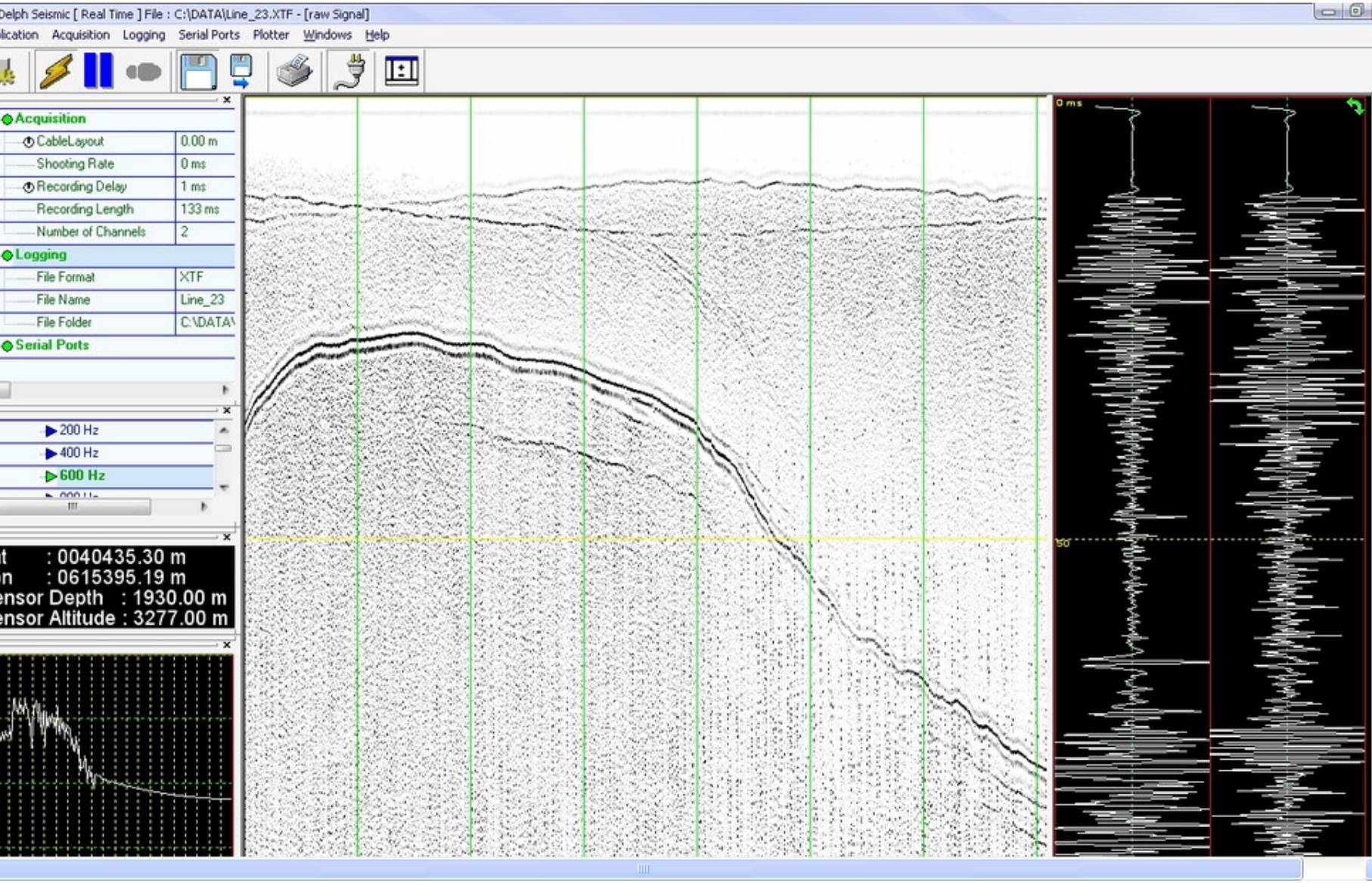
06/10/10 11:41:00 40° 36.1560' N 027° 43.7700' E Spd: 4.2 Hdg: 156.2 Depth: 70.3

06/10/10 11:42:00 40° 36.0900' N 027° 43.8060' E Spd: 4.1 Hdg: 159.4 Depth: 72.2

06/10/10 11:43:00 40° 36.0300' N 027° 43.8420' E Spd: 4.1 Hdg: 154.9 Depth: 69.8

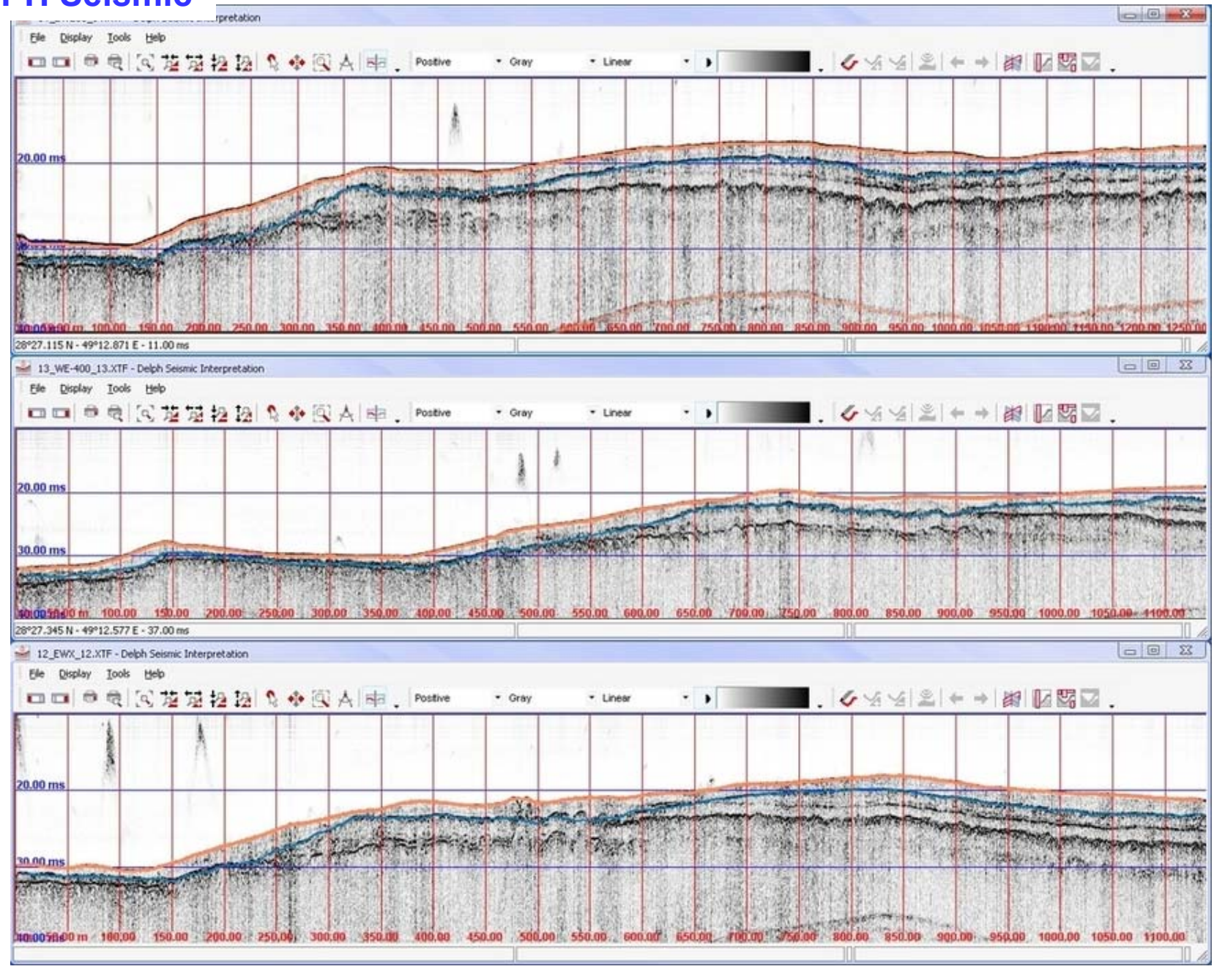
06/10/10 11:44:00 40° 35.9700' N 027° 43.8780' E Spd: 4.0 Hdg: 160.0 Depth: 72.7

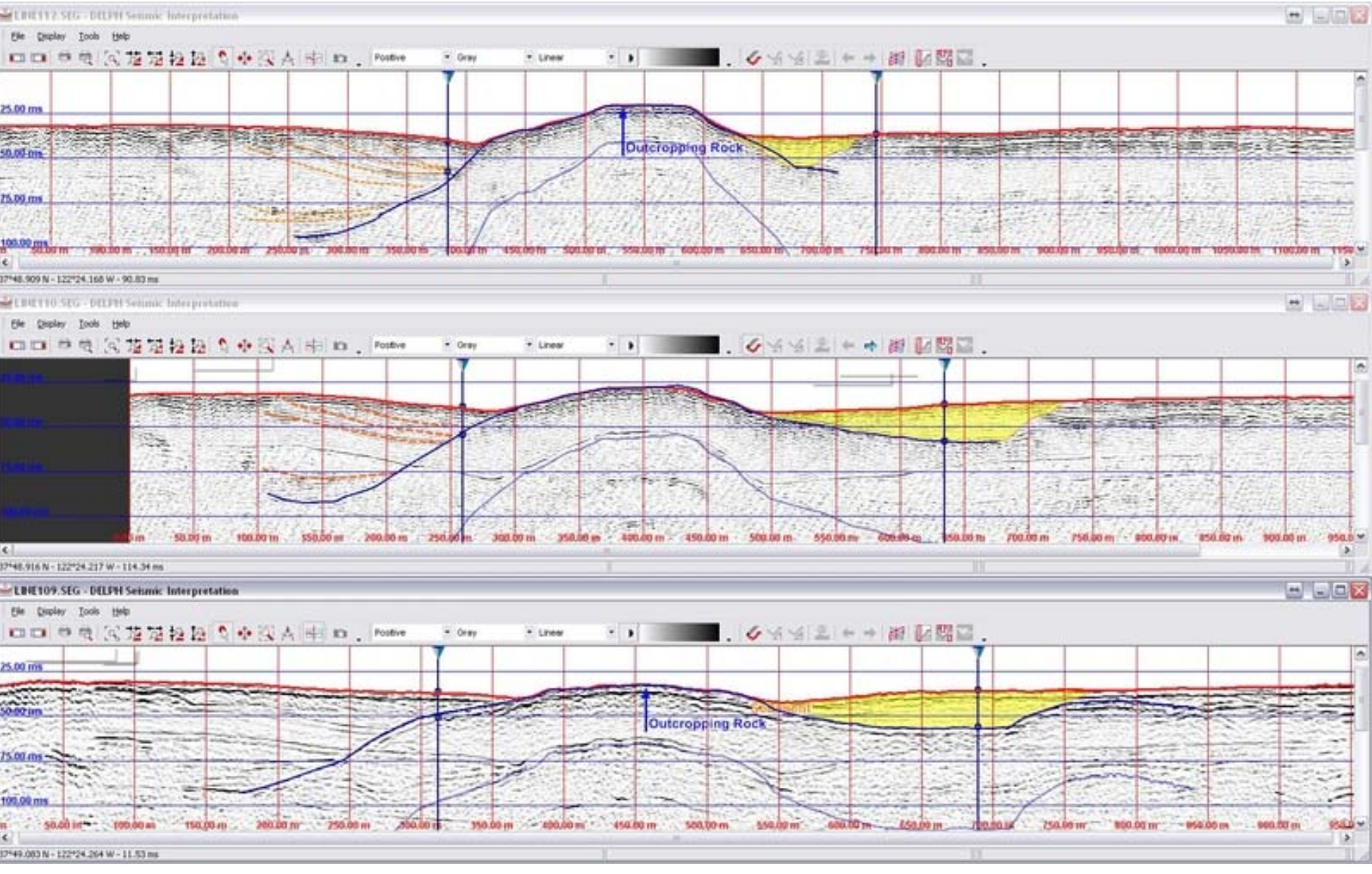
Playback Ch 1 - 3.5 KHz



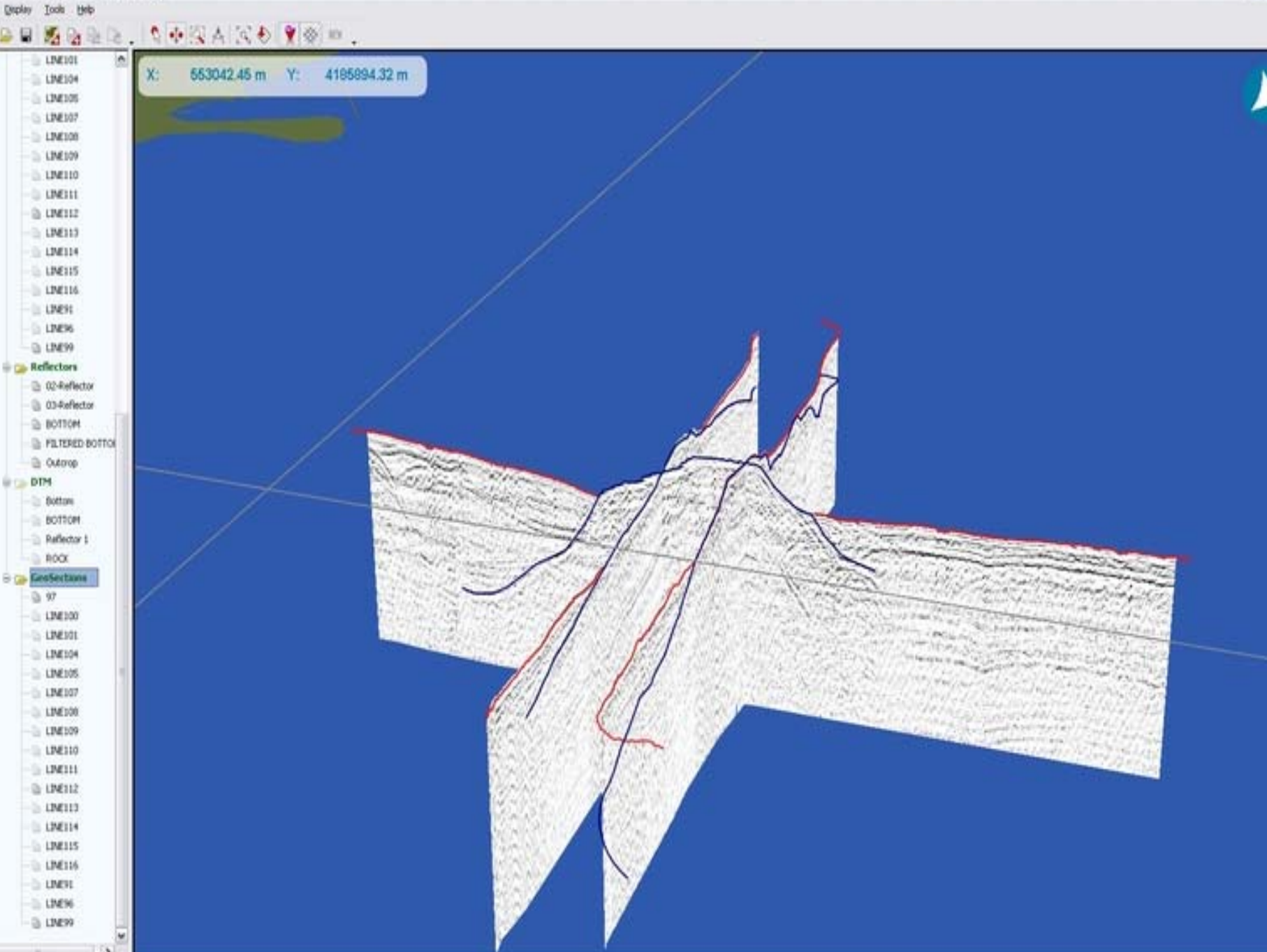
DELPH Seismic

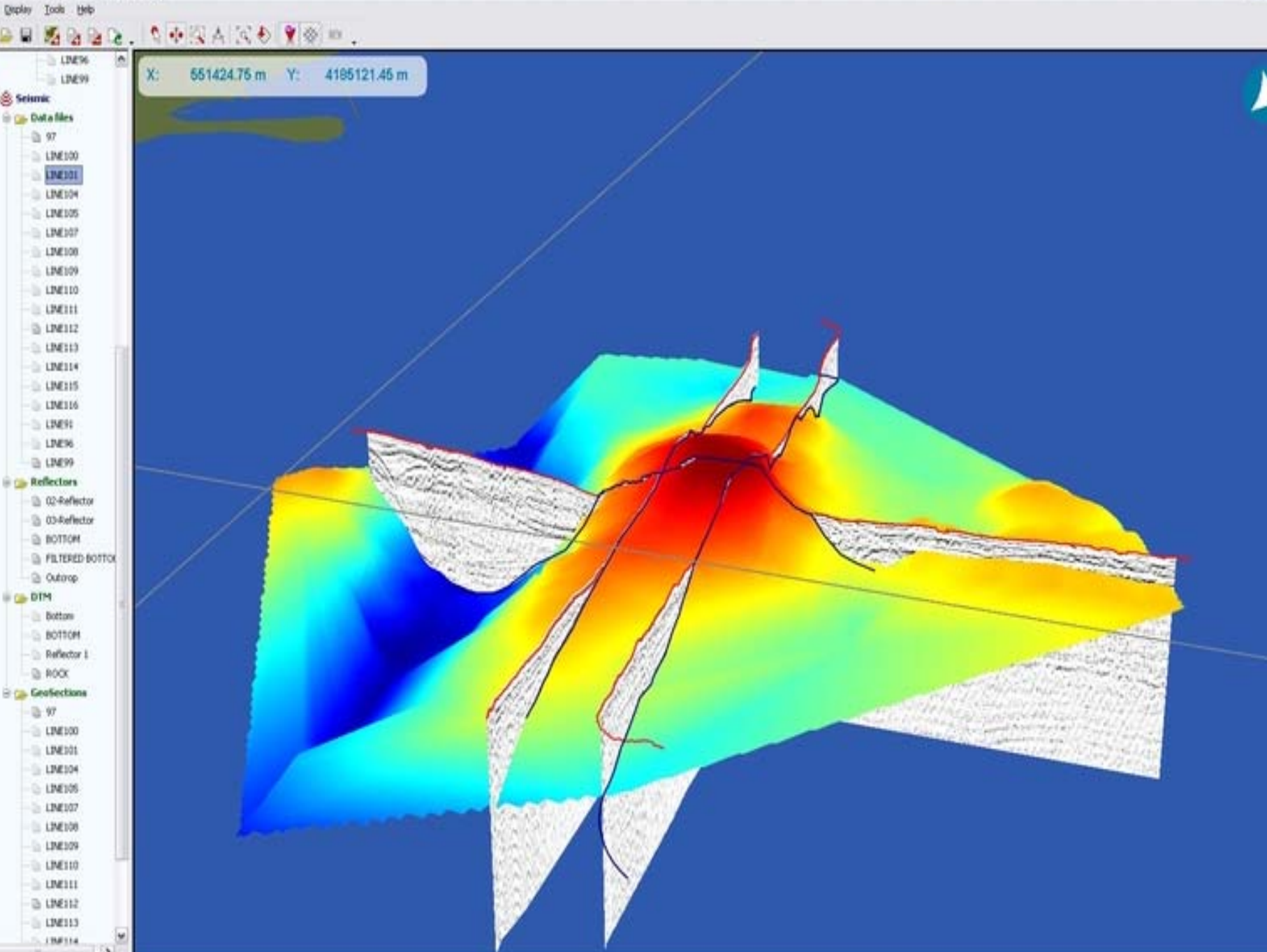
ELPH Seismic

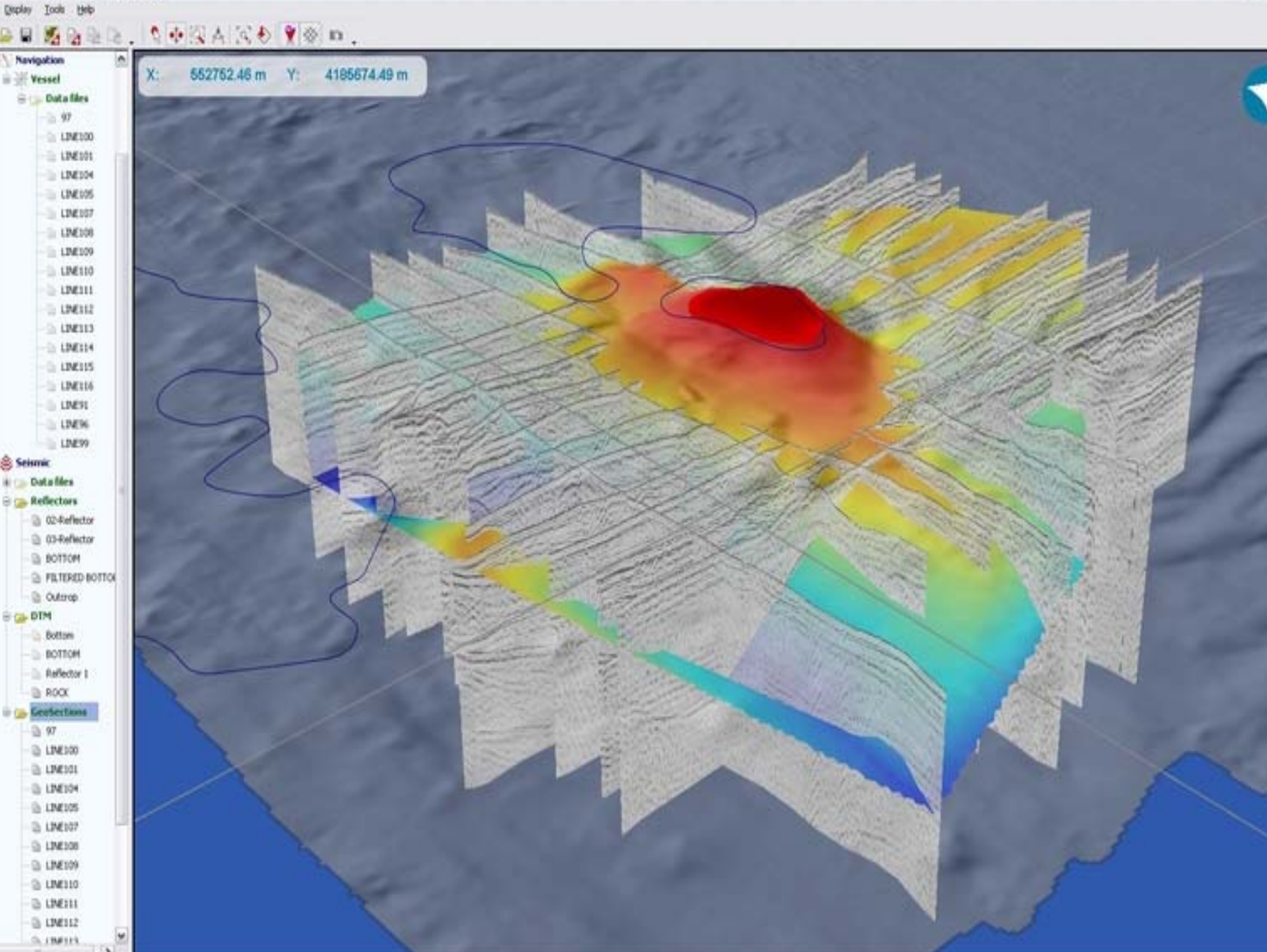




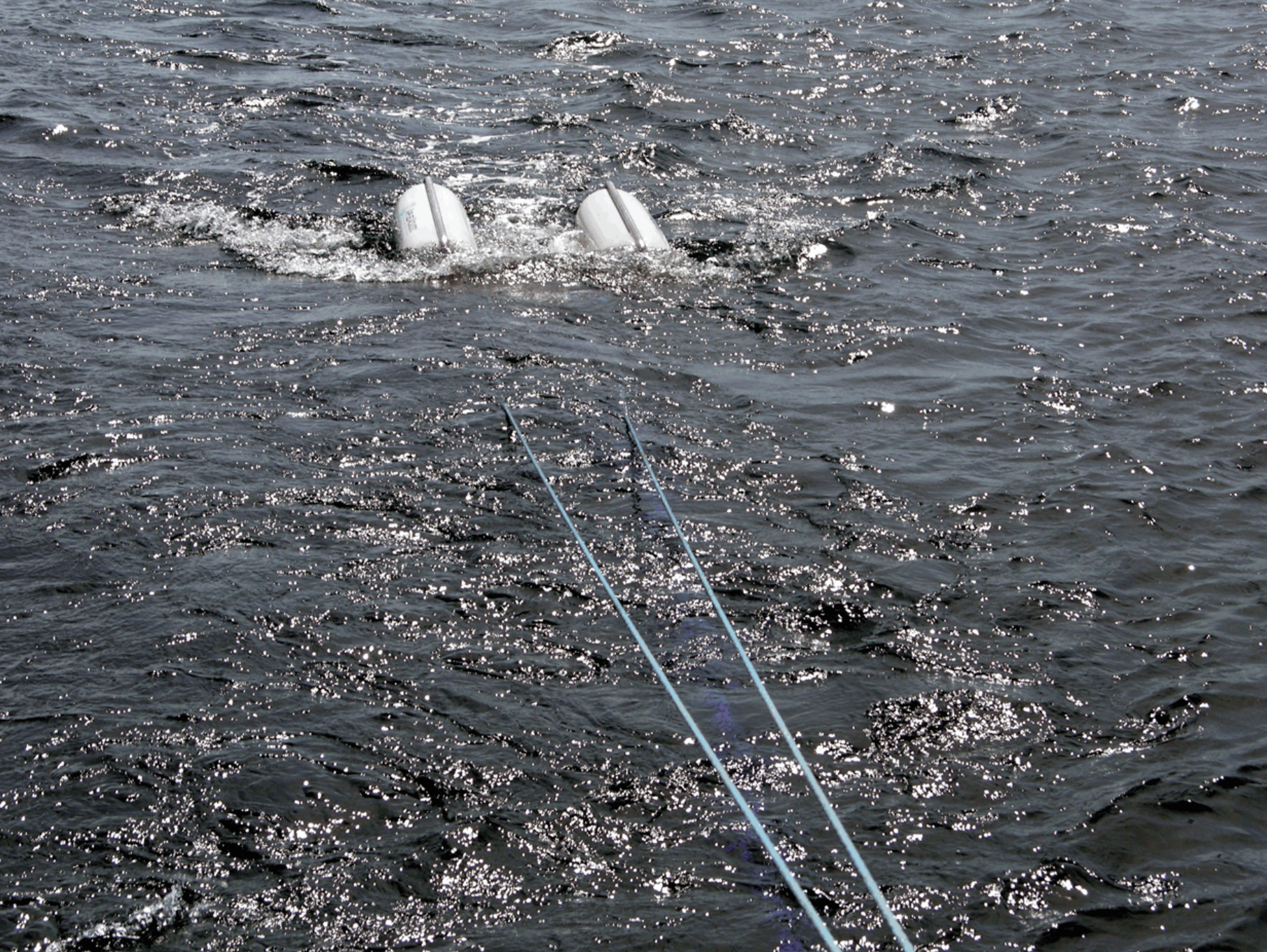
DELPH Seismic

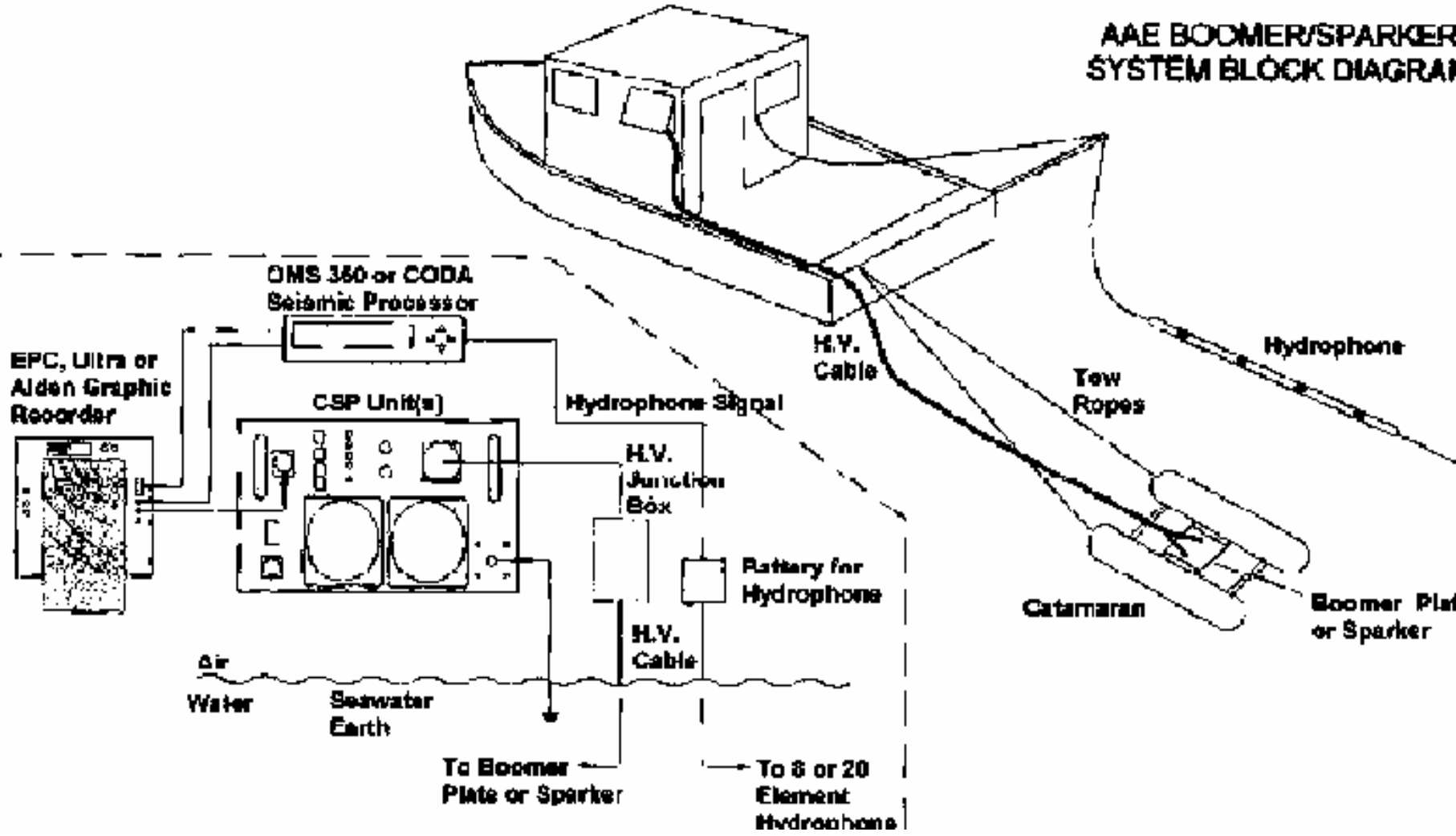

Display
Tools
Help
X: 553042.45 m Y: 4185894.32 m
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
LINE113
LINE114
LINE115
LINE116
LINE91
LINE96
LINE99
Reflectors
02-Reflector
03-Reflector
BOTTOM
FILTERED BOTTOM
Outcrop
DTM
Bottom
BOTTOM
Reflector 1
ROCK
LineSections
97
LINE100
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
LINE113
LINE114
LINE115
LINE116
LINE91
LINE96
LINE99

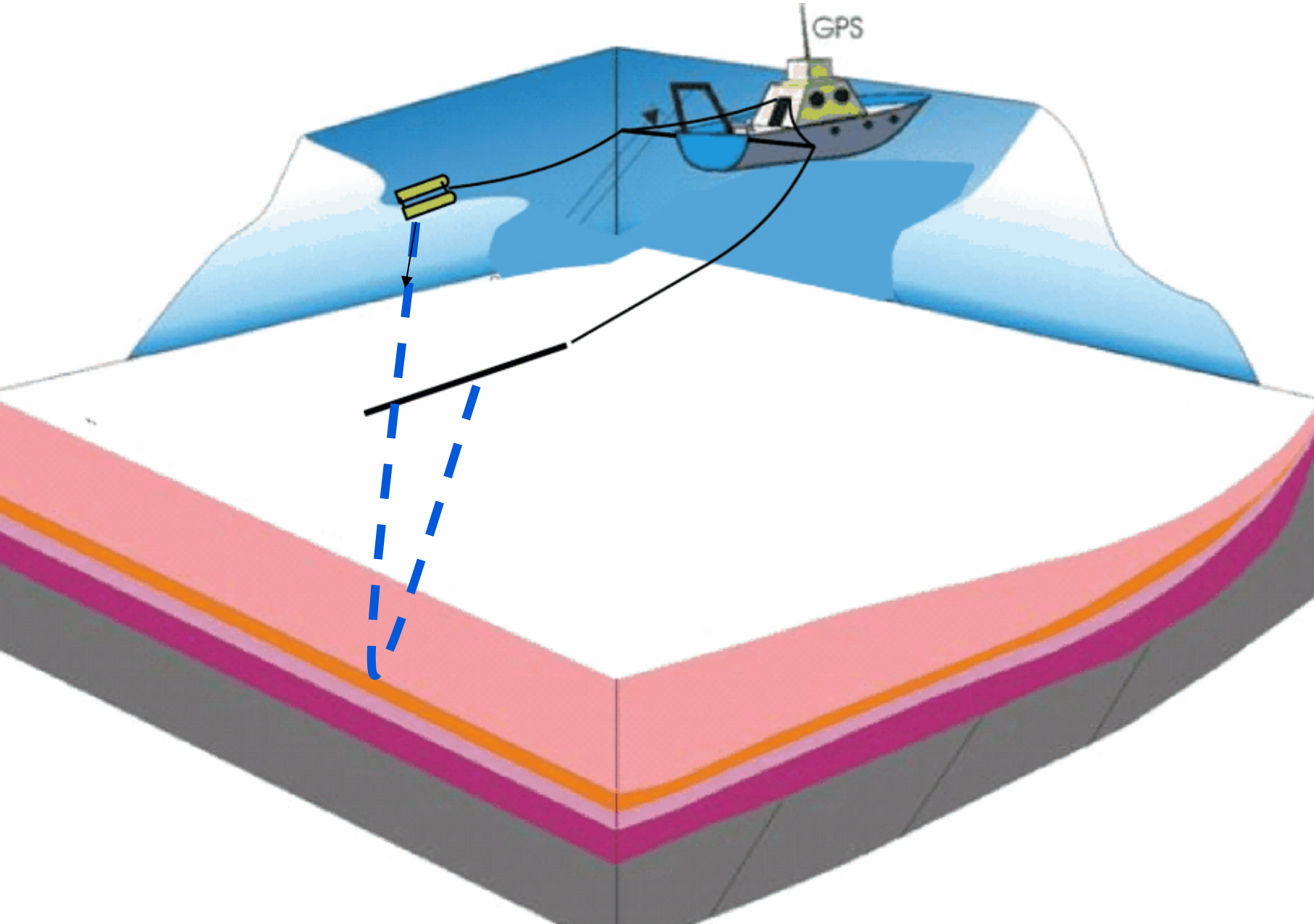

Display Tools Help
LINE96
LINE99
Seismic
Data files
97
LINE100
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
LINE113
LINE114
LINE115
LINE116
LINE91
LINE96
LINE99
Reflectors
02-Reflector
03-Reflector
BOTTOM
FILTERED BOTTOM
Outcrop
DTM
Bottom
BOTTOM
Reflector 1
ROCK
GeoSections
97
LINE100
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
LINE113
X: 551424.76 m Y: 4185121.45 m

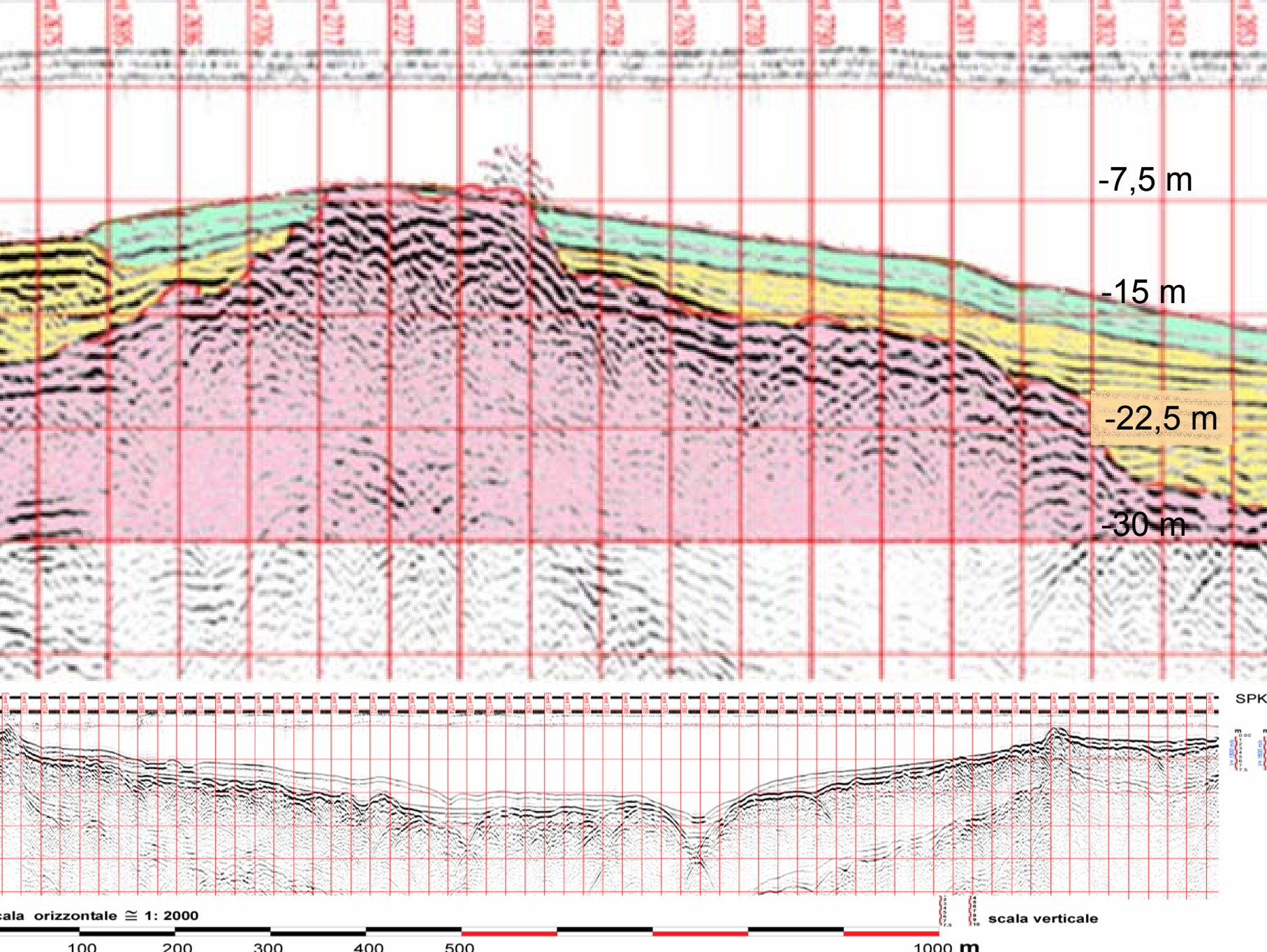

Display Tools Help
Navigation
Vessel
Data files
97
LINE100
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
LINE113
LINE114
LINE115
LINE116
LINE91
LINE96
LINE99
Seismic
Data files
Reflectors
02-Reflector
03-Reflector
BOTTOM
FILTERED BOTTOM
Outcrop
DTM
Bottom
BOTTOM
Reflector 1
ROCK
GeoSections
97
LINE100
LINE101
LINE104
LINE105
LINE107
LINE108
LINE109
LINE110
LINE111
LINE112
X: 552762.46 m Y: 4185674.49 m

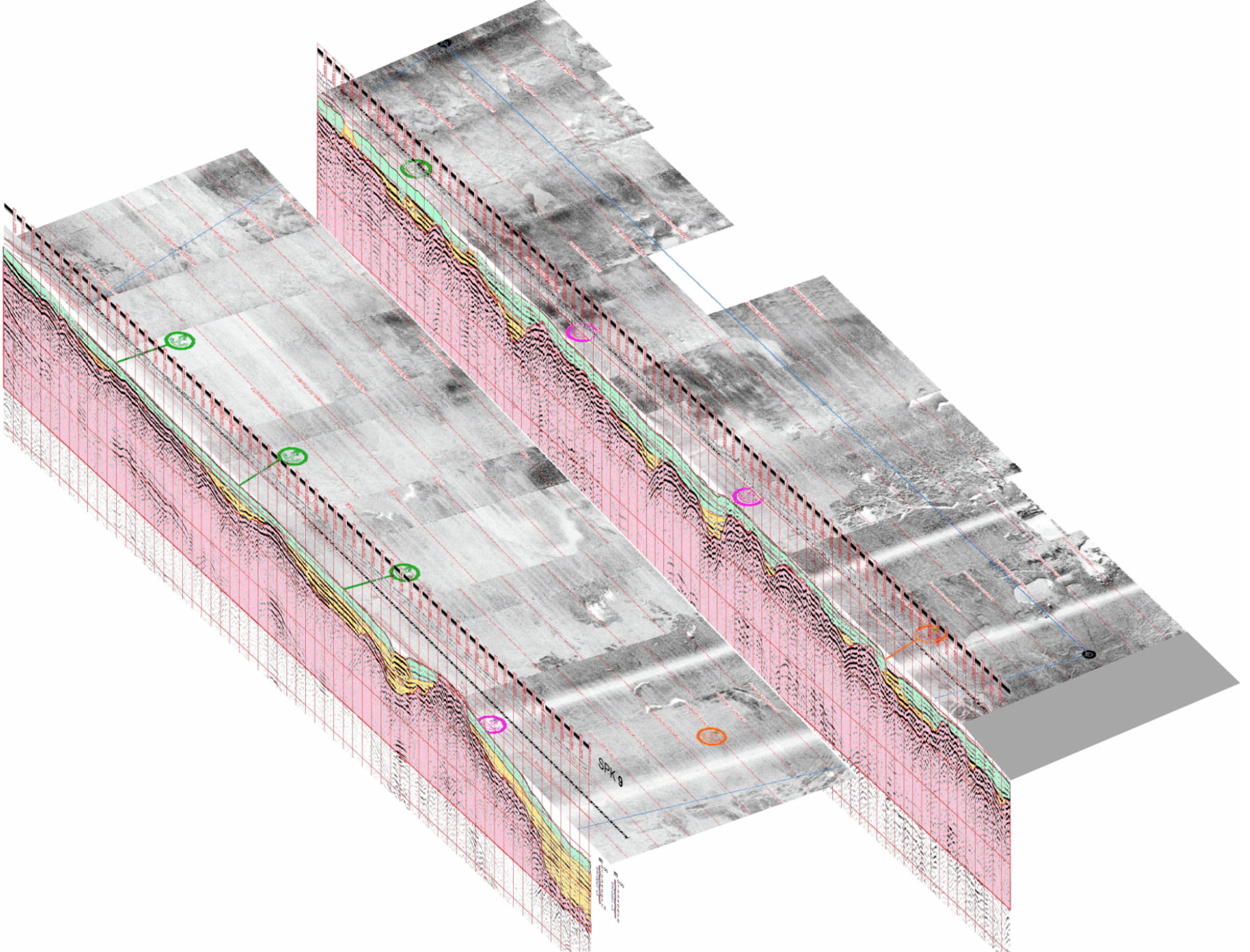

APPLIED ACOUSTIC
ENGINEERING

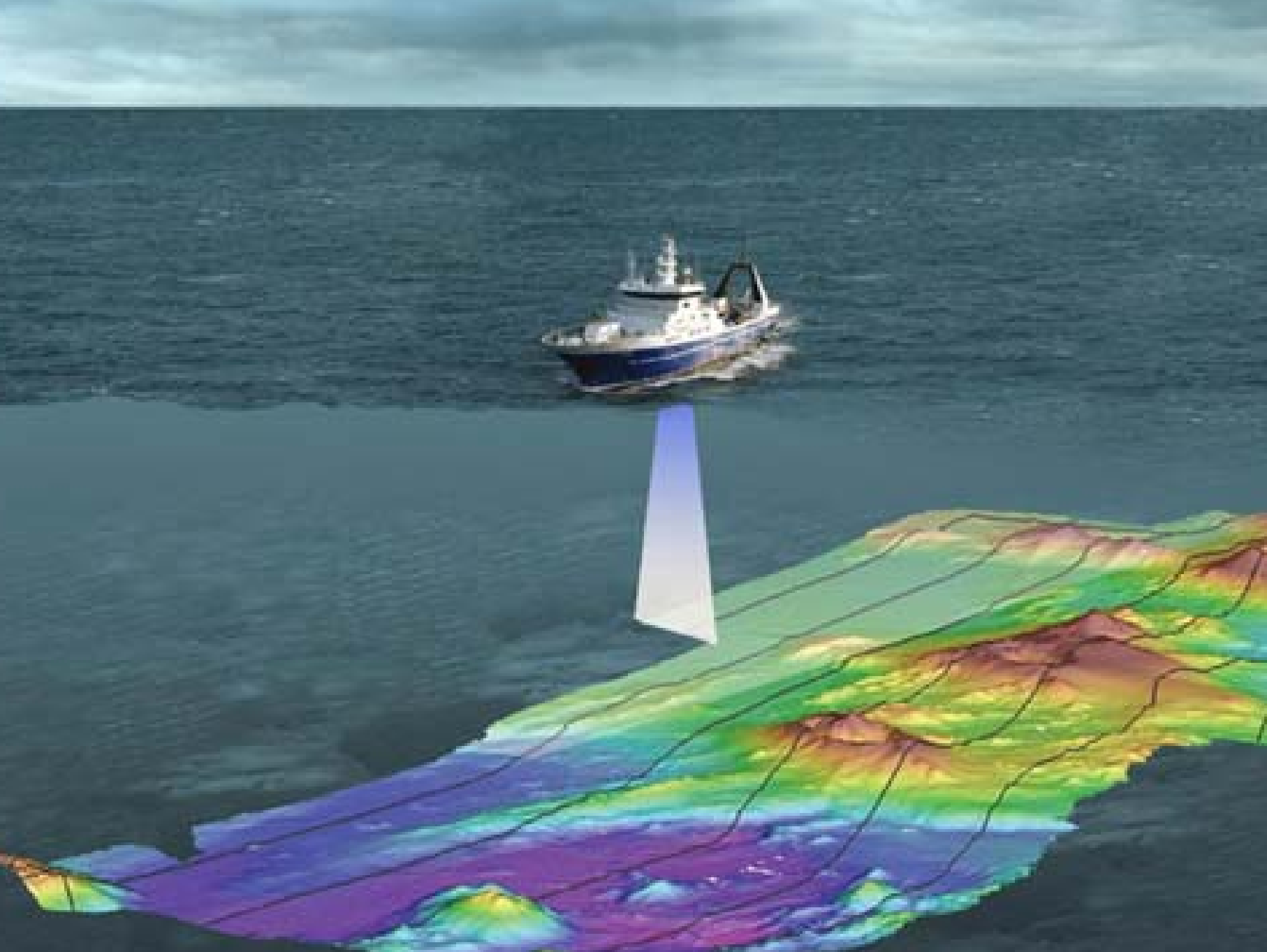



AAE BOOMER/SPARKER
SYSTEM BLOCK DIAGRAM
OMS 360 or CODA
Seismic Processor
EPC, Ultra or
Alden Graphic
Recorder
CSP Unit(s)
Hydrophone Signal
H.V.
Junction
Box
Battery for
Hydrophone
H.V.
Cable
Air
Water
Seawater
Earth
To Boomer
Plate or Sparker
To 8 or 20
Element
Hydrophone
H.V.
Cable
Tow
Ropes
Hydrophone
Catamaran
Boomer Plat
or Sparker

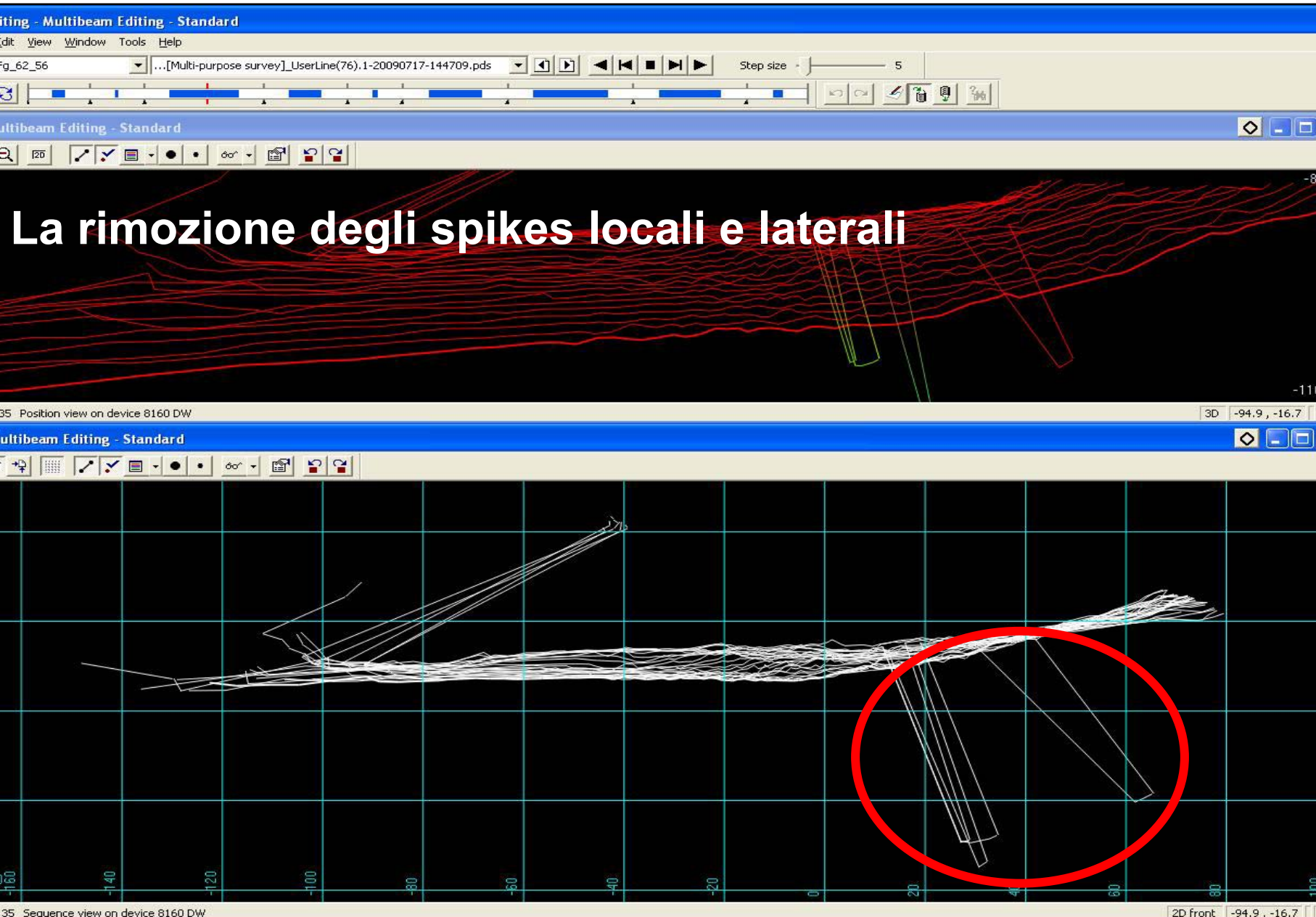

GPS


-7,5 m
-15 m
-22,5 m
-30 m
SPK
cala orizzontale ≅ 1: 2000
scala verticale
100
200
300
400
500
1000 m


SPK-9



Il processing dei dati multibeam



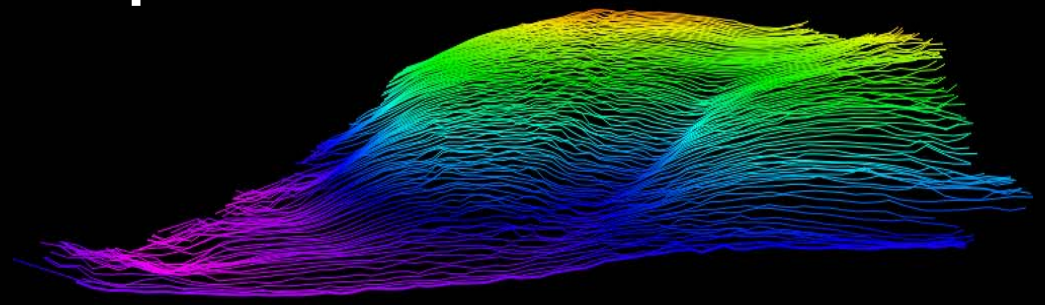
View Window Tools Help

...ti-purpose survey]_UserLine(22).1.L.1-20090704-035838.pds

Step size 4

tibeam Editing - Standard

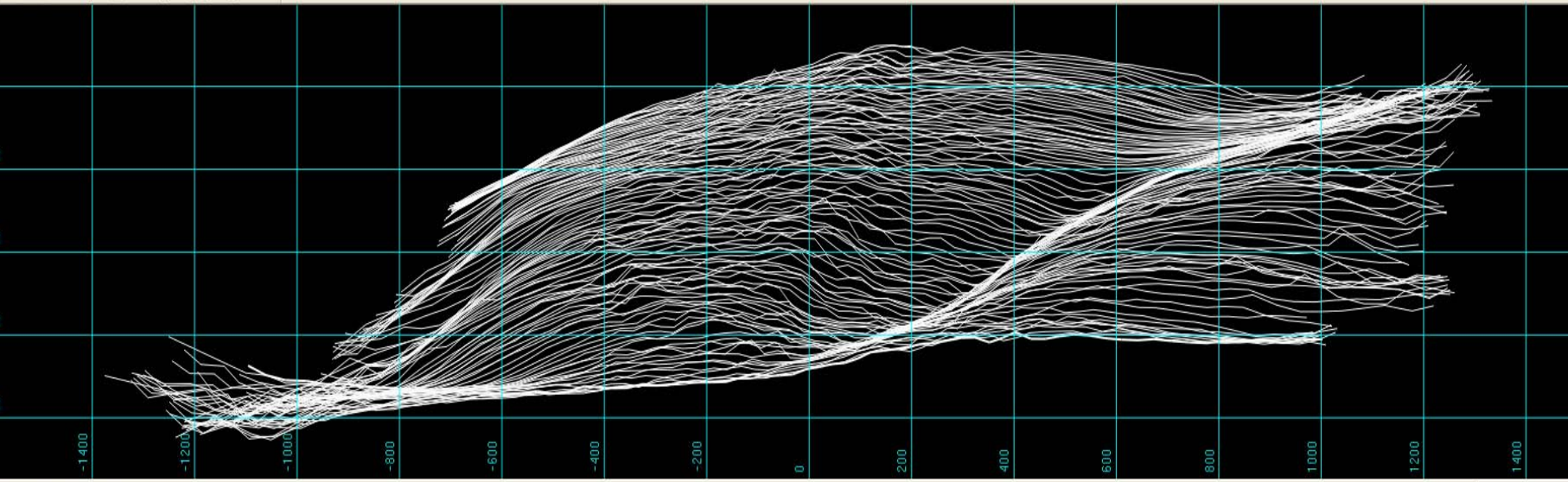
correzione del profilo di velocità del suono



Position view on device 8160 DW

3D -1326.6 , -8

tibeam Editing - Standard

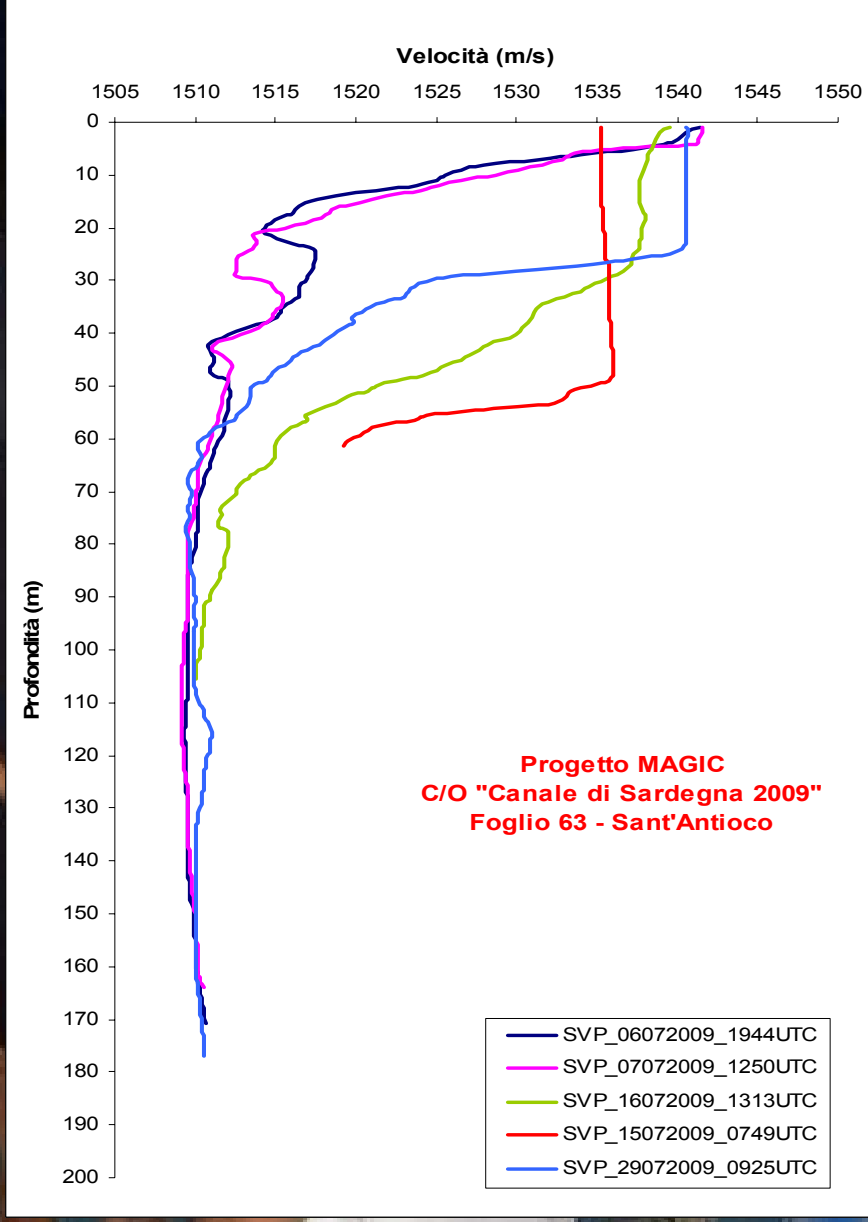


Sequence view on device 8160 DW

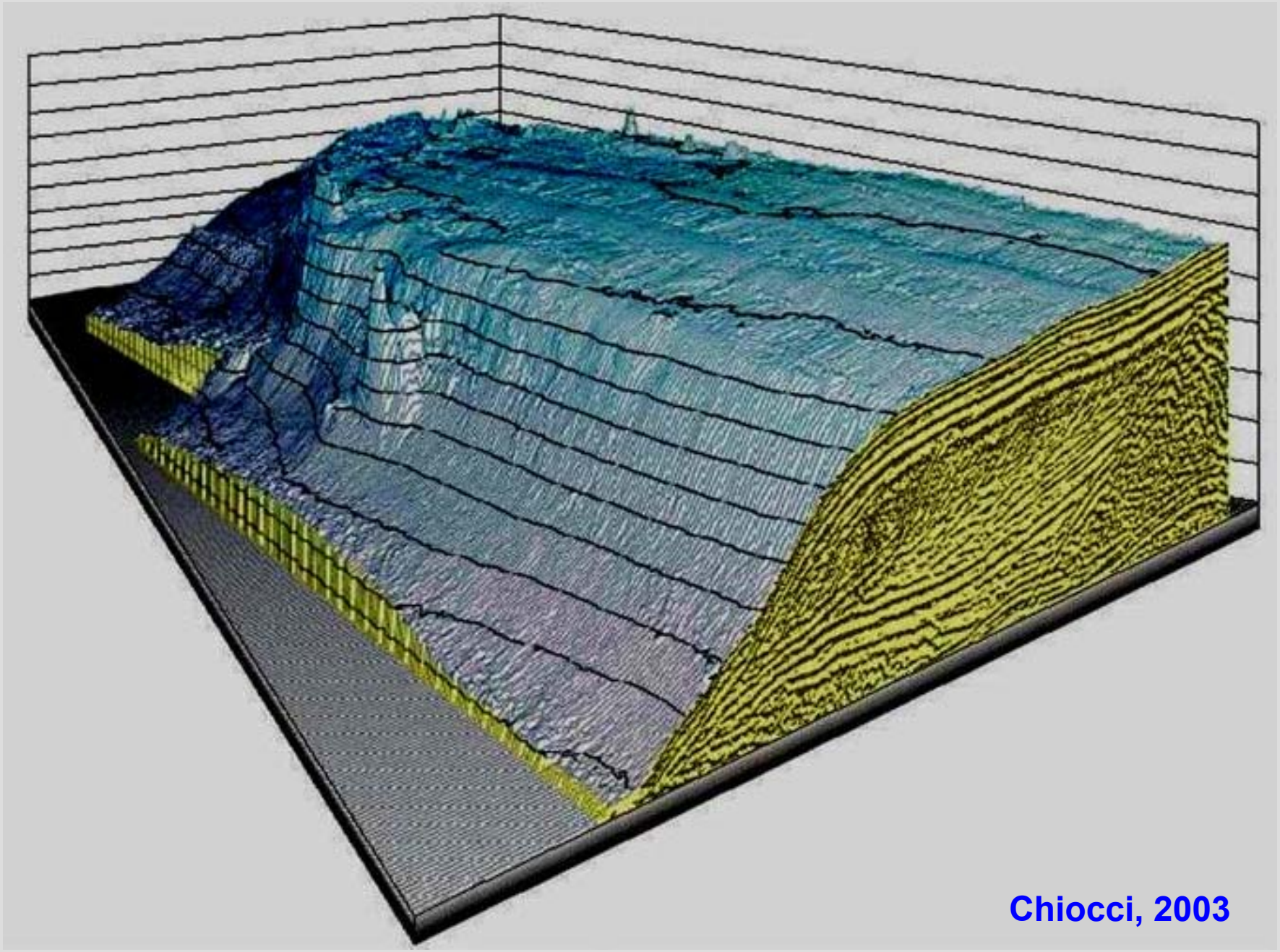
2D front -1326.6

press F1

CALIBRAZIONE velocità del suono CTD: (SVP_Sound Vertical Profile)



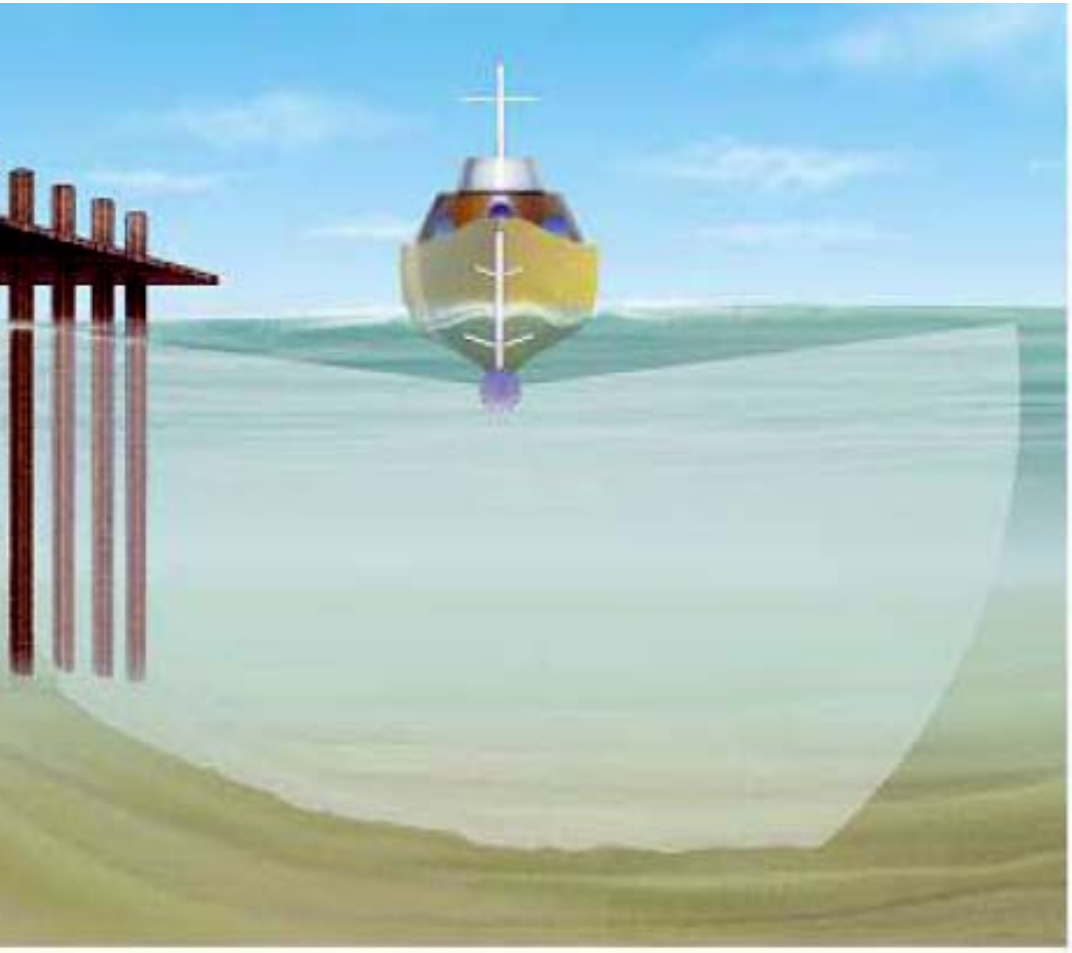
deve essere eseguita a intervalli circa regolari (24 ore) la misura della velocità del suono tramite una sonda SVP che rileva le caratteristiche chimico-fisiche lungo la

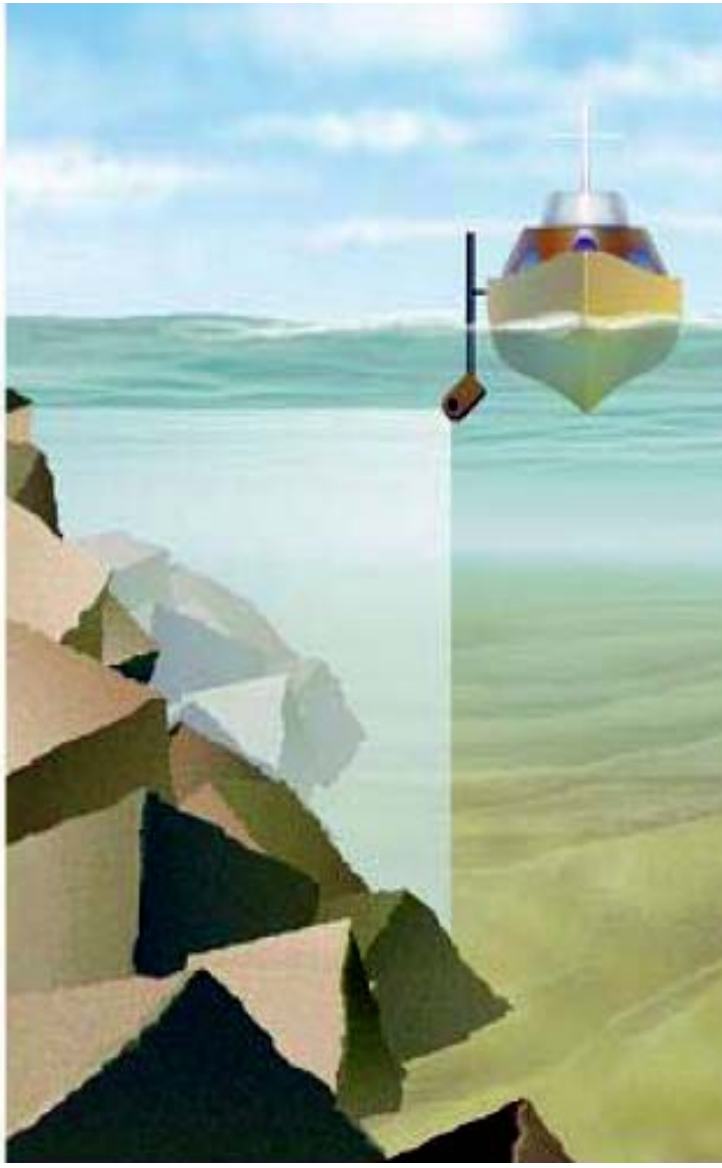


Chiocci, 2003


RESON Seabat 8125
mulibeam echosounder


TRER
RHEA
1100





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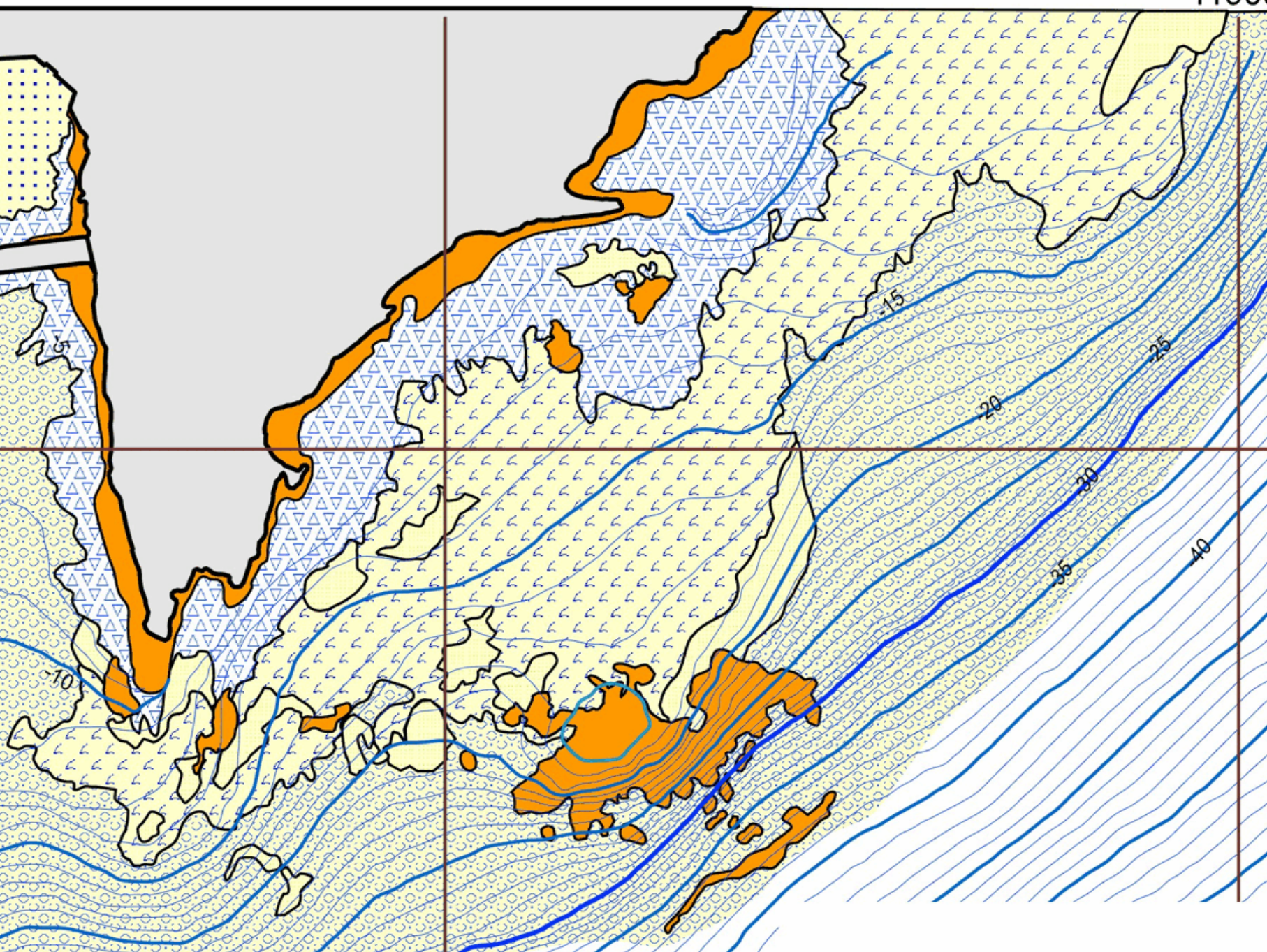
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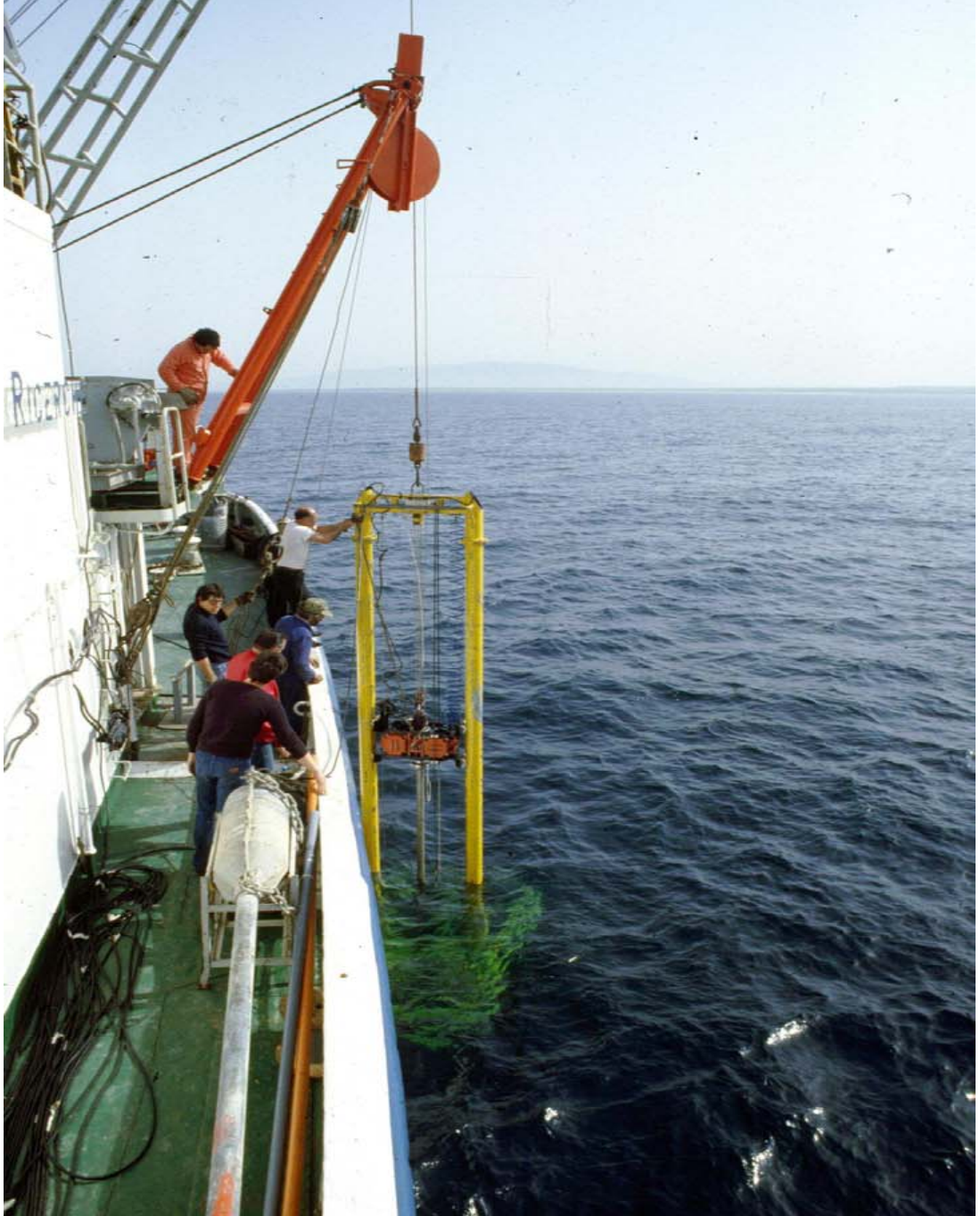
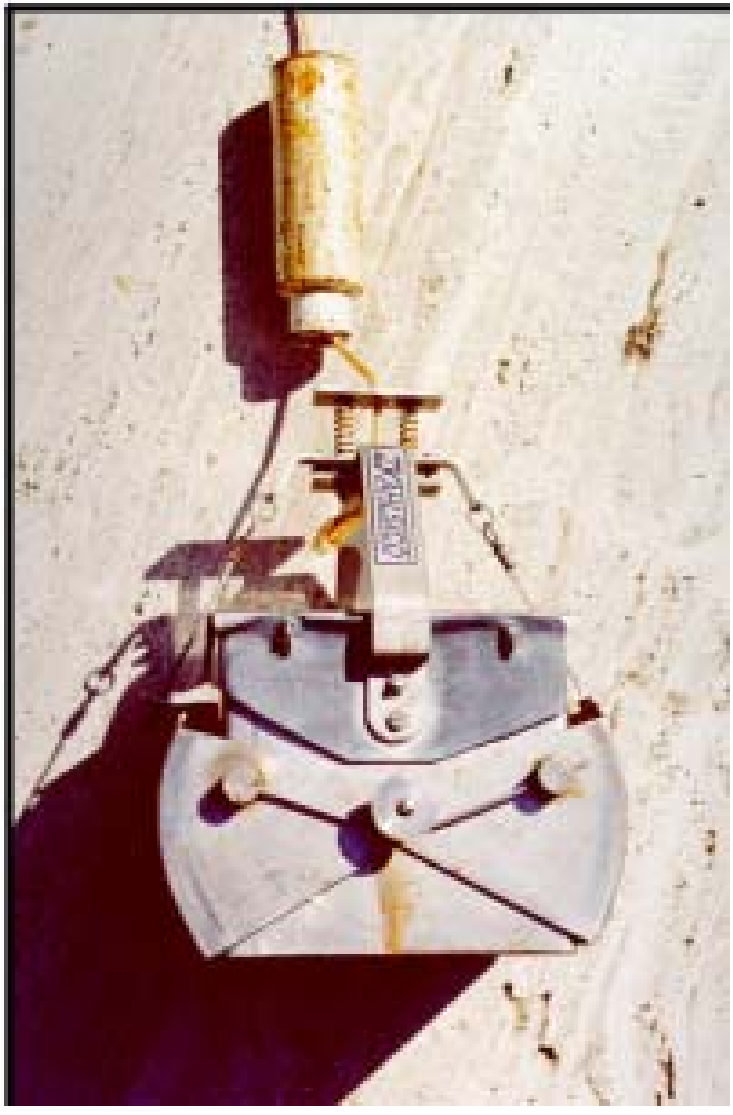


Benne utilizzate per il campionamento dei sedimenti superficiali

Benna Van Veen



Box corer