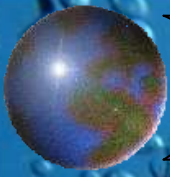


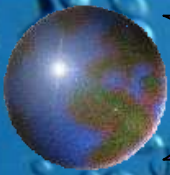
*Υποθαλάσσια (βενθικά) παρατηρητήρια
στον Ελληνικό θαλάσσιο χώρο*



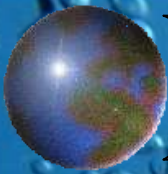
Επιχειρησιακή Ωκεανογραφία
Γ. Παπαθεοδώρου



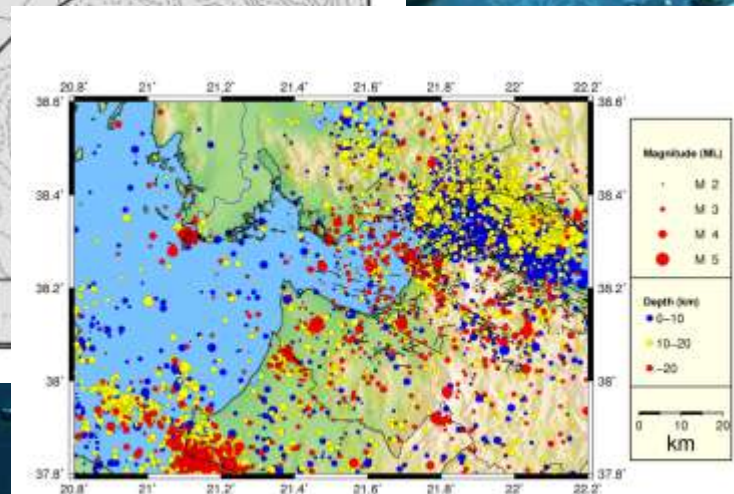
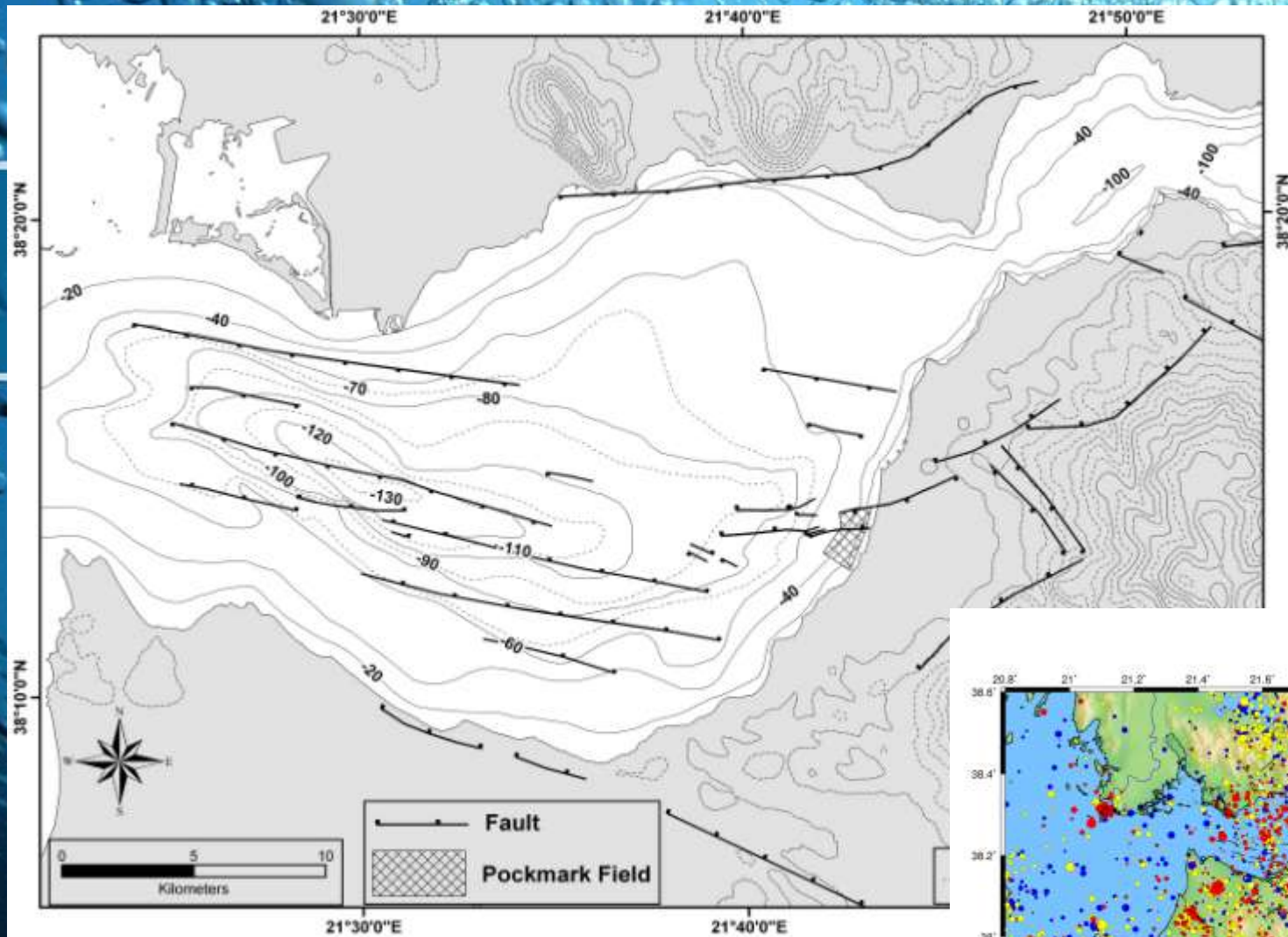
ΠΑΤΡΑΪΚΟΣ ΚΟΛΠΟΣ



*Το επιστημονικό πρόβλημα
Η επιλογή της θέσης
Ο σχεδιασμός του παρατηρητηρίου
Η πόντιση
Ο χρόνος παρακολούθησης
Η ανέλκυση*



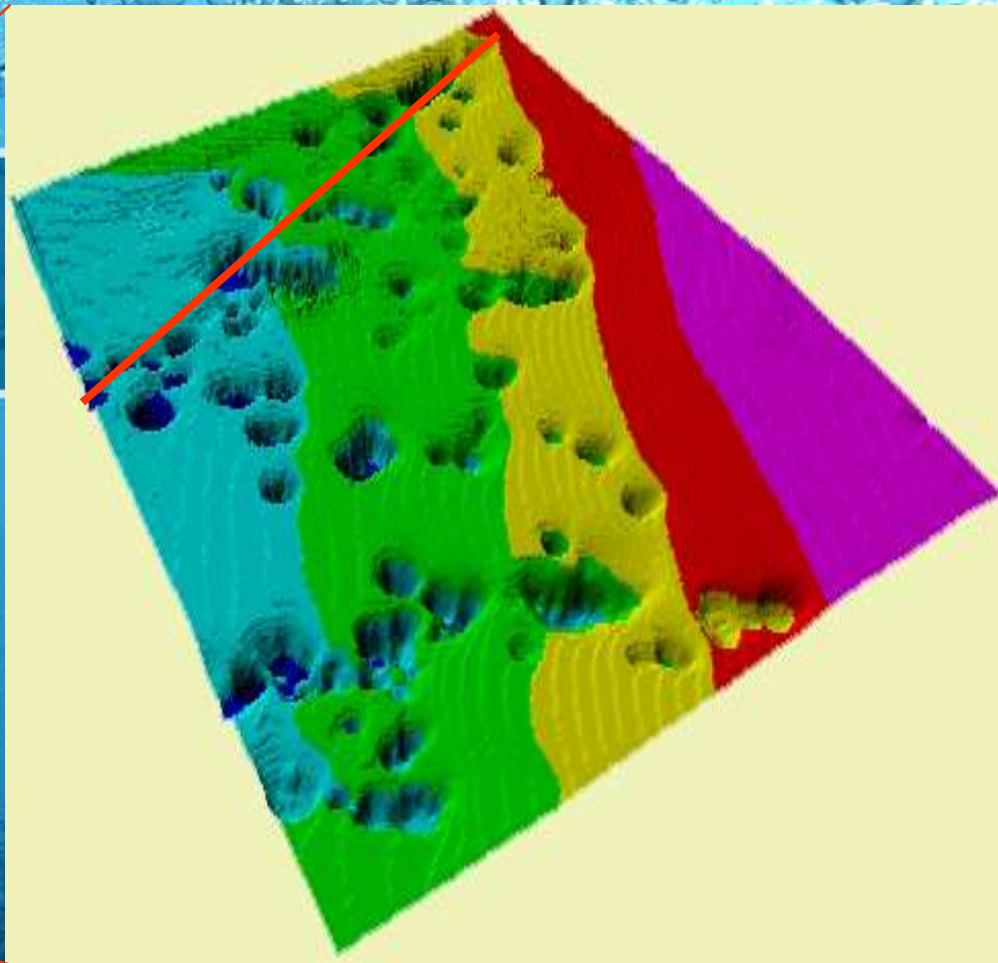
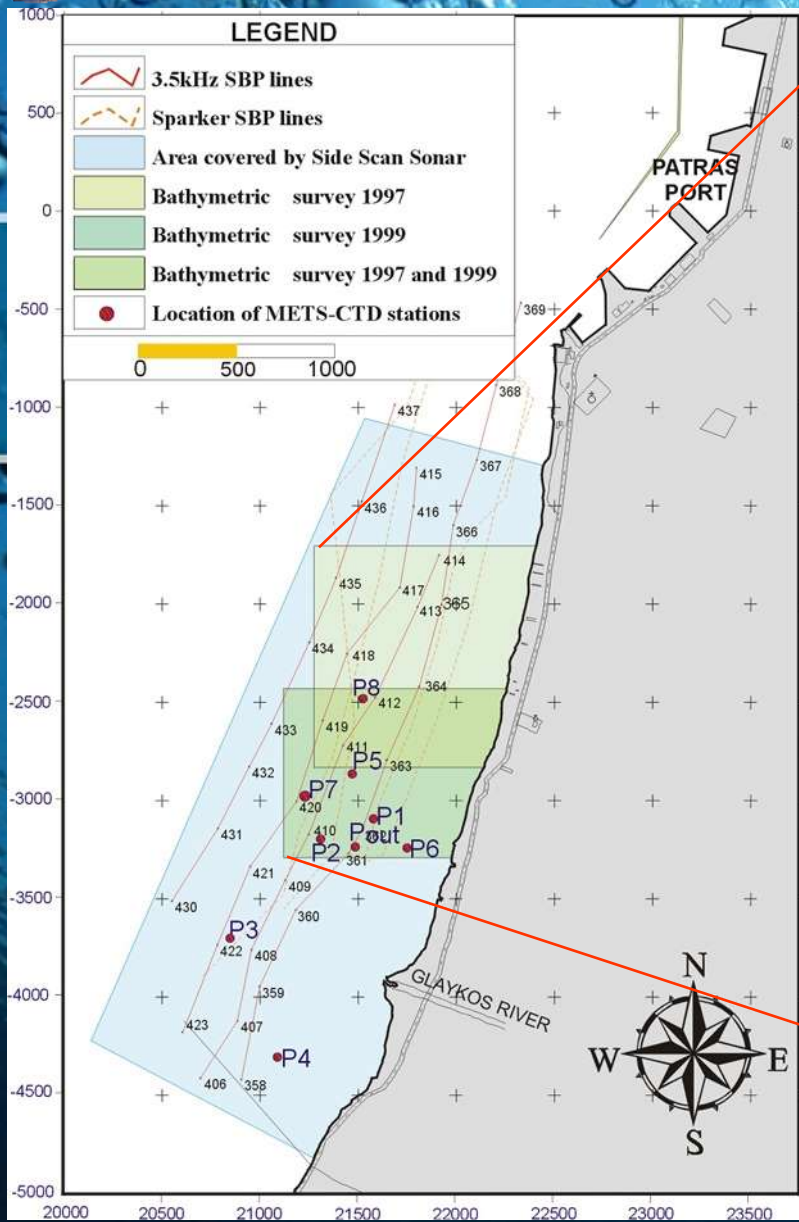
ΡΗΓΜΑΤΑ & ΣΕΙΣΜΙΚΟΤΗΤΑ

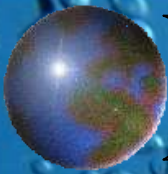




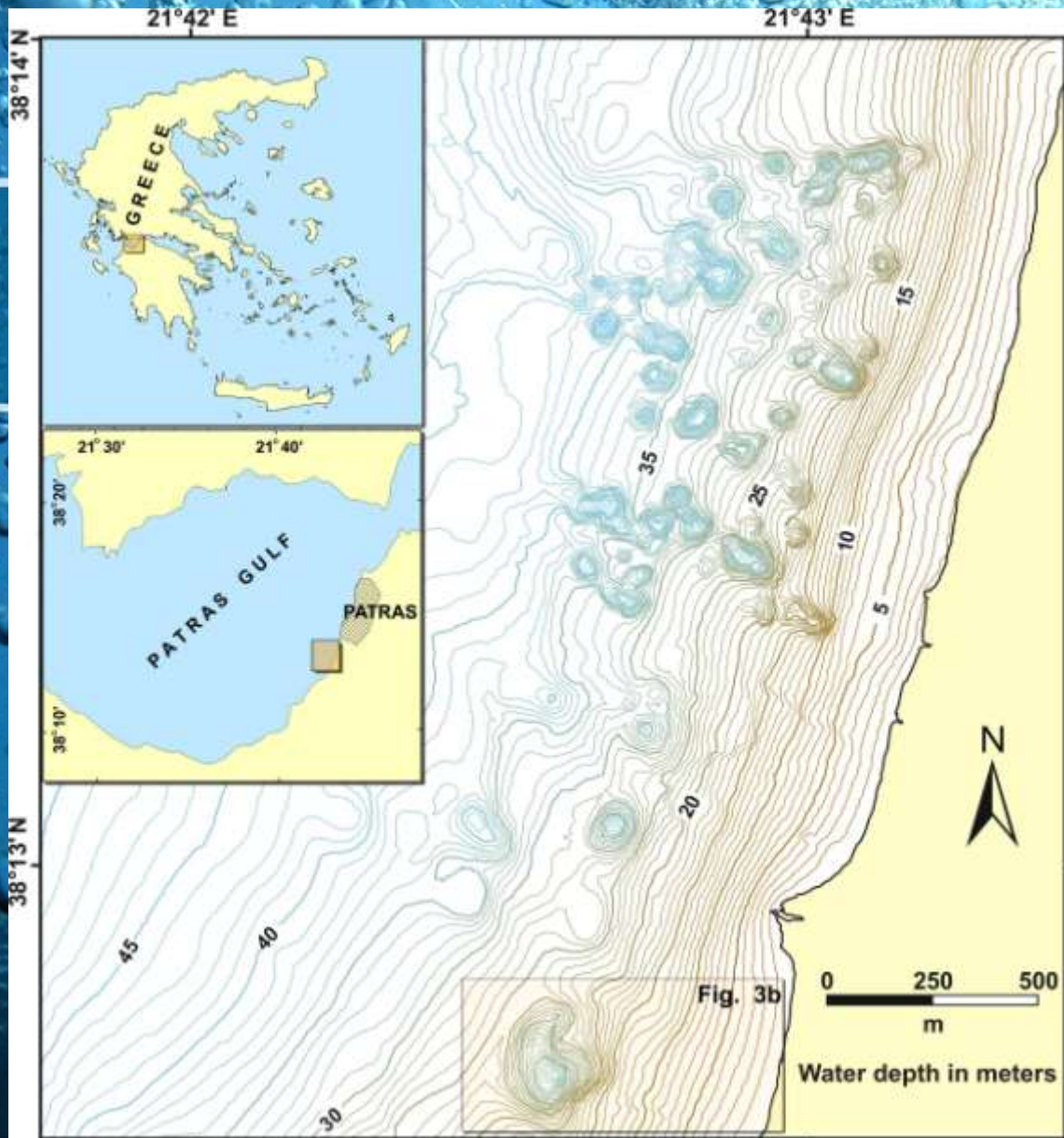
ΤΟ ΠΕΔΙΟ ΤΩΝ ΚΡΑΤΗΡΩΝ

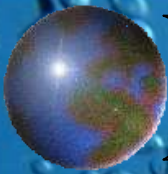
Ρήγμα Αγ. Τριάδος





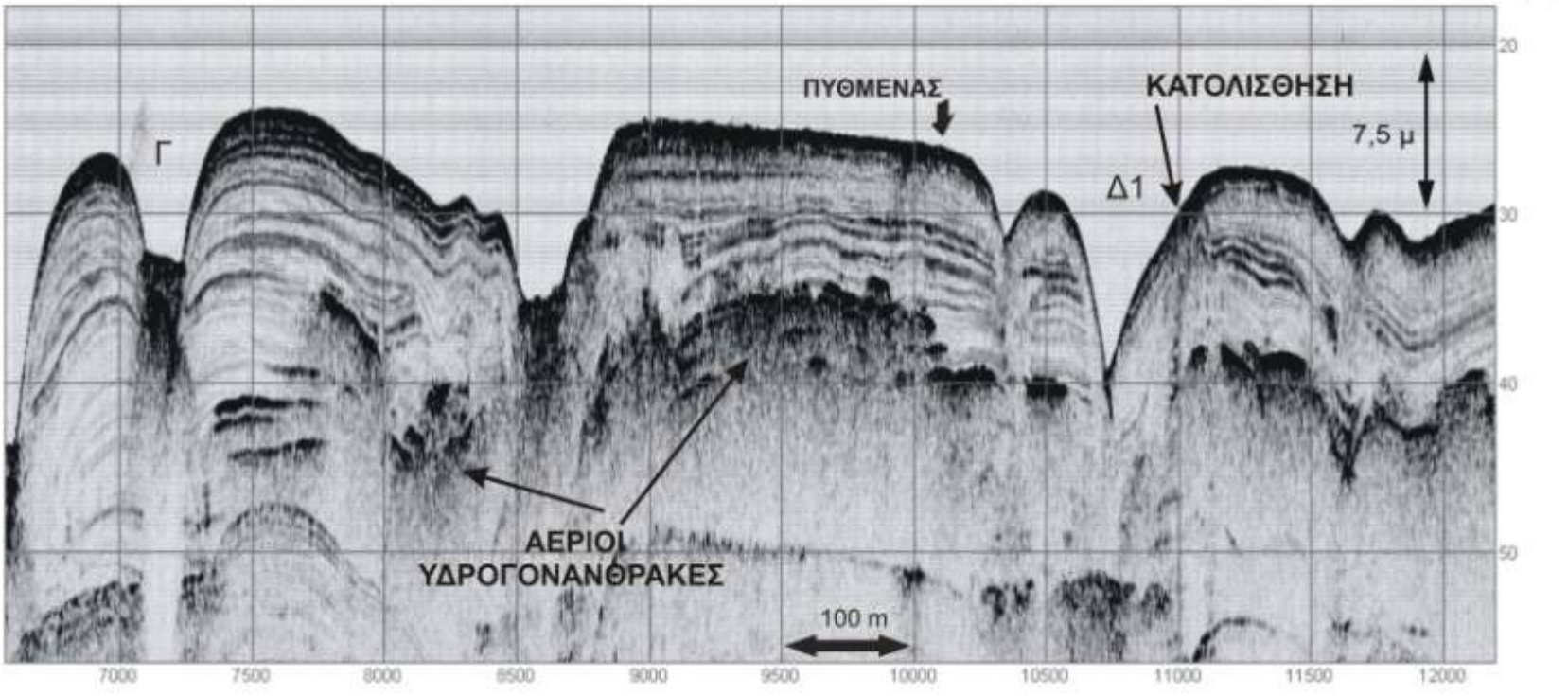
ΛΕΠΤΟΜΕΡΗΣ ΒΥΘΟΜΕΤΡΙΚΟΣ ΧΑΡΤΗΣ

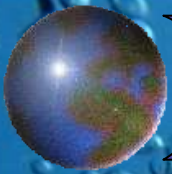




ΟΙ ΚΡΑΤΗΡΕΣ

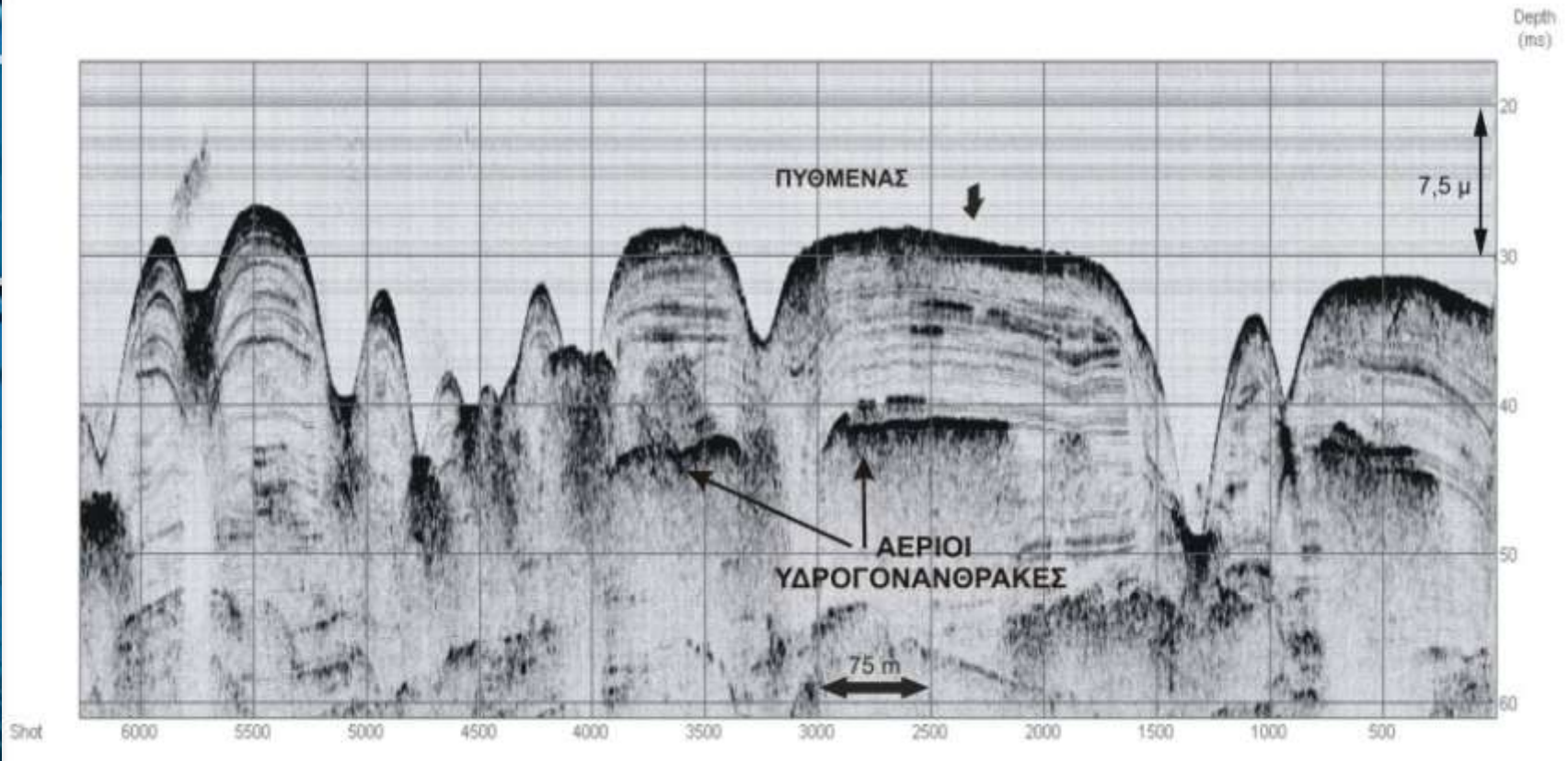
ΓΕΩΑΚΟΥΣΤΙΚΗ ΤΟΜΗ Ρ10

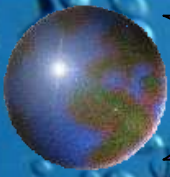




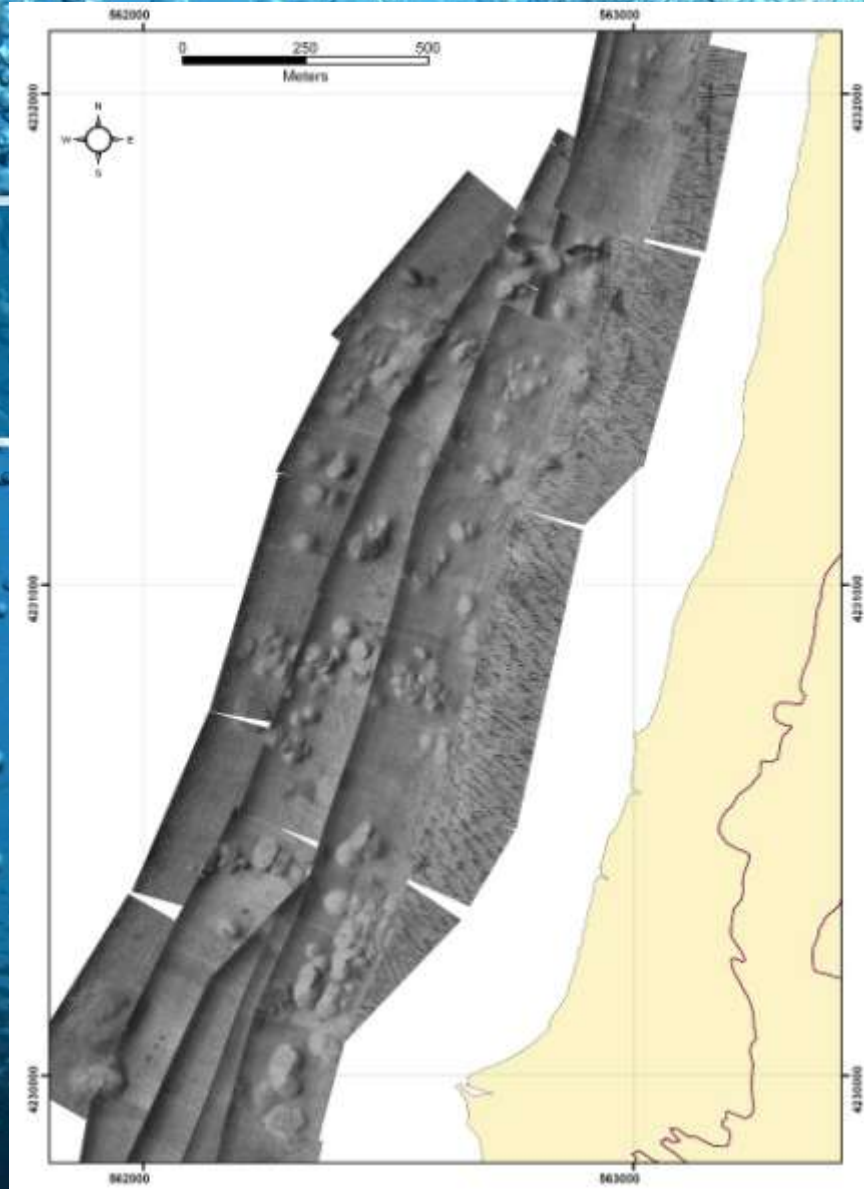
ΟΙ ΚΡΑΤΗΡΕΣ

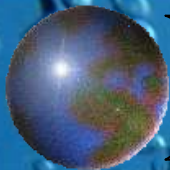
ΓΕΩΑΚΟΥΣΤΙΚΗ ΤΟΜΗ Ρ9



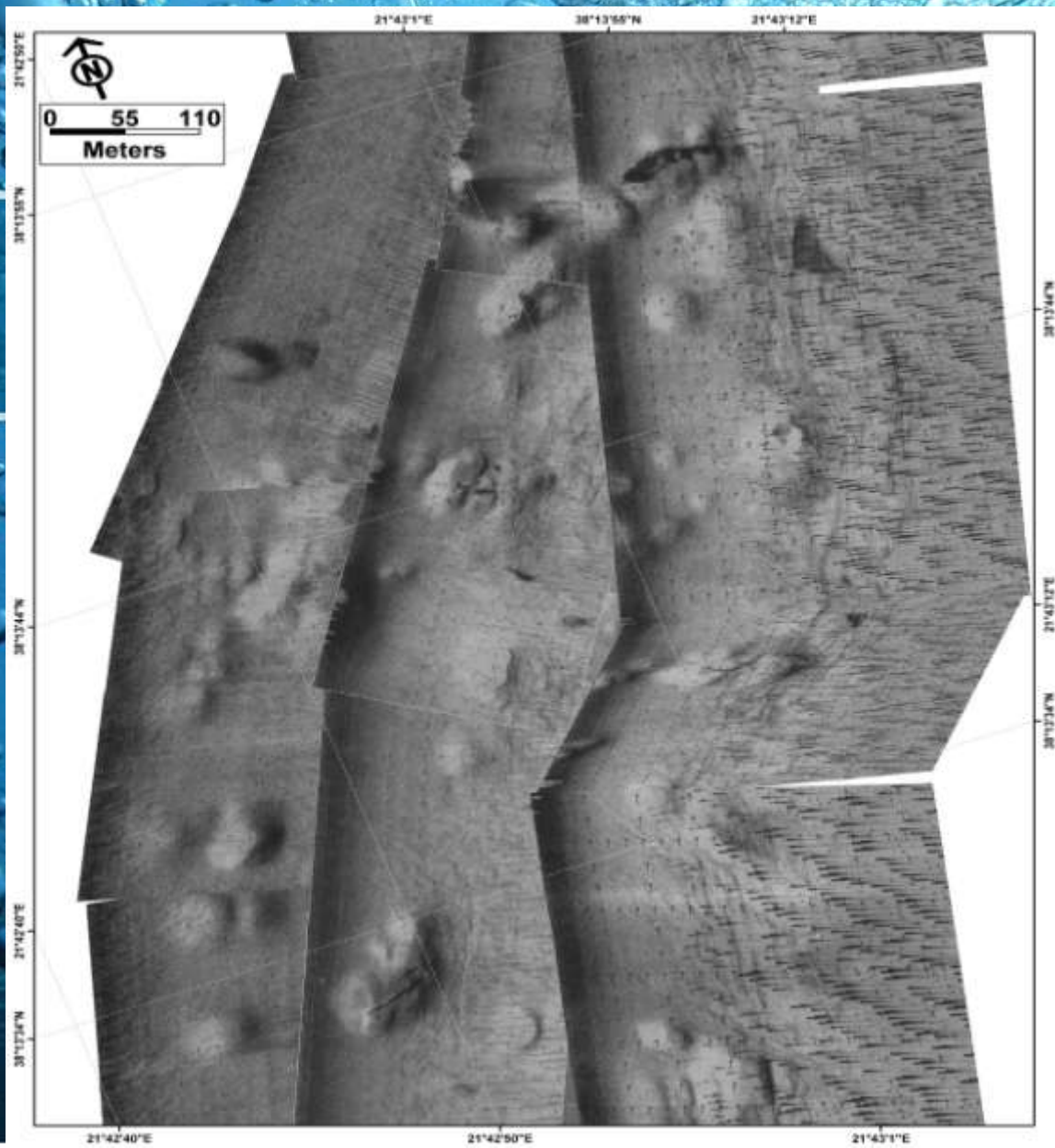


ΗΧΟΓΡΑΦΙΑ («ΑΕΡΟΦΩΤΟΓΡΑΦΙΑ») ΤΟΥ ΠΕΔΙΟΥ





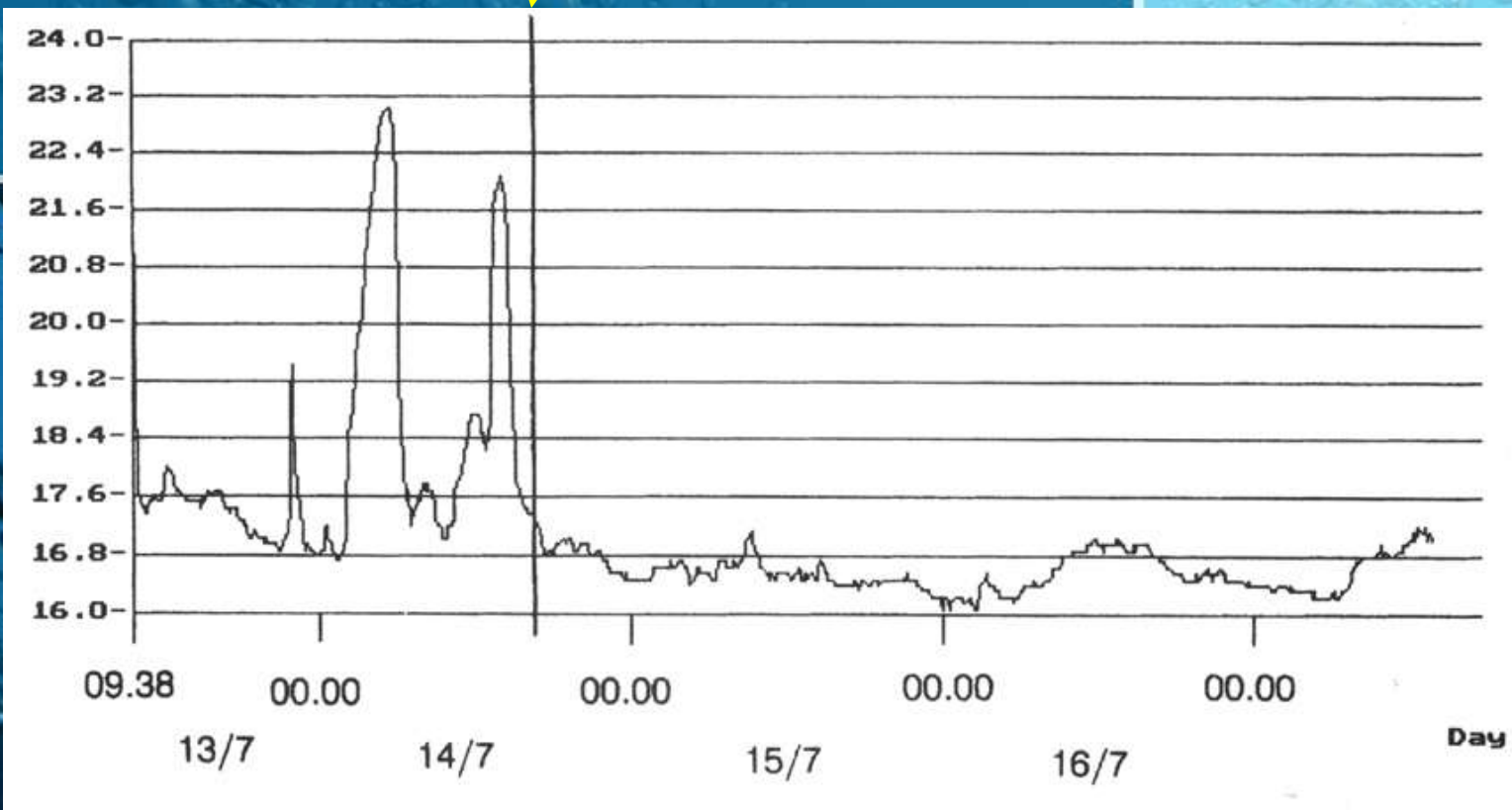
.....λεπτομέρεια

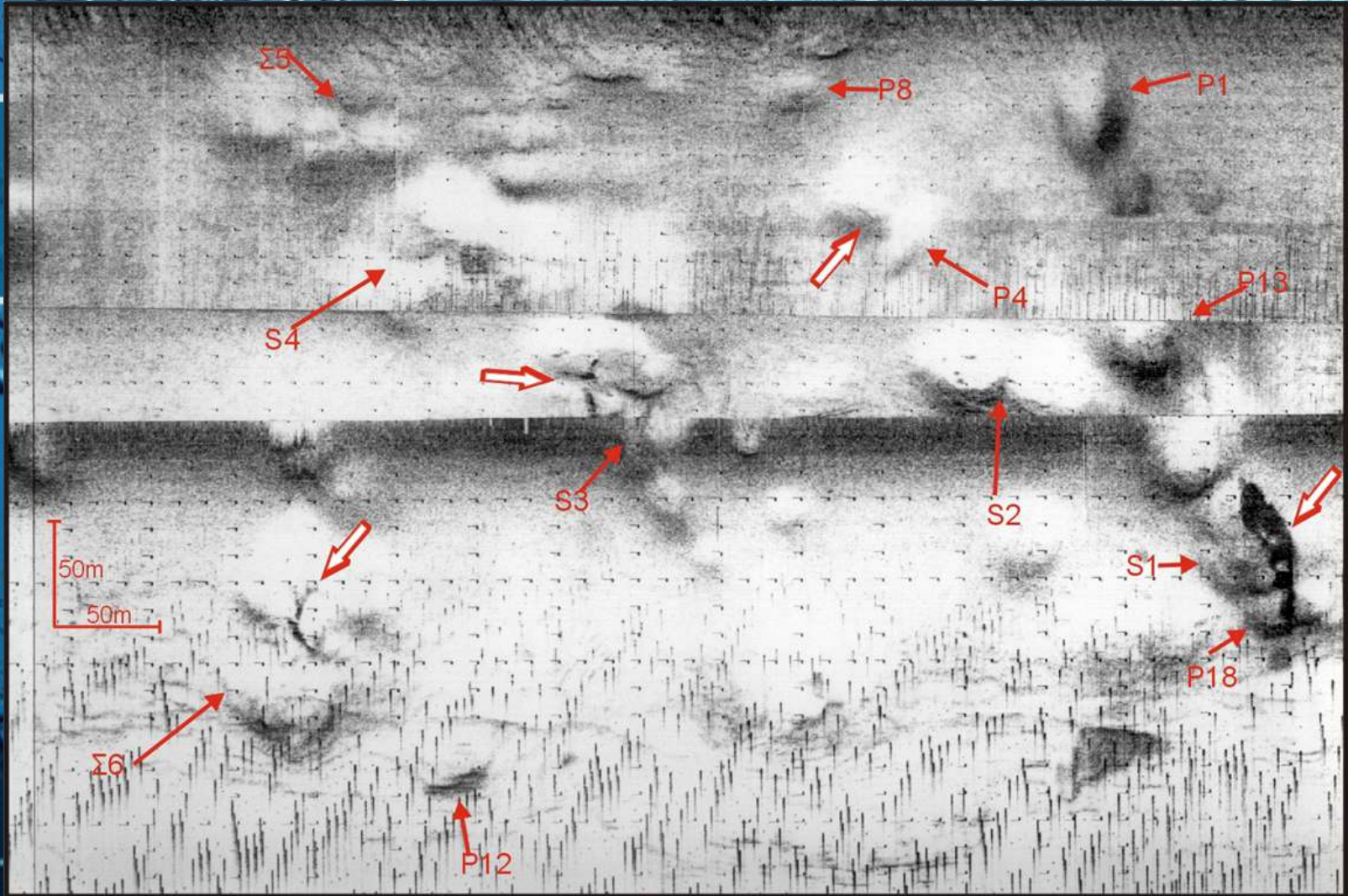
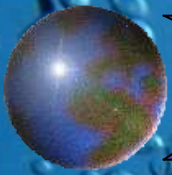


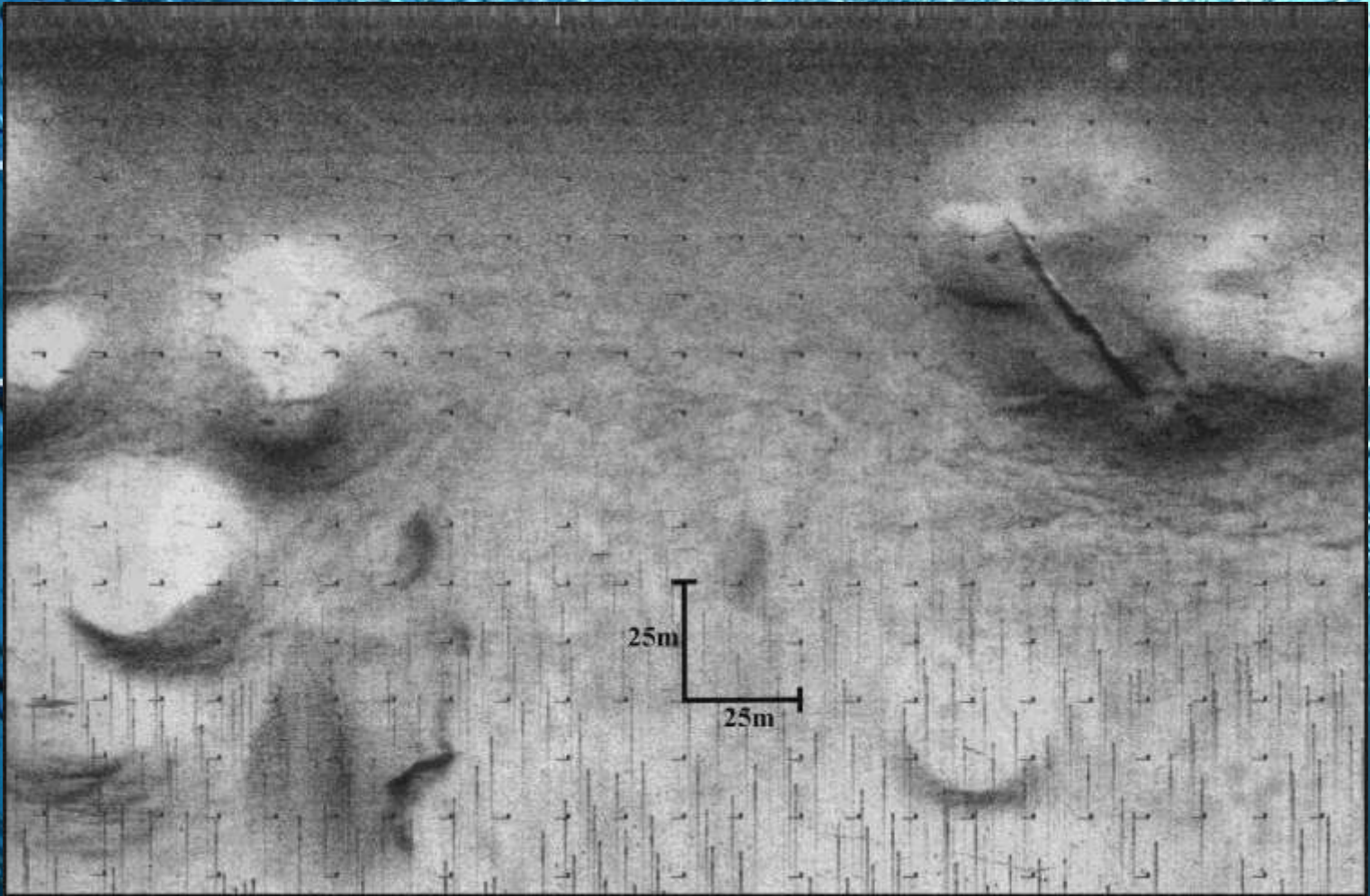
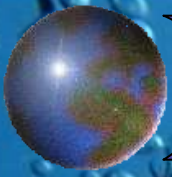


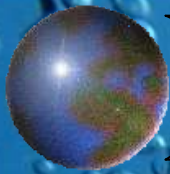
ΣΕΙΣΜΟΣ 5.4R (14/7/1993)

ΣΕΙΣΜΟΣ 5.4R



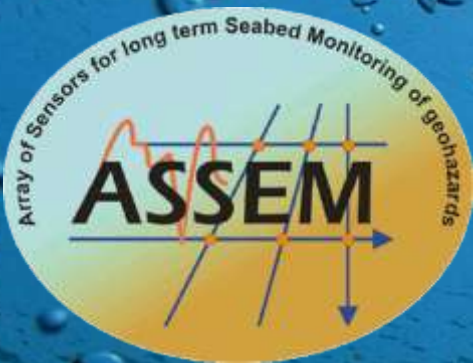




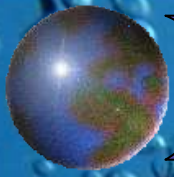


ΗΠΑΡΑΚΟΛΟΥΘΗΣΗ ΕΝΟΣ ΚΡΑΤΗΡΑ

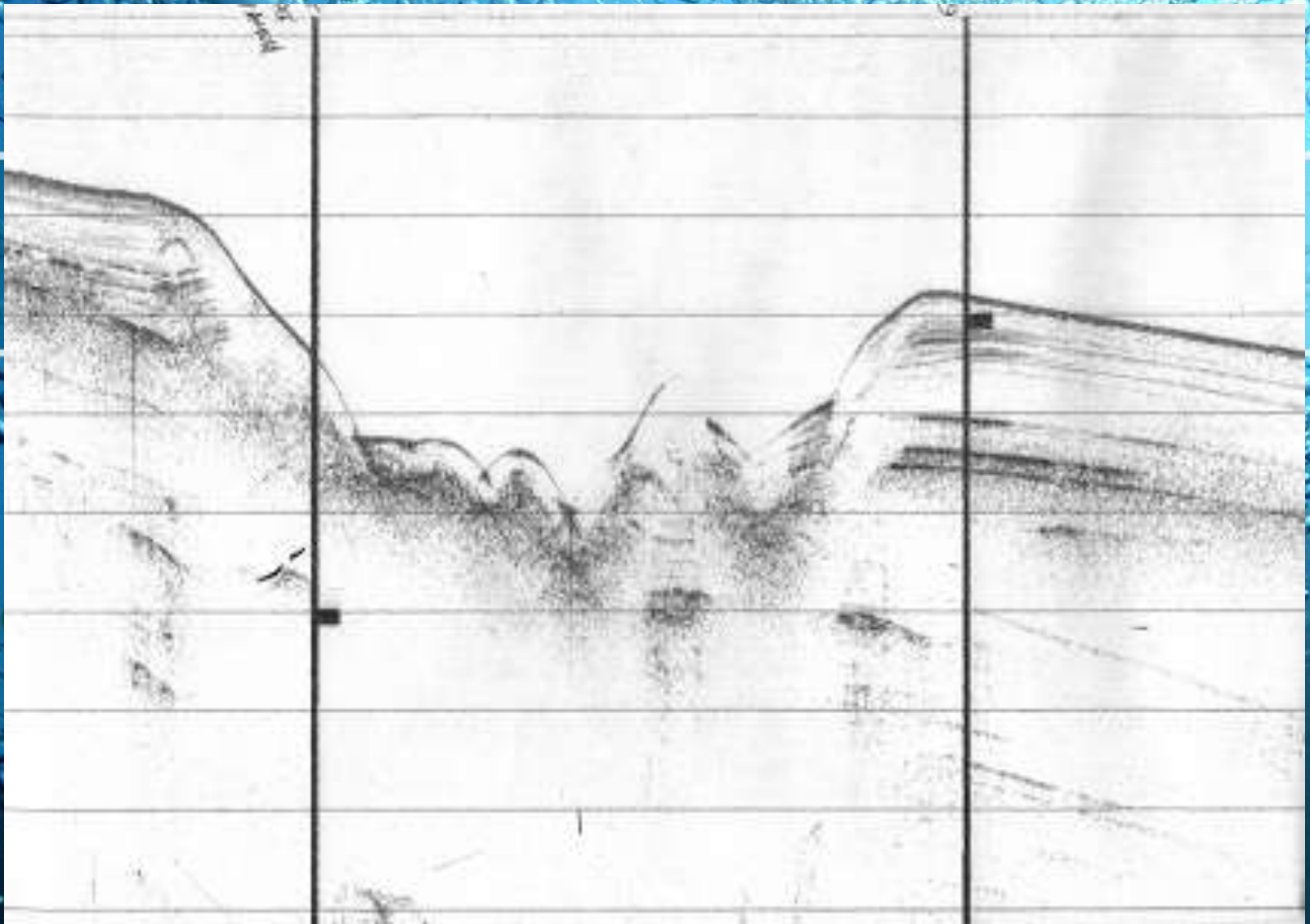
Μακράς διάρκειας παρακολούθηση της δραστηριότητας ενός αντιπροσωπευτικού κρατήρα του πεδίου του Πατραϊκού

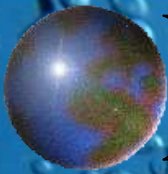


ΠΥΘΑΓΟΡΑΣ ΙΙ
ΠΕΡΙΒΑΛΛΟΝ
ΥΠΟΥΡΓΕΙΟ ΕΘΝΙΚΗΣ ΠΑΙΔΕΙΑΣ
& ΘΡΗΣΚΕΥΜΑΤΩΝ



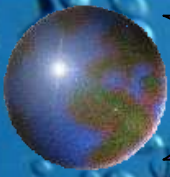
Ο ΚΡΑΤΗΡΑΣ Ρ4



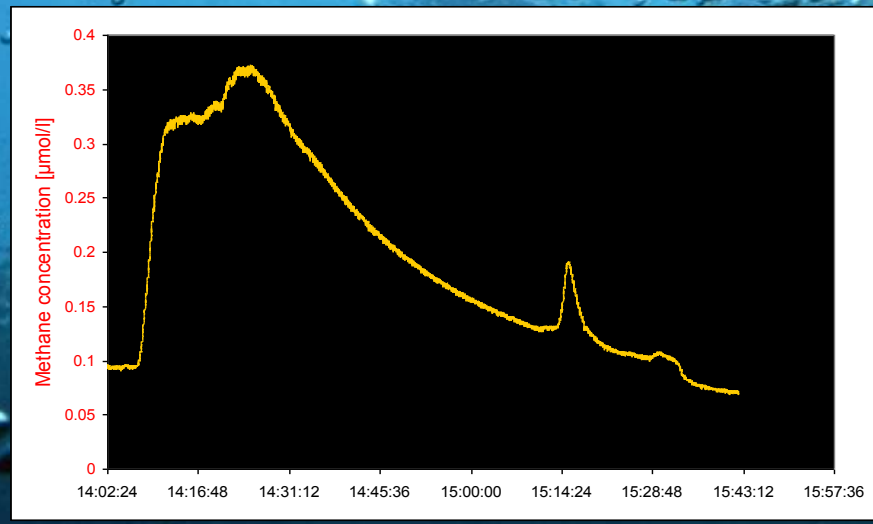
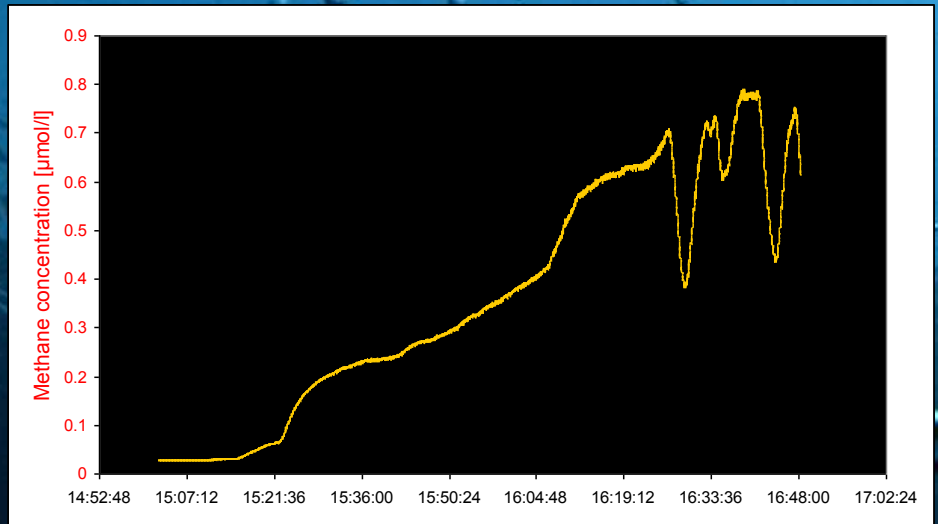
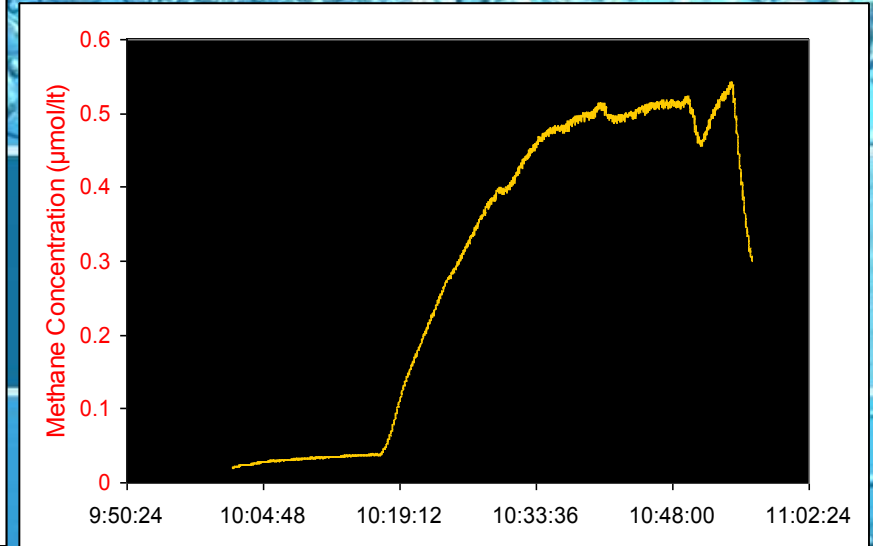
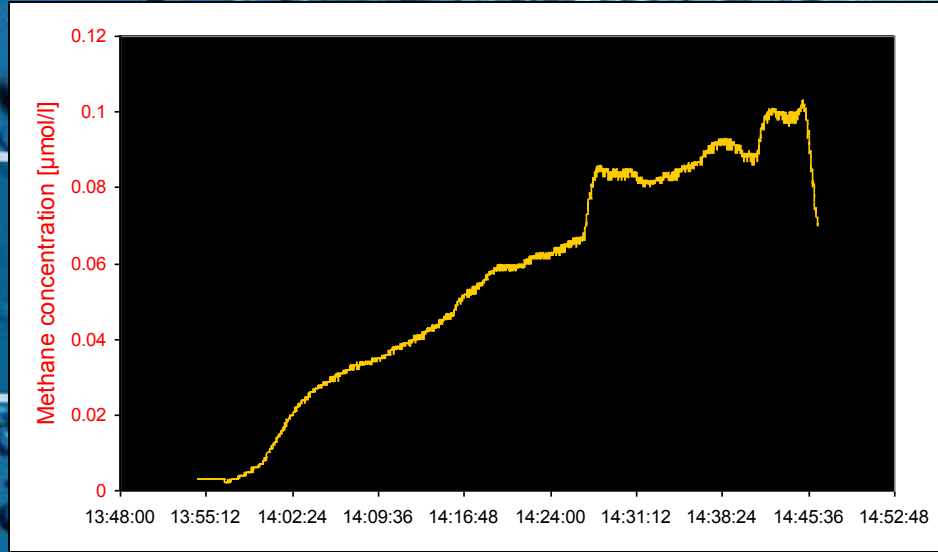


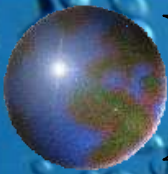
ΣΥΣΤΗΜΑΤΙΚΕΣ ΜΕΤΡΗΣΕΙΣ ΚΡΑΤΗΡΩΝ





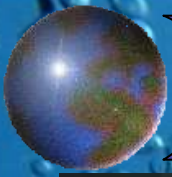
ΜΕΤΡΗΣΕΙΣ ΜΕΘΑΝΙΟΥ ΚΡΑΤΗΡΑ Ρ4





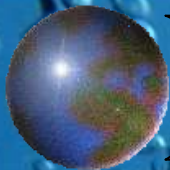
ΚΑΤΑΔΥΣΗ ΣΤΟΝ ΚΡΑΤΗΡΑ Ρ4





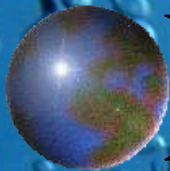
Ο ΚΡΑΤΗΡΑΣ Ρ4





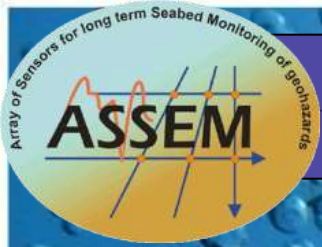
Ο ΚΡΑΤΗΡΑΣ Ρ4





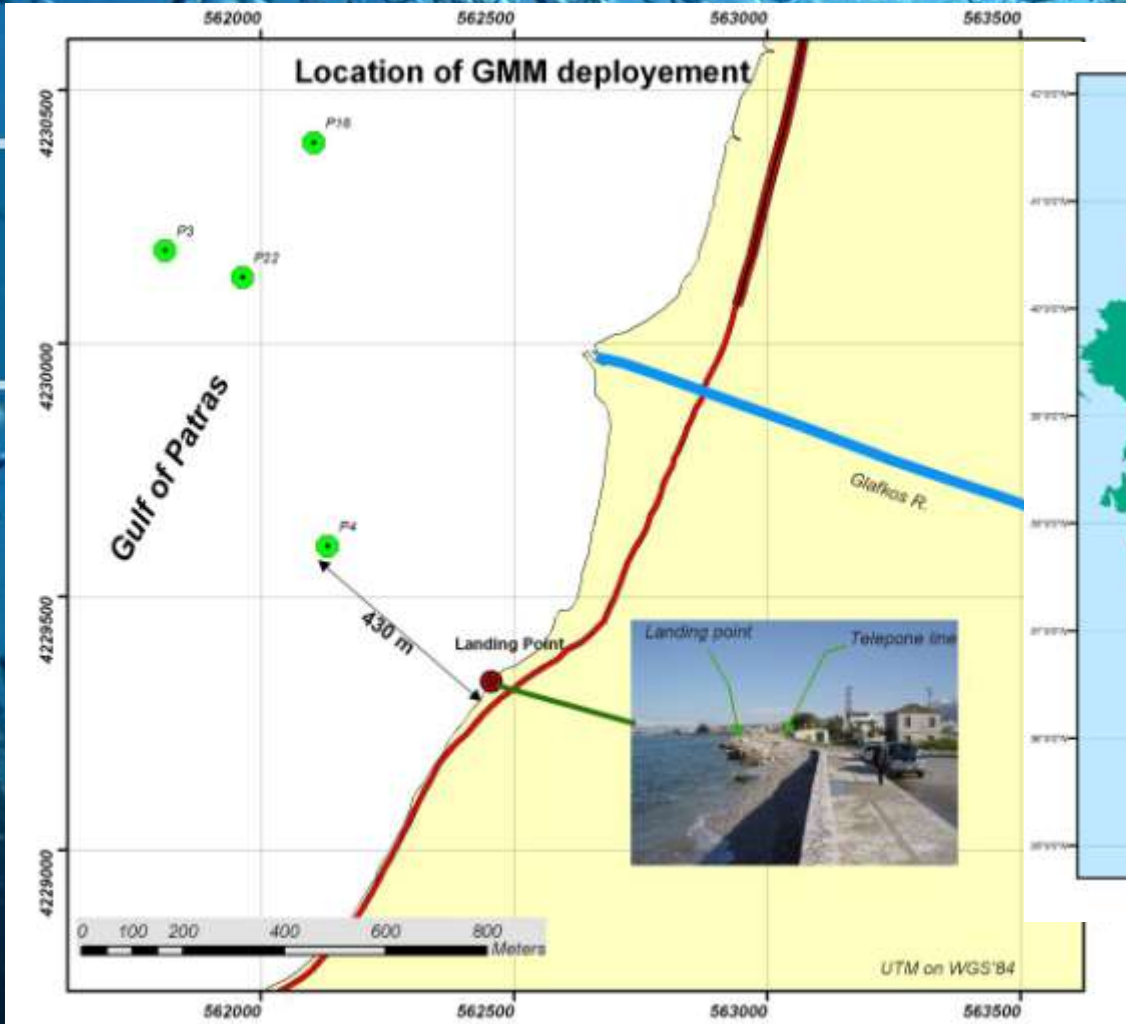
Ο ΚΡΑΤΗΡΑΣ Ρ4

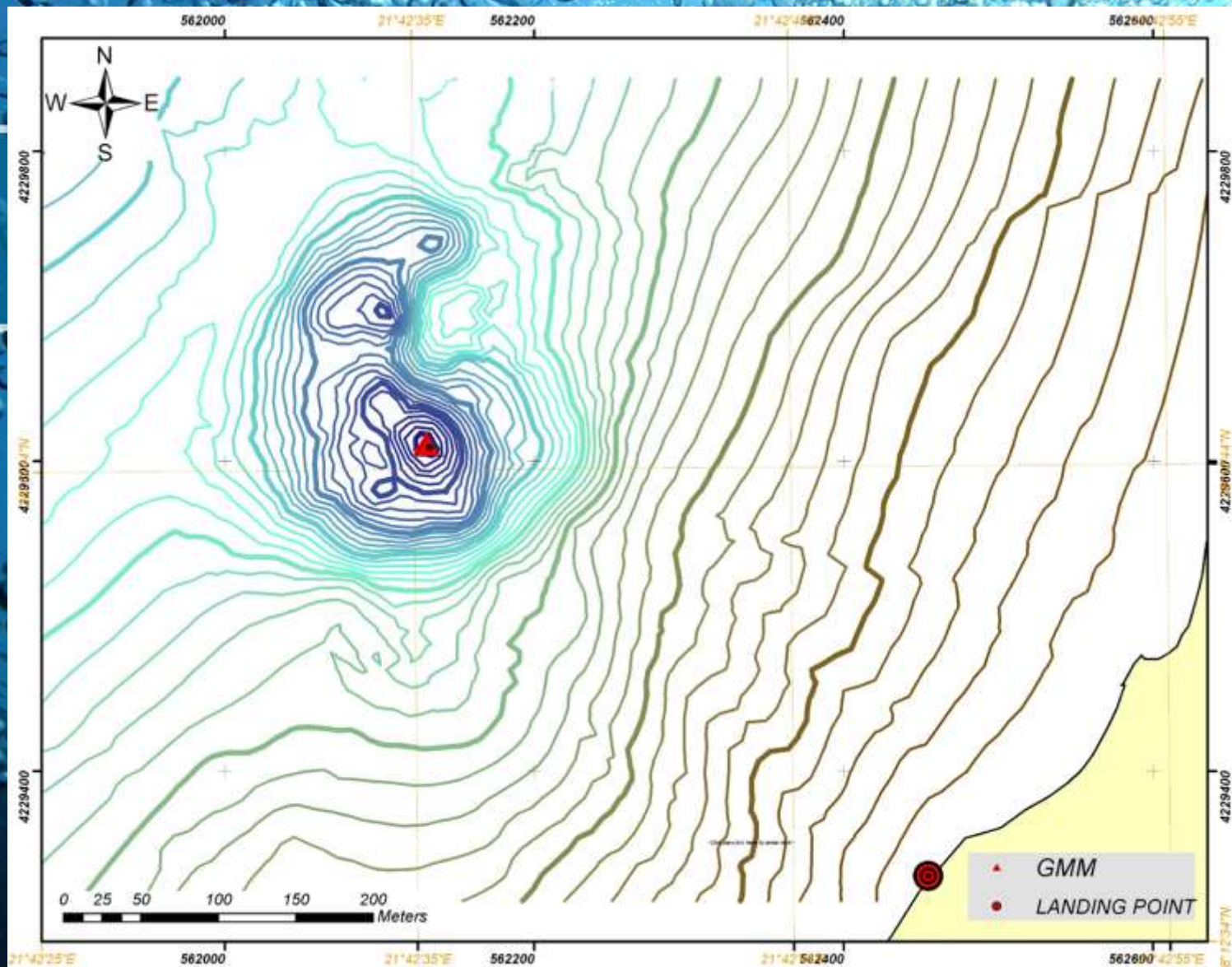
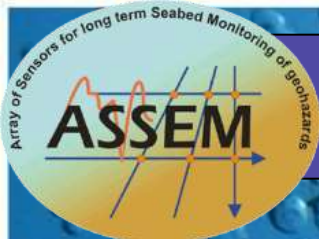


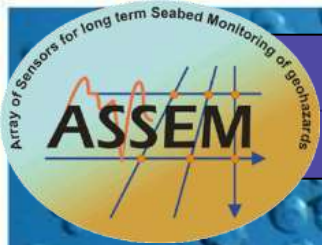


Tecnomare

Istituto Nazionale
di GEOFISICA,
VULCANOLOGIA





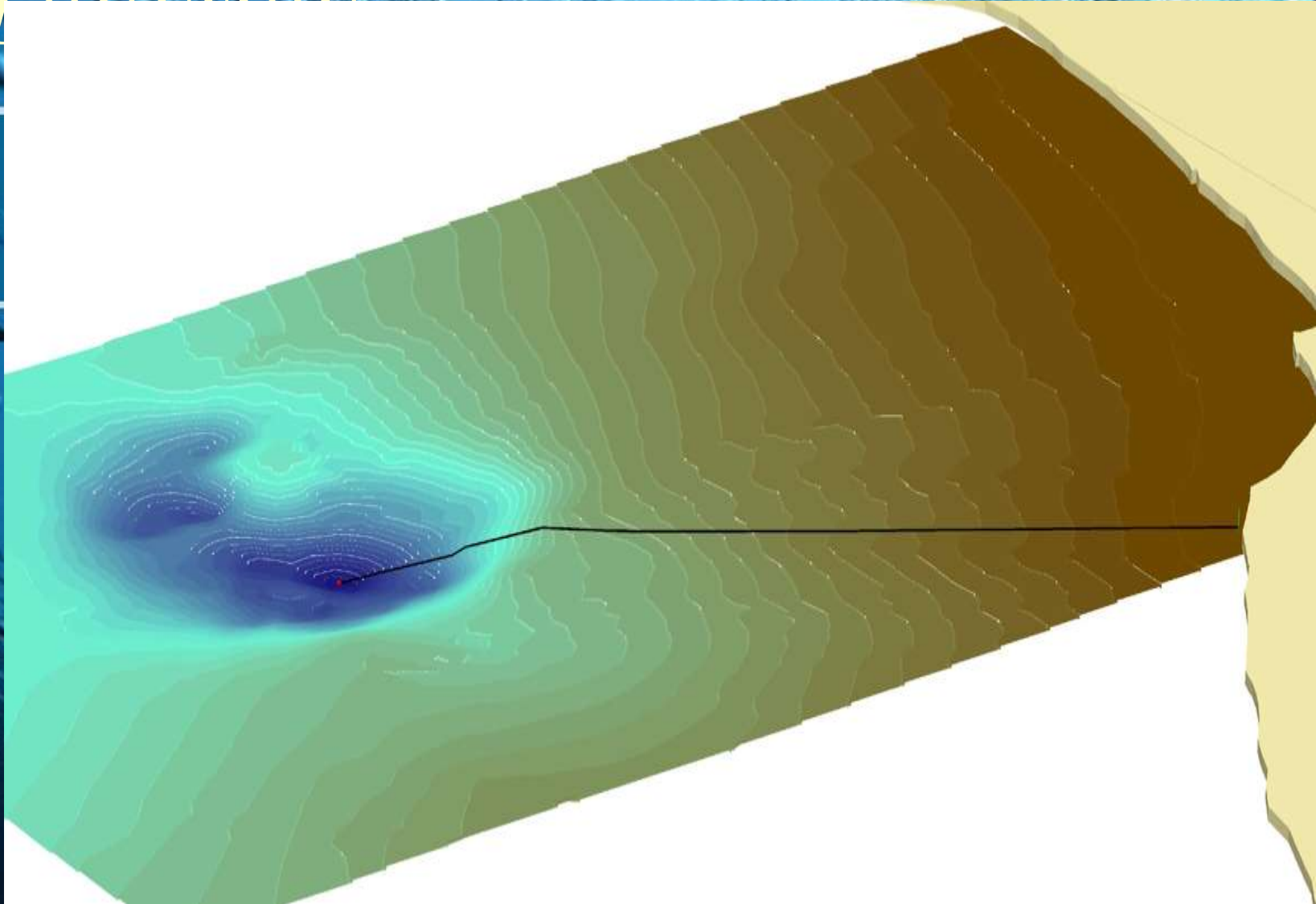


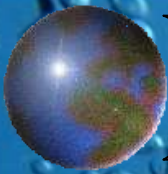
Tecnomare

Istituto Nazionale
**di GEOFISICA,
VULCANOLOGIA**

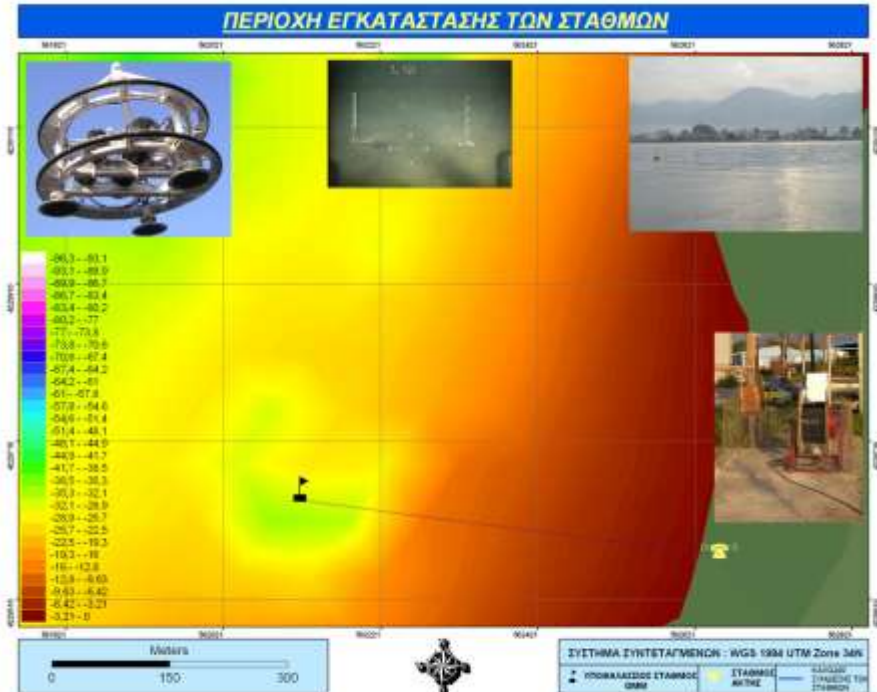
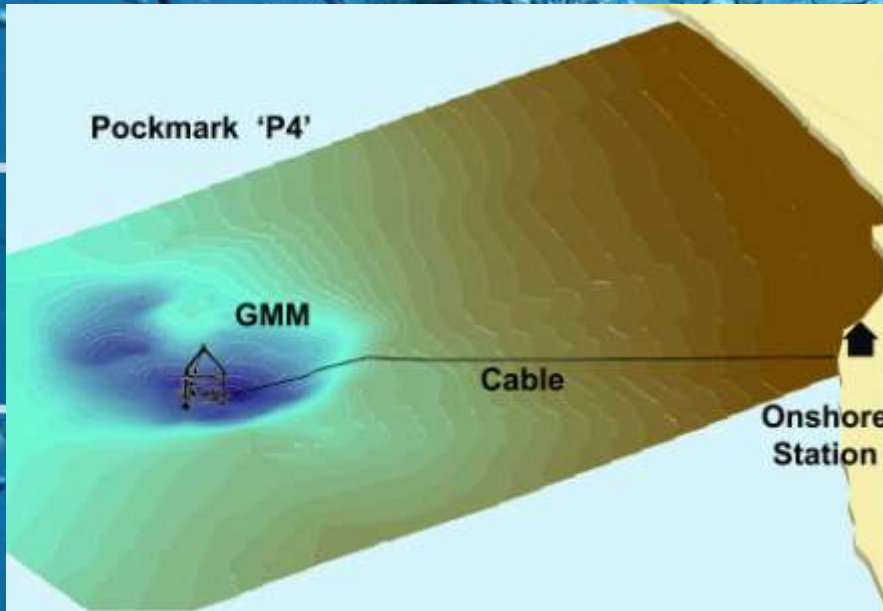


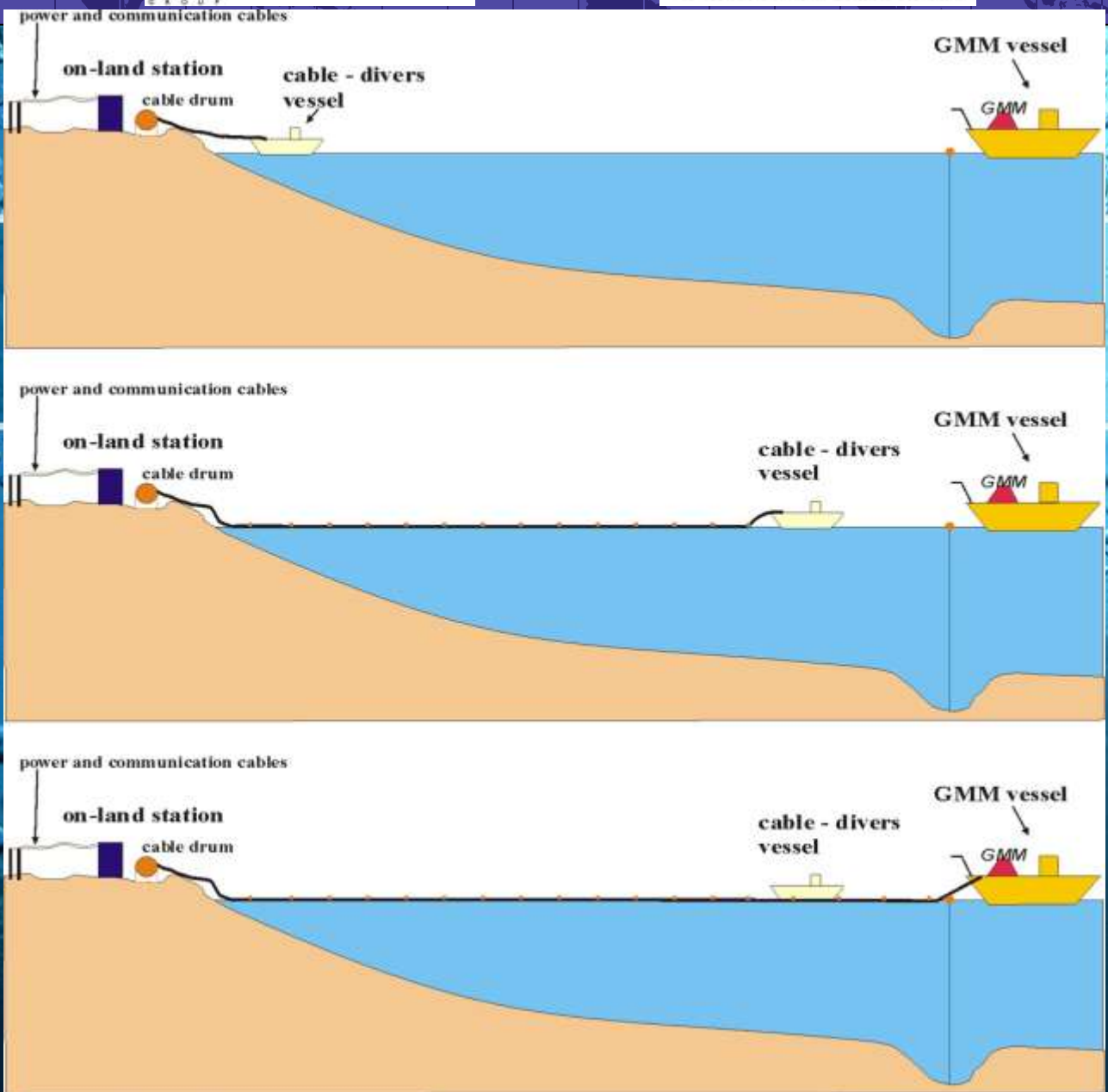
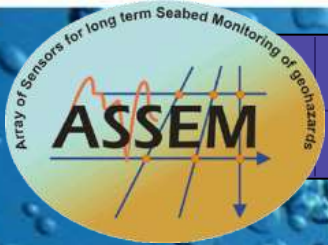
LOCATIONS

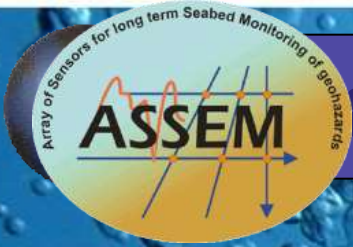




Η ΜΕΘΟΔΟΣ

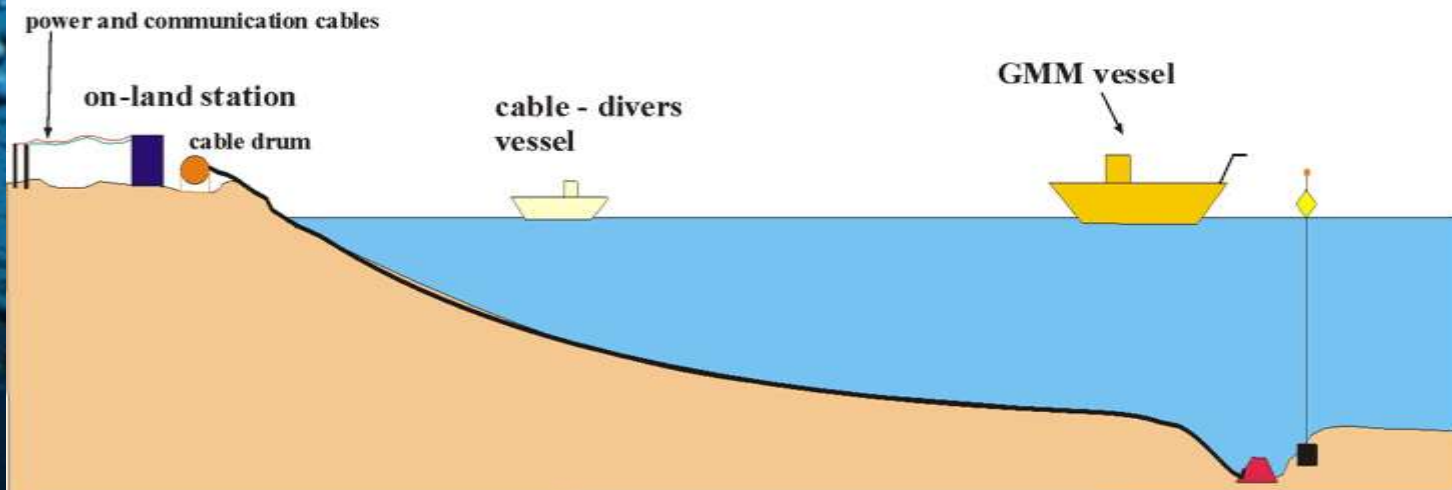
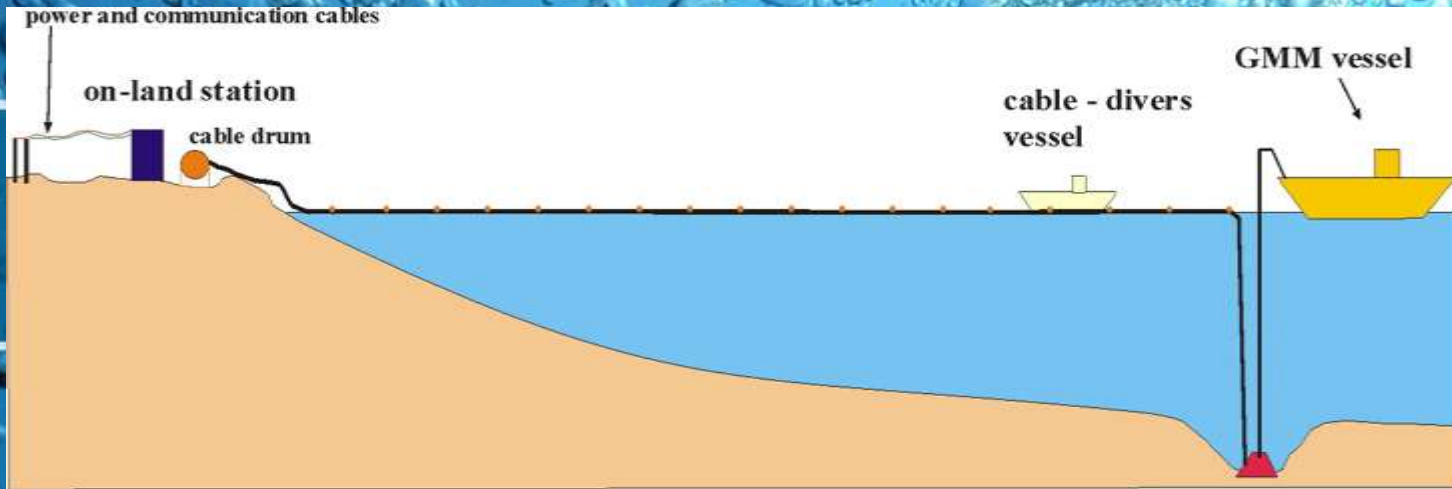


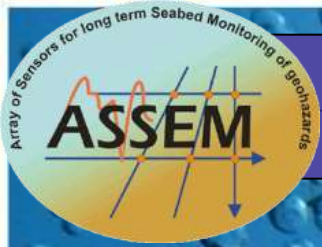




Tecnomare

Istituto Nazionale
di GEOFISICA,
VULCANOLOGIA

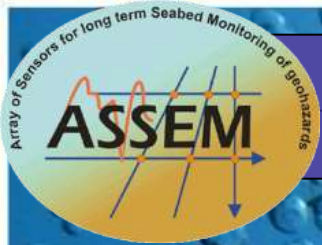




Tecnomare



ON – LAND STATION



Tecnomare

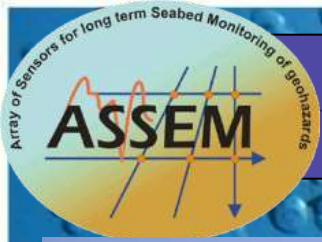


Istituto Nazionale
GEOFISICA.
VULCANOLOGIA



CABLE DEPLOYMENT



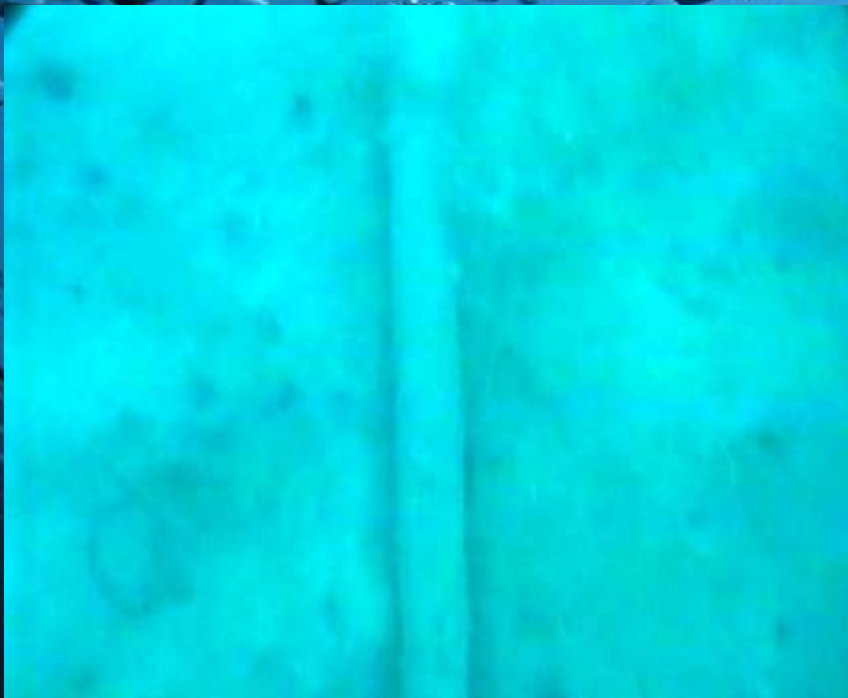
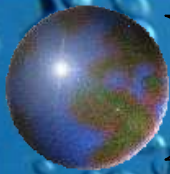


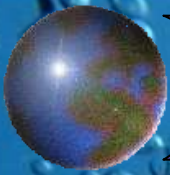
Tecnomare

Istituto Nazionale
di GEOFISICA,
VULCANOLOGIA

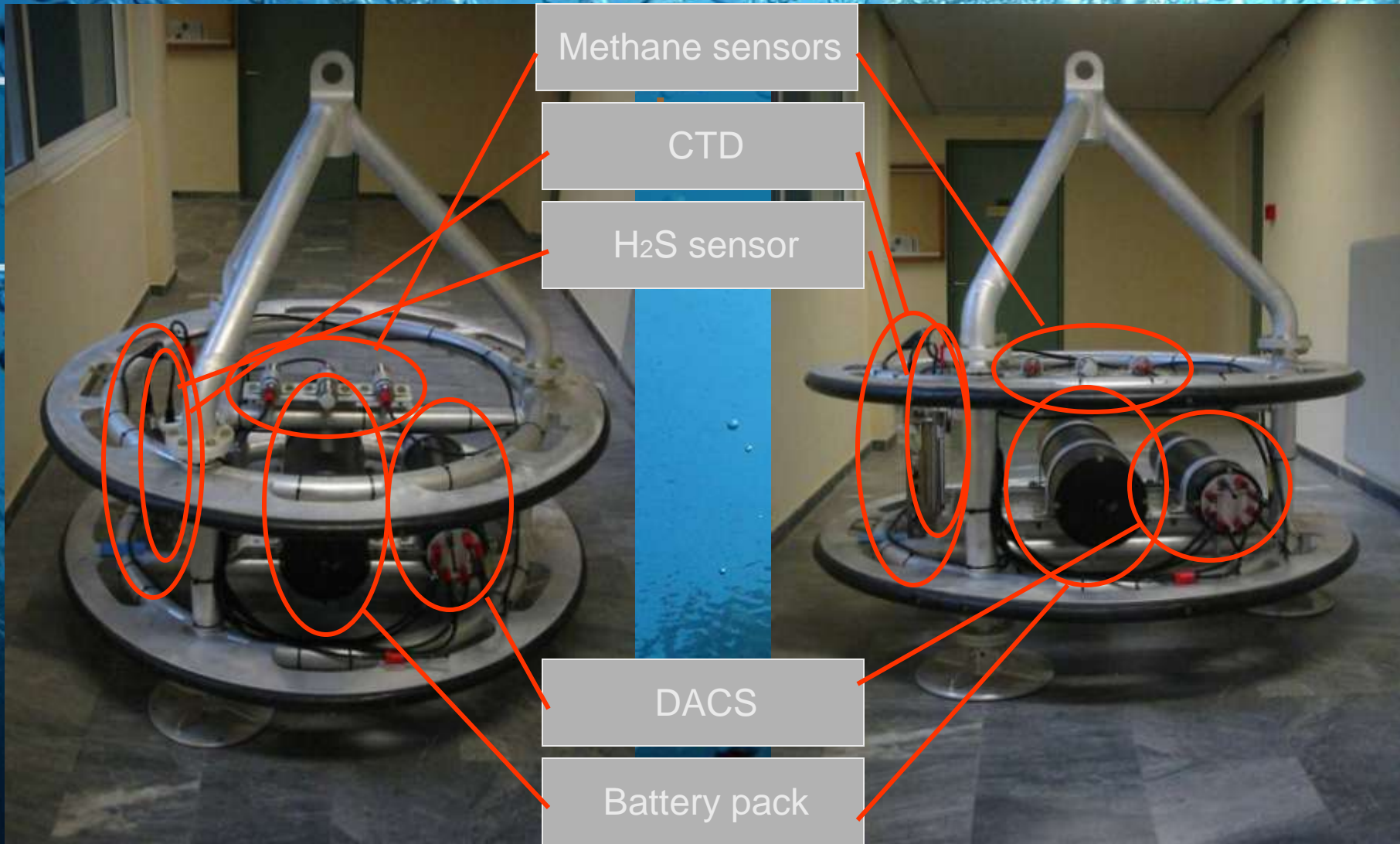
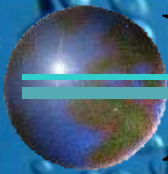


CABLE DEPLOYMENT





Το βενθικό παρατηρητήριο GMM στον Πατραϊκό



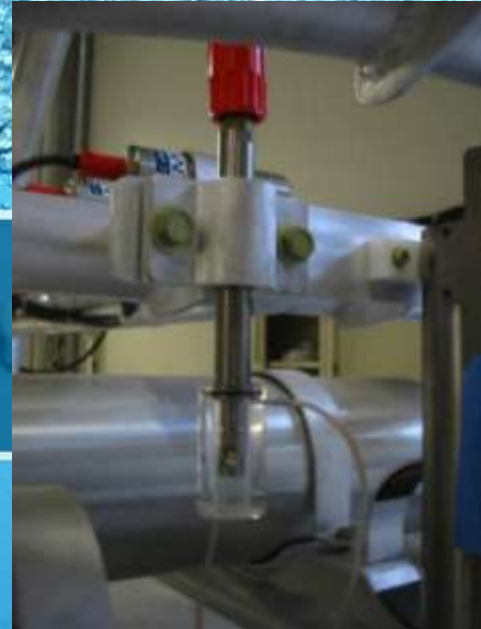
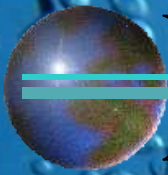
Methane sensors

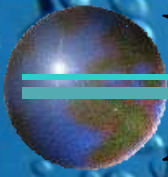
CTD

H₂S sensor

DACS

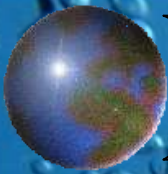
Battery pack





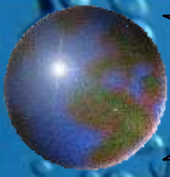
GMM onshore station and cable





ΤΟΠΑΡΑΤΗΡΗΤΗΡΙΟ







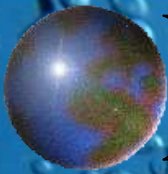
Η ΠΟΝΤΙΣΗ

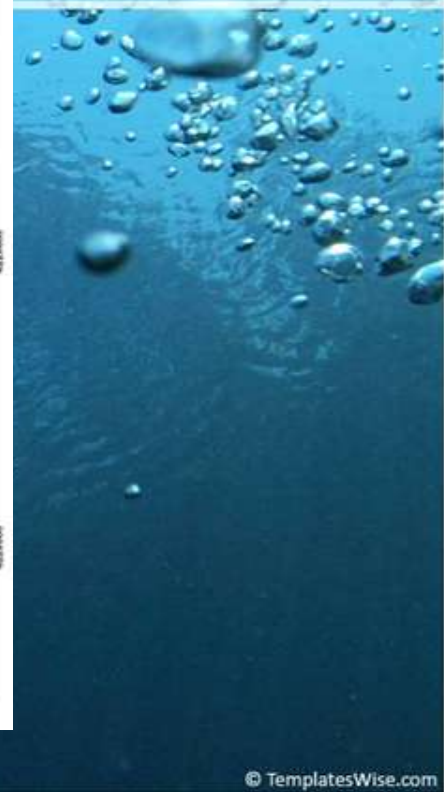
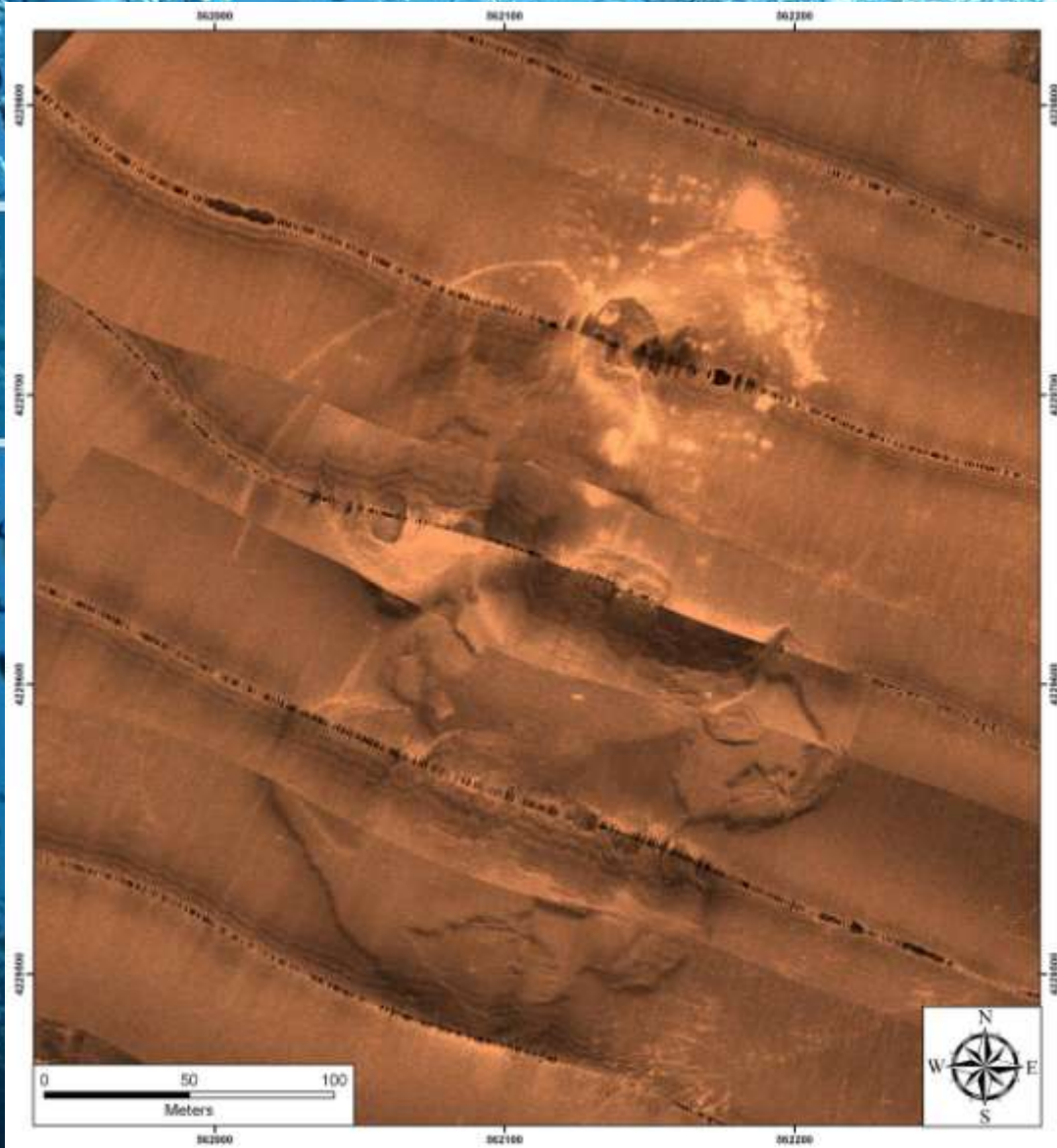
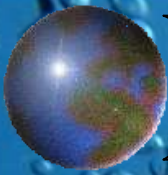




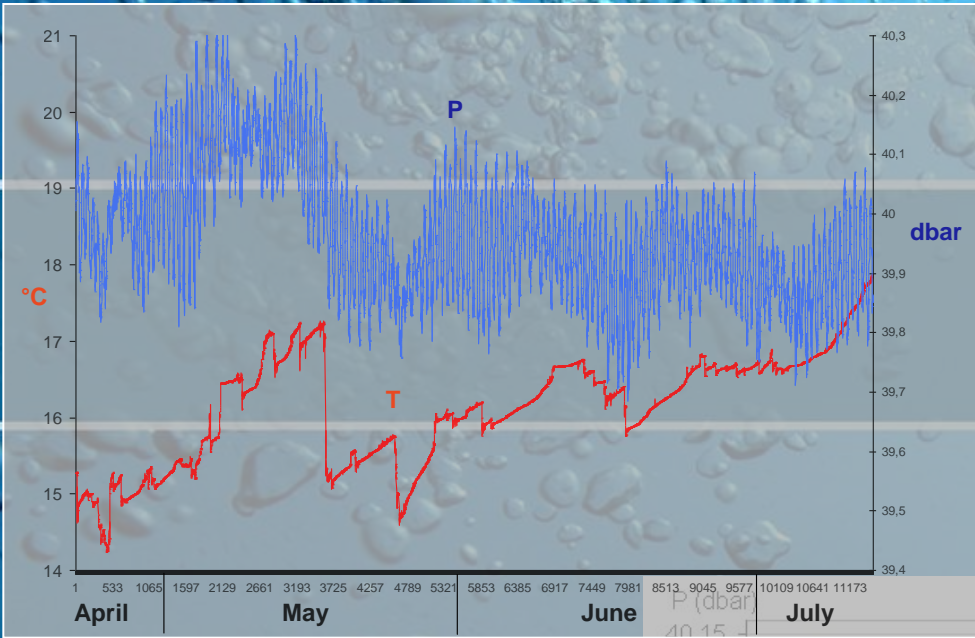
Η ΠΟΝΤΙΣΗ



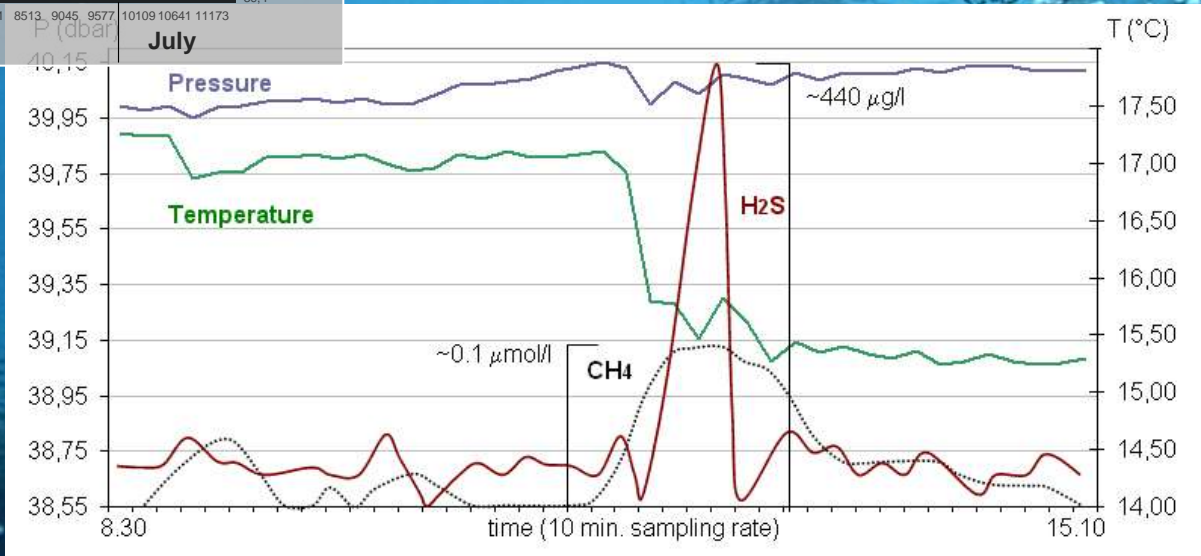


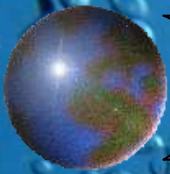


ΤΑ ΑΠΟΤΕΛΕΣΜΑΤΑ



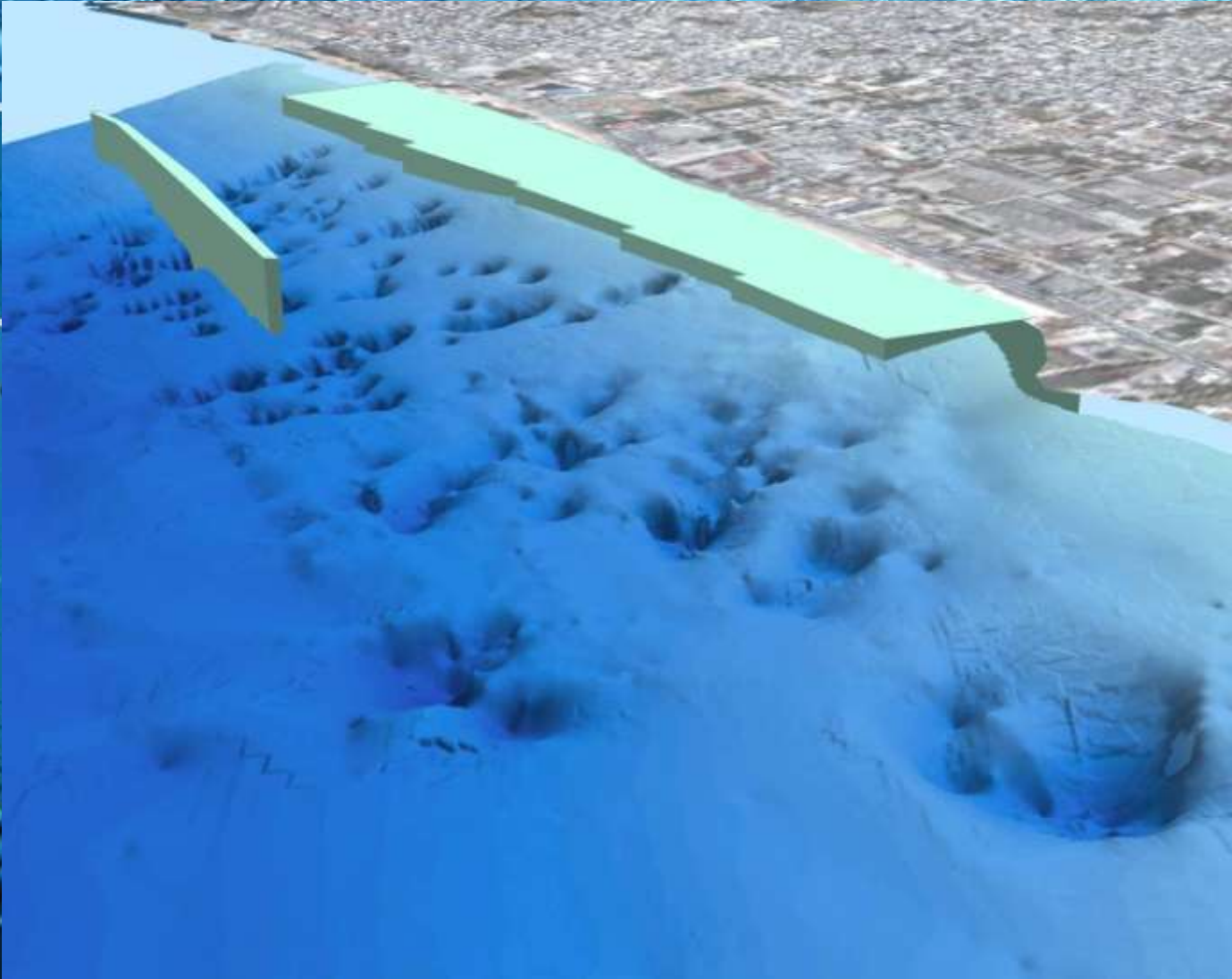
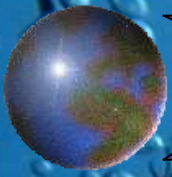
*46 διαφυγές H_2S και CH_4
σε 201 ημέρες καταγραφής*





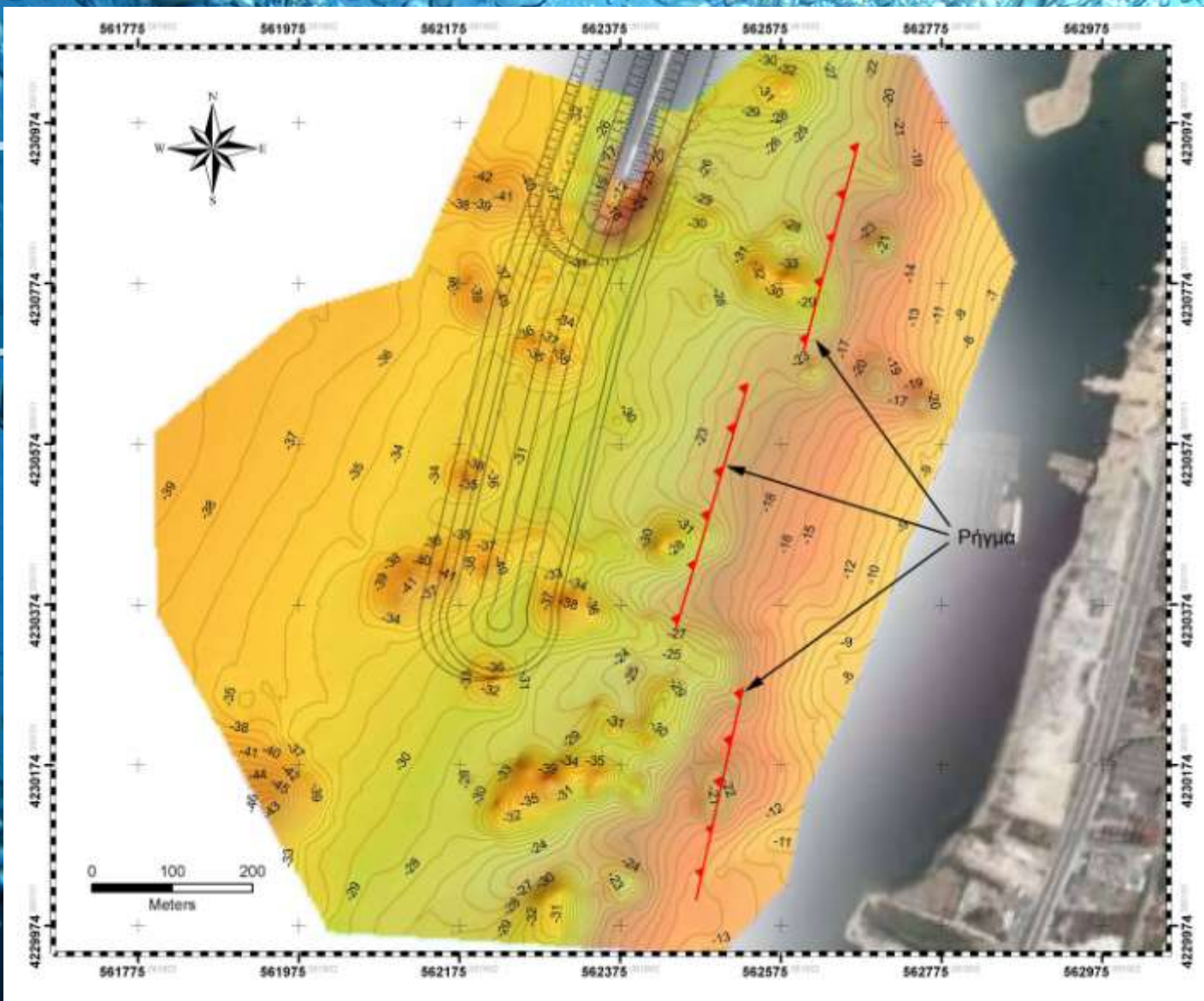
Η σχέση.....

ΚΡΑΤΗΡΕΣ ΚΑΙ ΝΕΟΣ ΛΙΜΕΝΑΣ ΠΑΤΡΩΝ



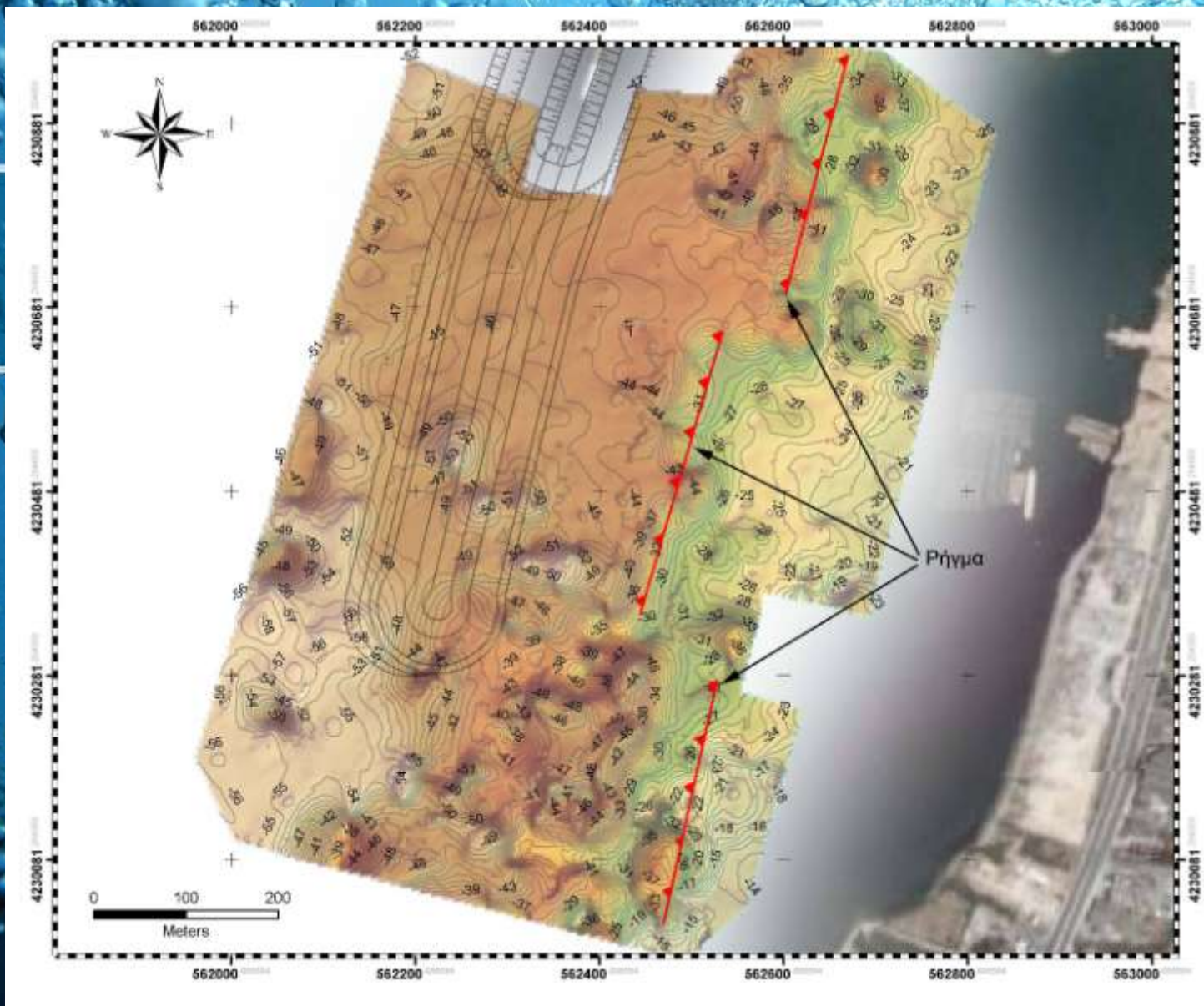


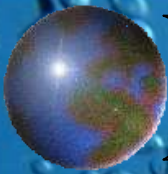
ΝΕΟΣ ΛΙΜΕΝΑΣ ΠΑΤΡΩΝ





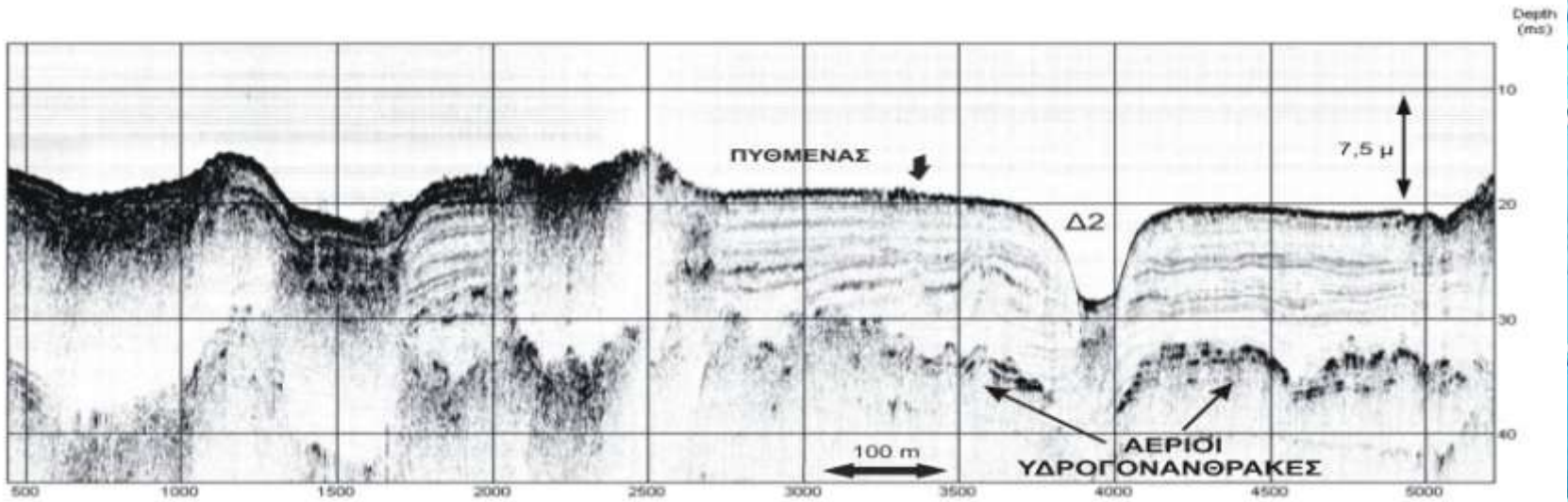
ΝΕΟΣ ΛΙΜΕΝΑΣ ΠΑΤΡΩΝ



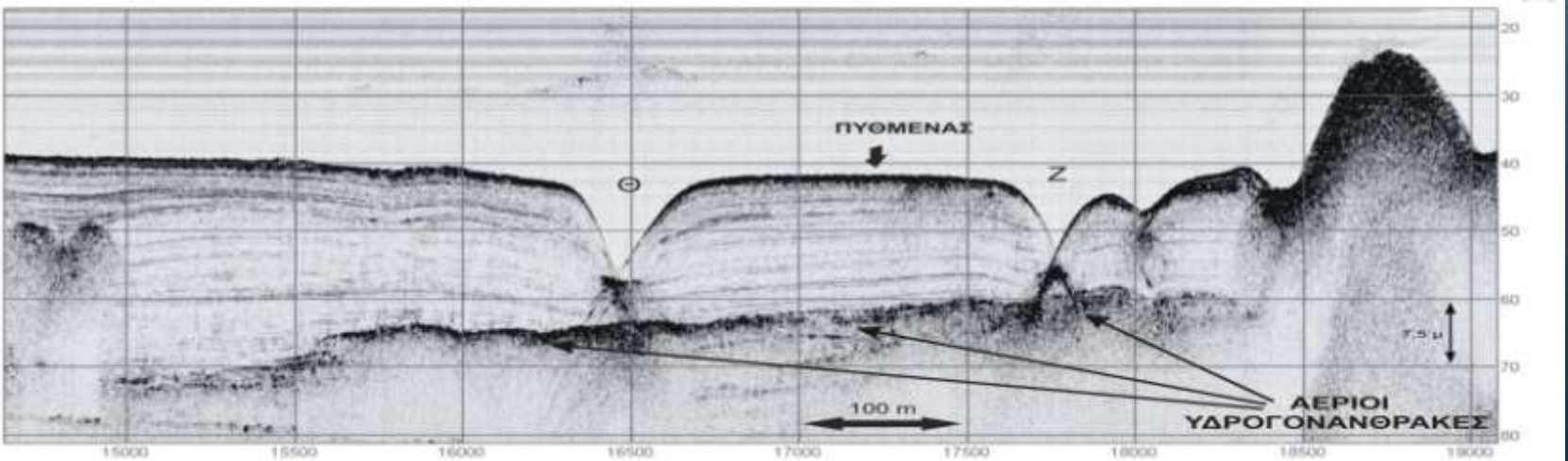


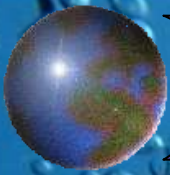
ΤΟ «ΜΠΑΖΩΜΑ» ΤΩΝ ΚΡΑΤΗΡΩΝ

ΓΕΩΑΚΟΥΣΤΙΚΗ ΤΟΜΗ P12



ΓΕΩΑΚΟΥΣΤΙΚΗ ΤΟΜΗ P4





Το βενθικό παρατηρητήριο ORION στον Κορινθιακό κόλπο



ORION node deployment

Final assembly of the node and preparation for the deployment, carried out on the Aigion harbour (17-18 April)





ORION node deployment

1 broad-band seismometer

1 methane sensor

1 hydrophone

status sensors (tilt, water leakage, temperature inside vessels, etc)

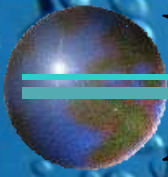
battery package (in aluminium vessel)

Data Acquisition and Control System (in aluminium vessel)

Acoustic unit (omnidirectional acoustic modem)

Loading of the system on the R/V Aegaeon.

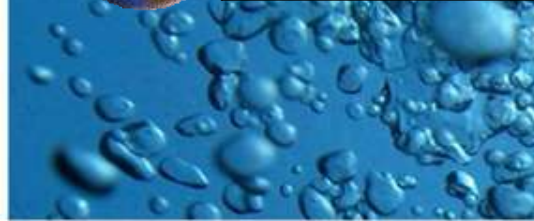
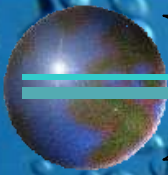
NODE 4 is positioned close to the stern c/o A frame, which will be used for the deployment (19 April)

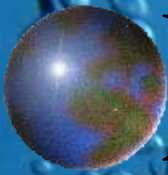


ORION node deployment

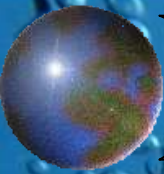
Deployment of Node 4 (20 April)



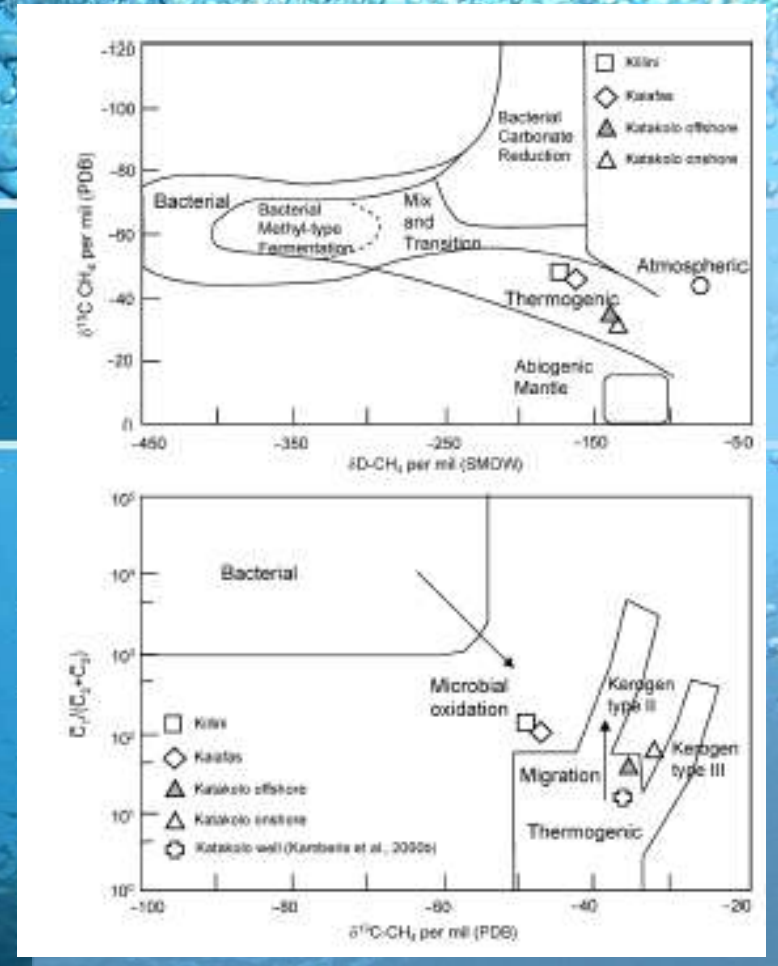
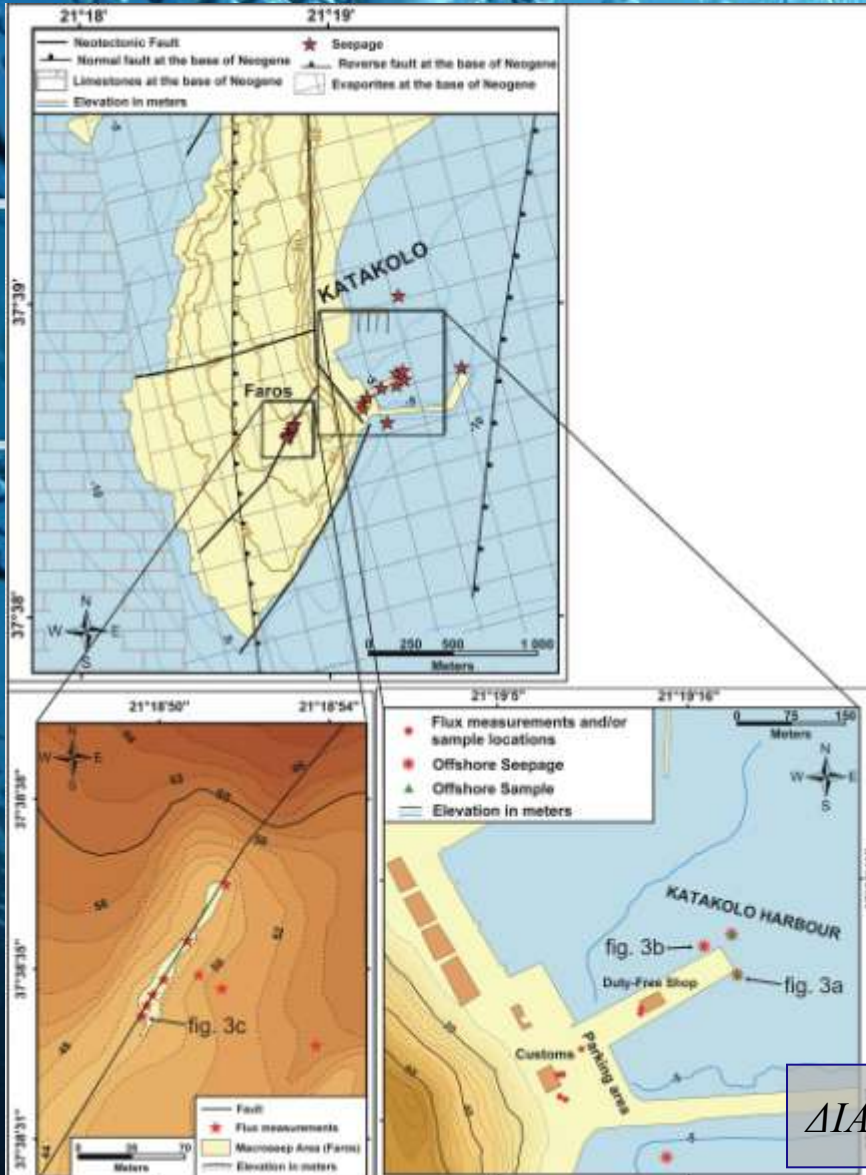




Διαφυγές αερίων Κατάκολου



ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ

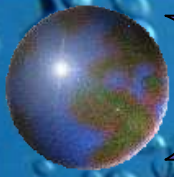


ΔΙΑΦΥΓΕΣ ΘΕΡΜΟΓΕΝΩΝ ΑΕΡΙΩΝ ΣΤΟ ΚΑΤΑΚΩΛΟ



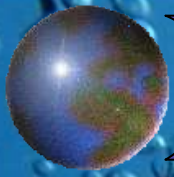
ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ



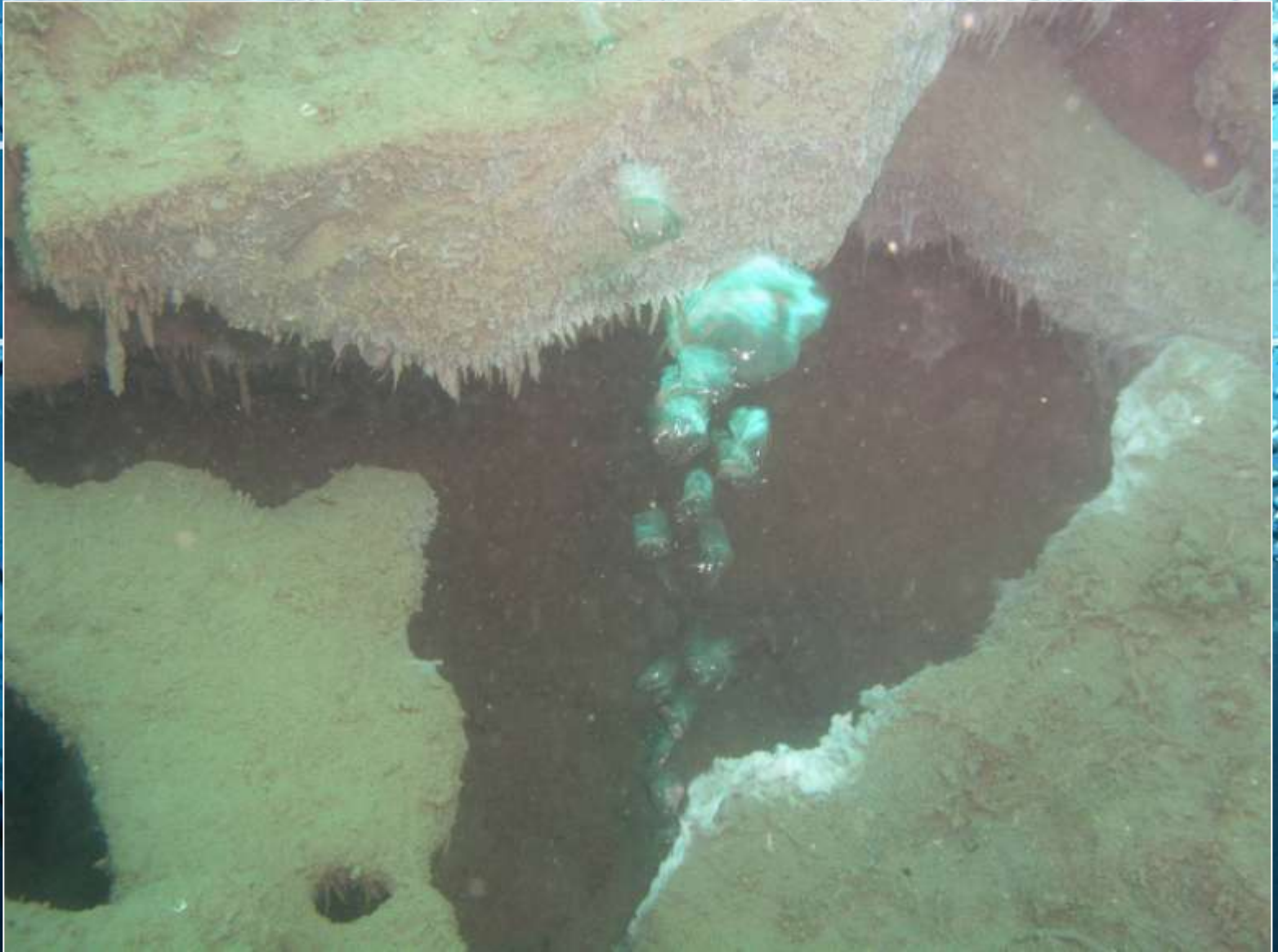


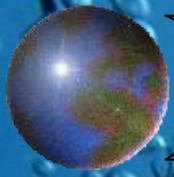
ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ





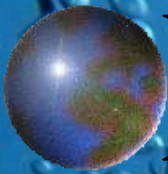
ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ





ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ

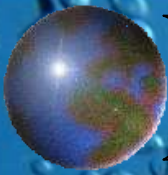




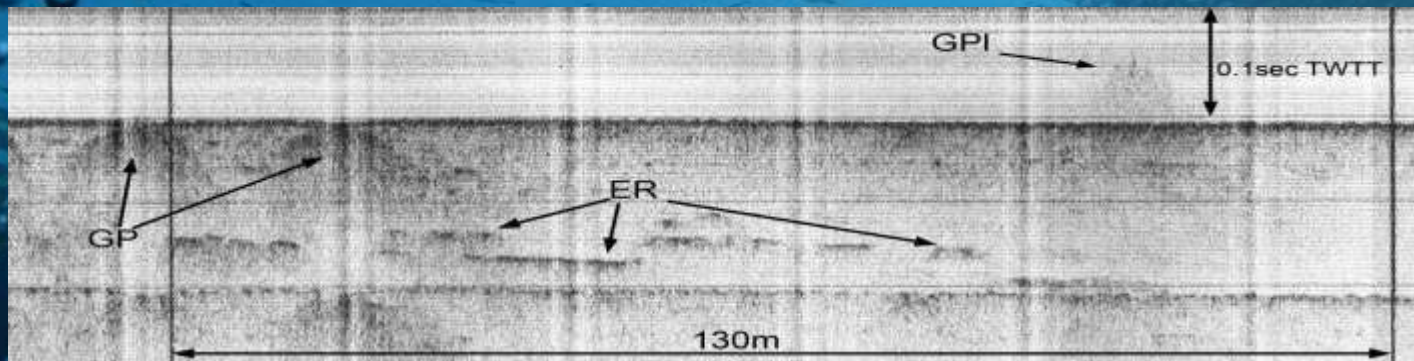
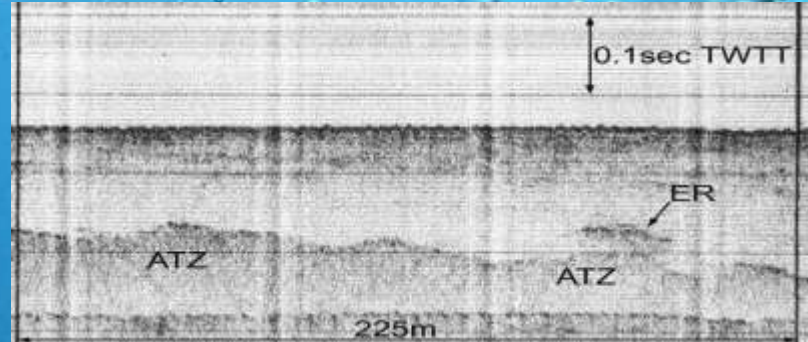
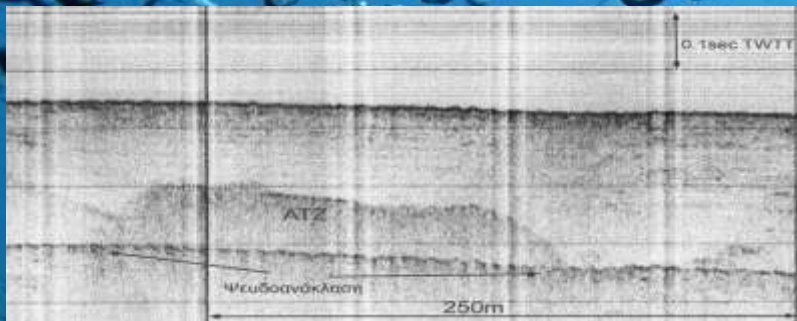
ΛΙΜΑΝΙ ΚΑΤΑΚΩΛΟΥ

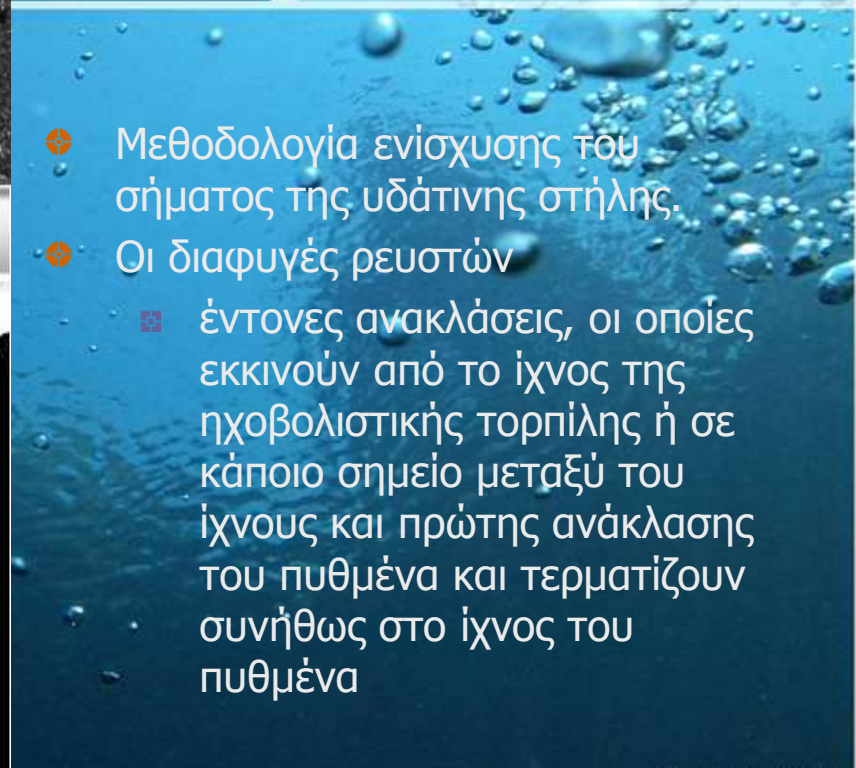
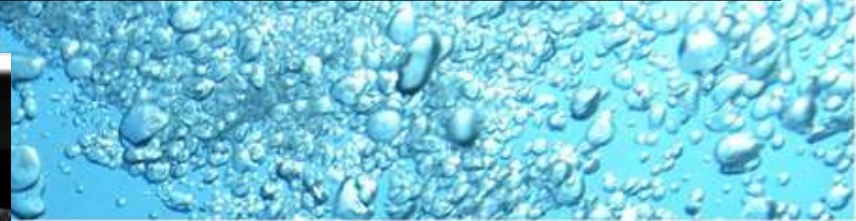
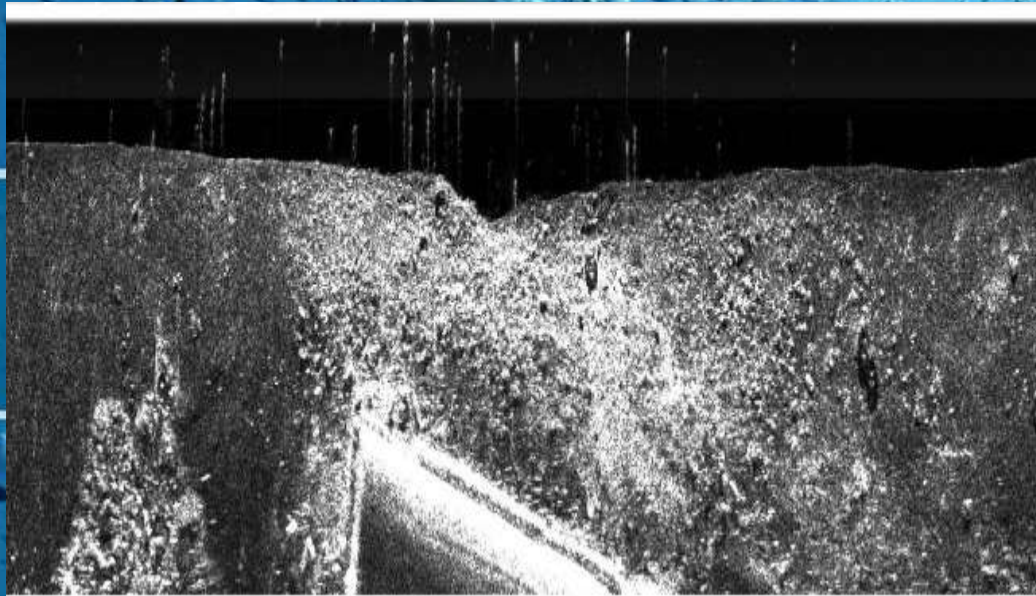
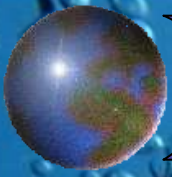
ΑΝΑΦΑΞΙΜΕΣ ΣΥΓΚΕΝΤΡΩΣΕΙΣ ΜΕΘΑΝΙΟΥ



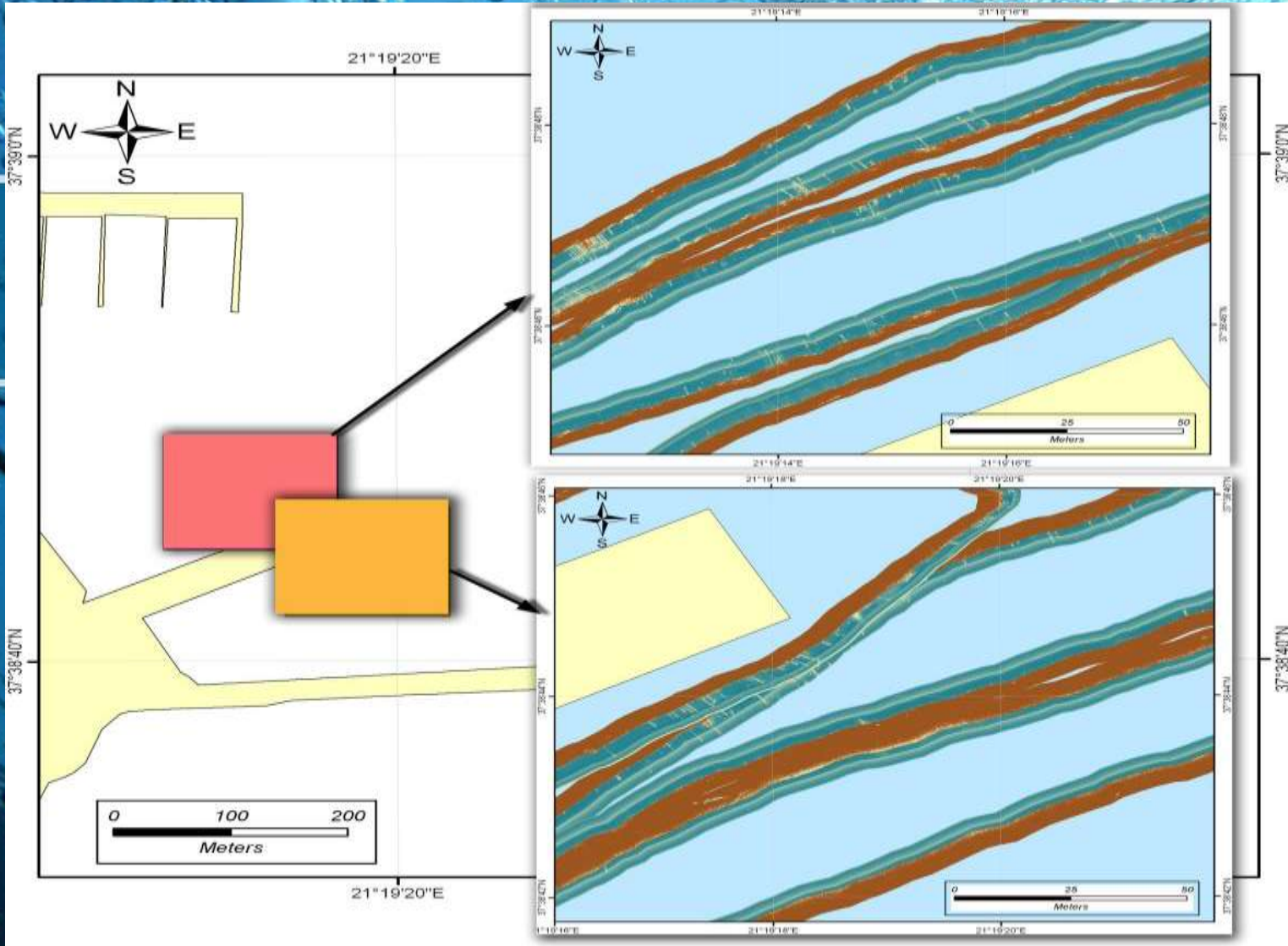
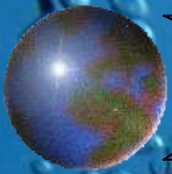


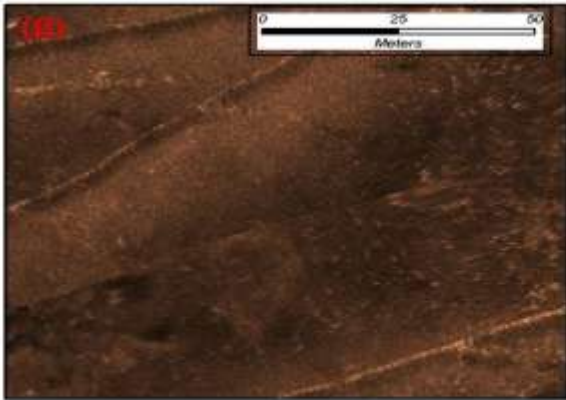
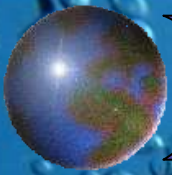
Ενδείξεις παρουσίας αερίων στις σεισμικές τομογραφίες



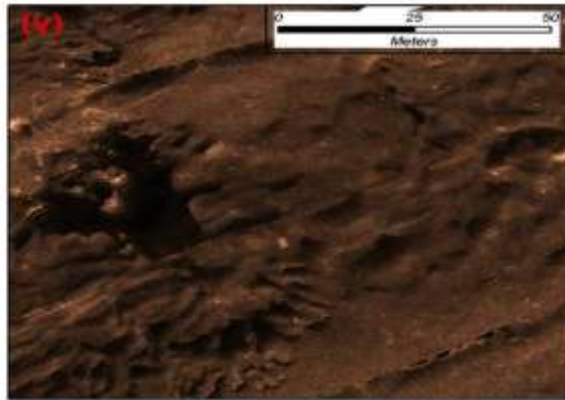


- ✦ Μεθοδολογία ενίσχυσης του σήματος της υδάτινης στήλης.
- ✦ Οι διαφυγές ρευστών
 - έντονες ανακλάσεις, οι οποίες εκκινούν από το ίχνος της ηχοβολιστικής τορπίλης ή σε κάποιο σημείο μεταξύ του ίχνους και πρώτης ανάκλασης του πυθμένα και τερματίζουν συνήθως στο ίχνος του πυθμένα

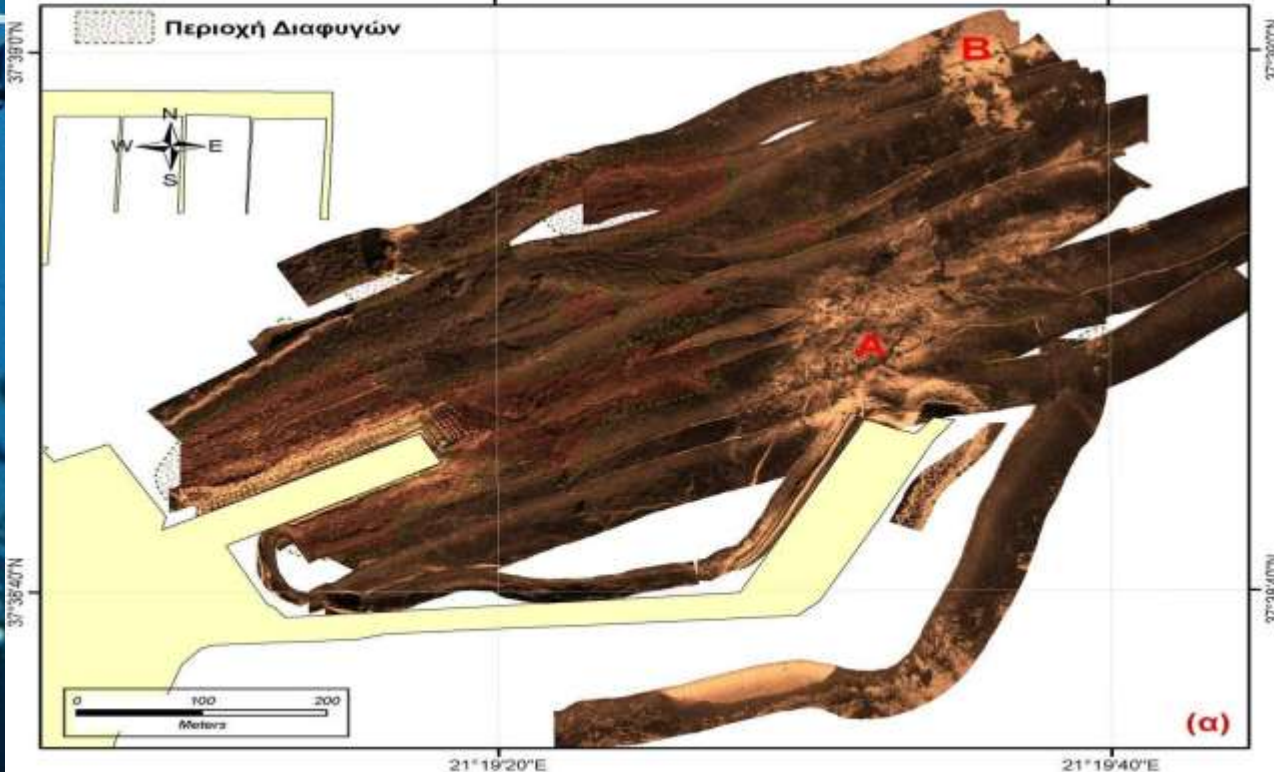


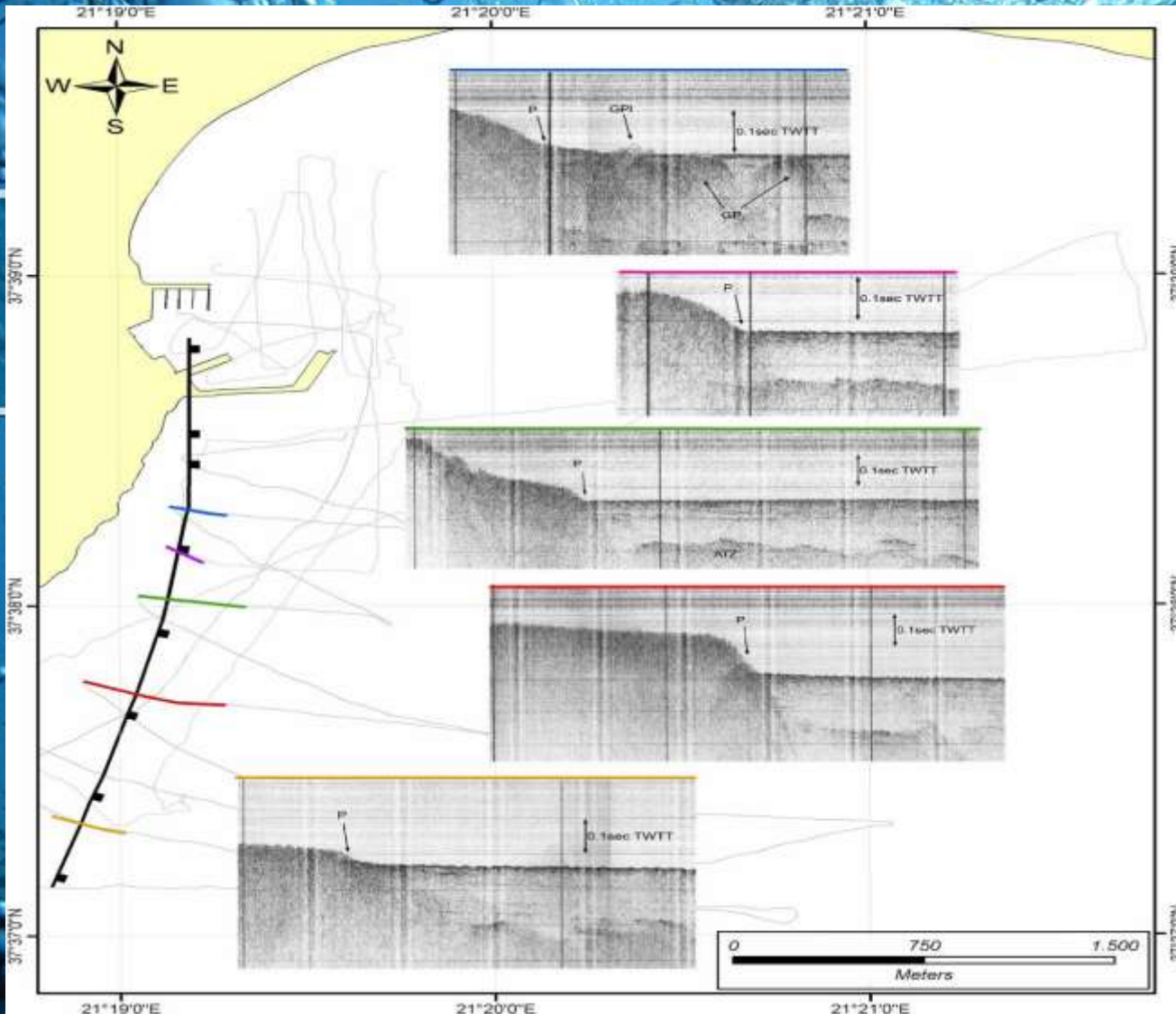
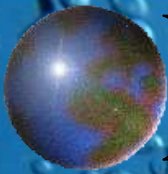


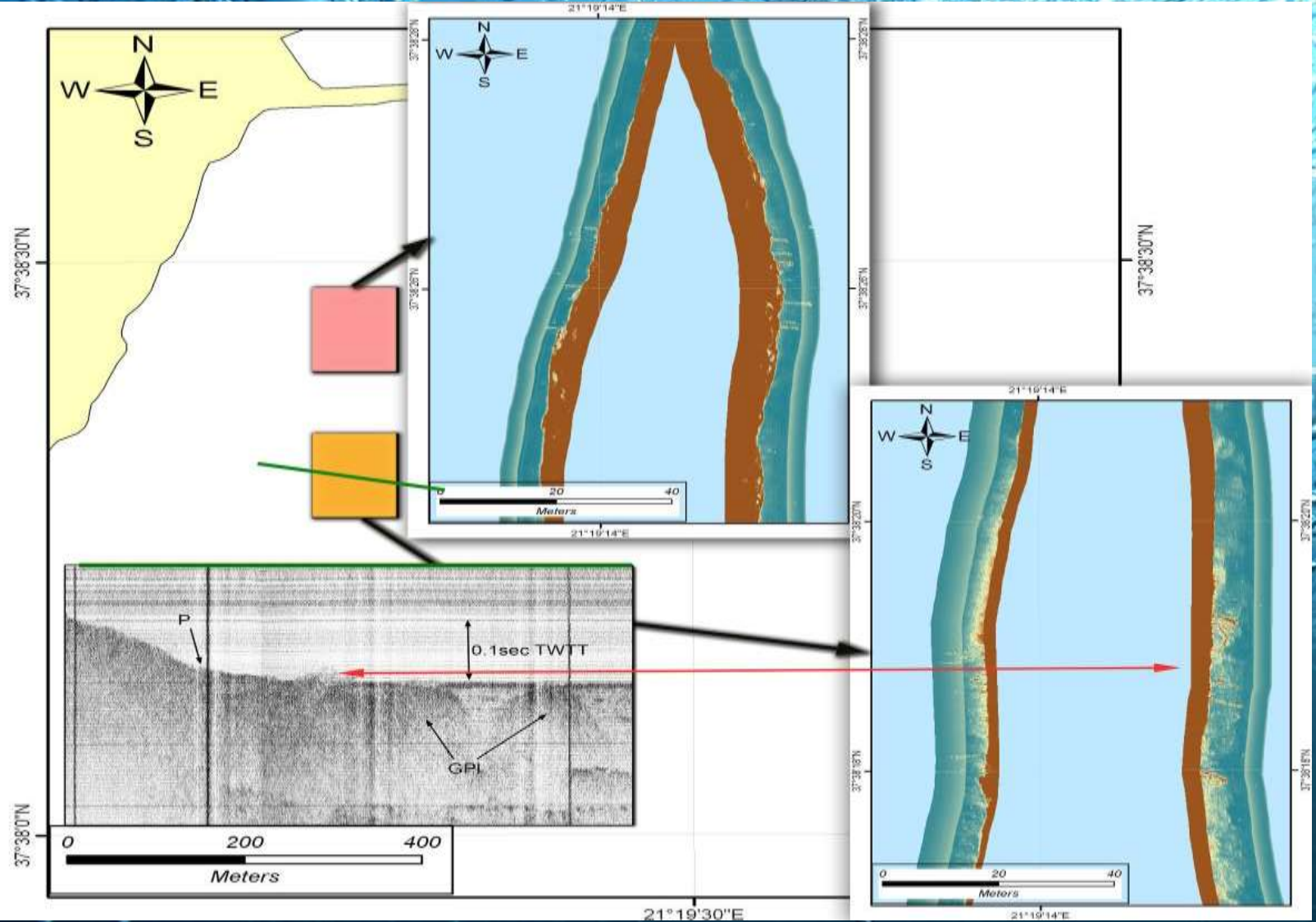
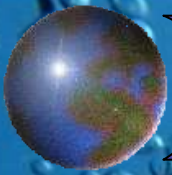
21°19'20"E

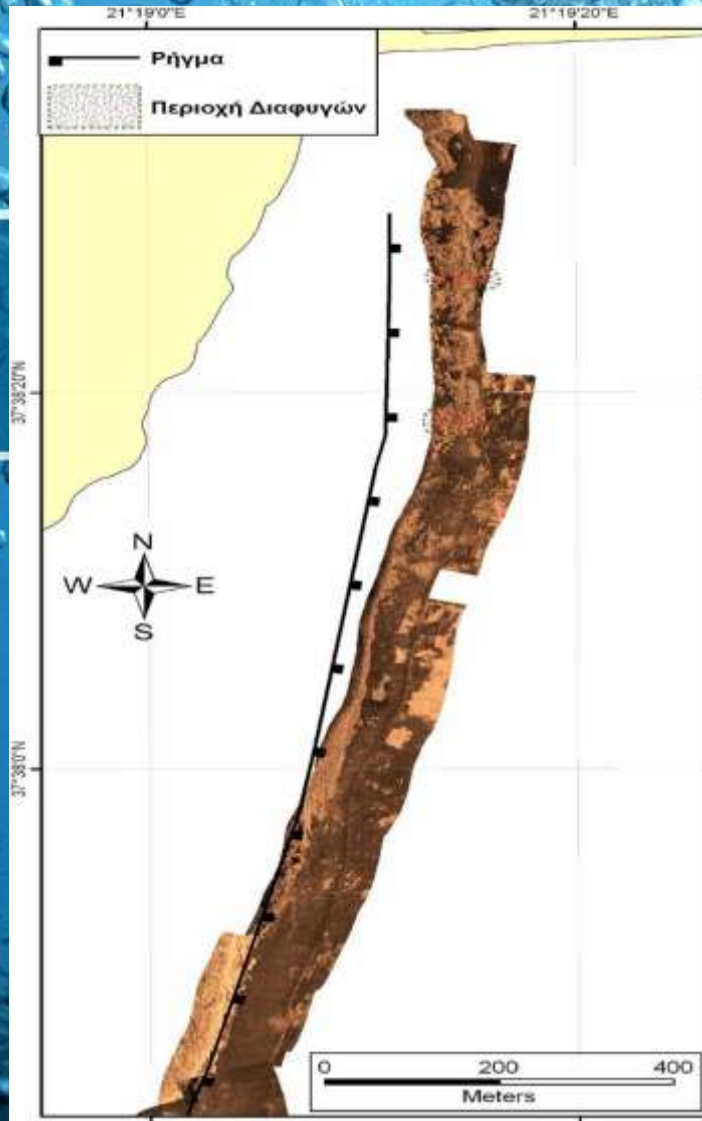
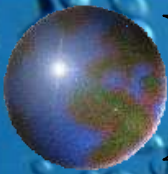


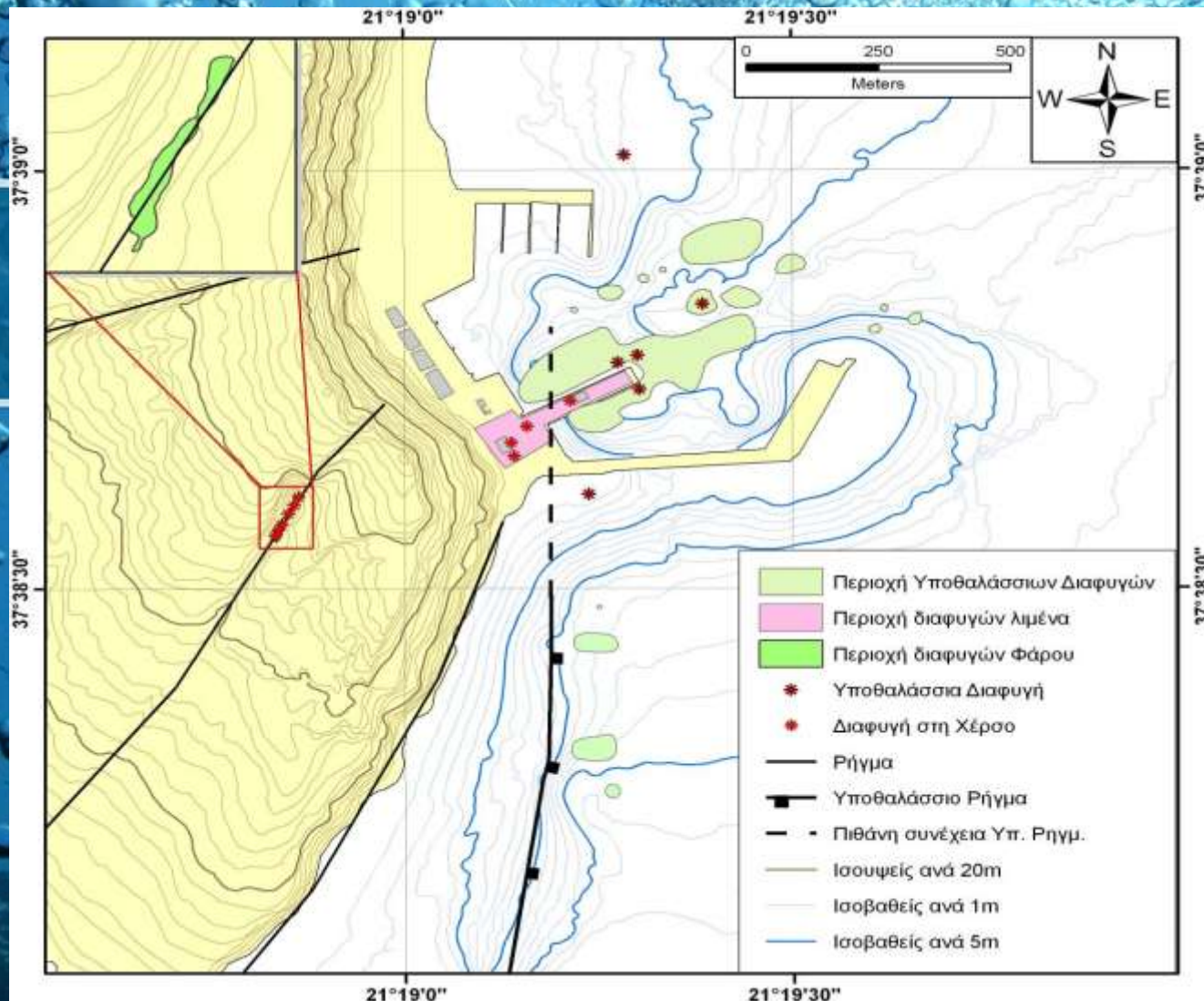
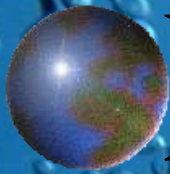
21°19'40"E

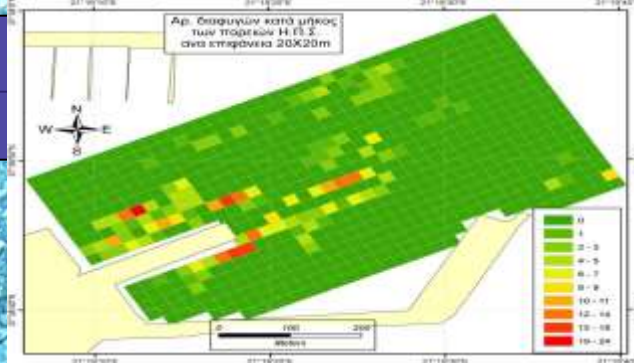
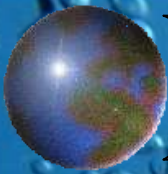




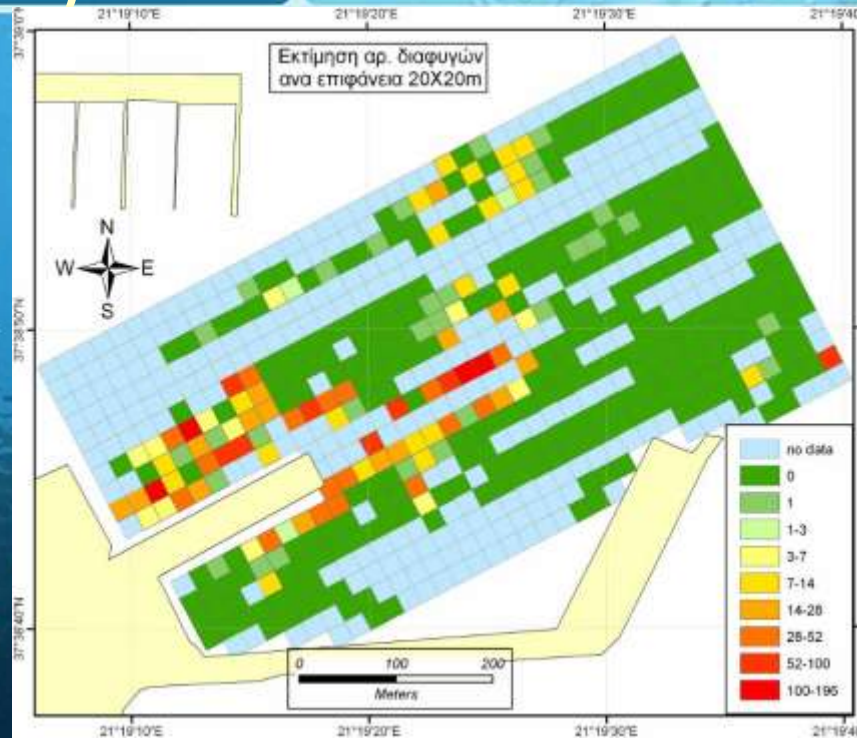
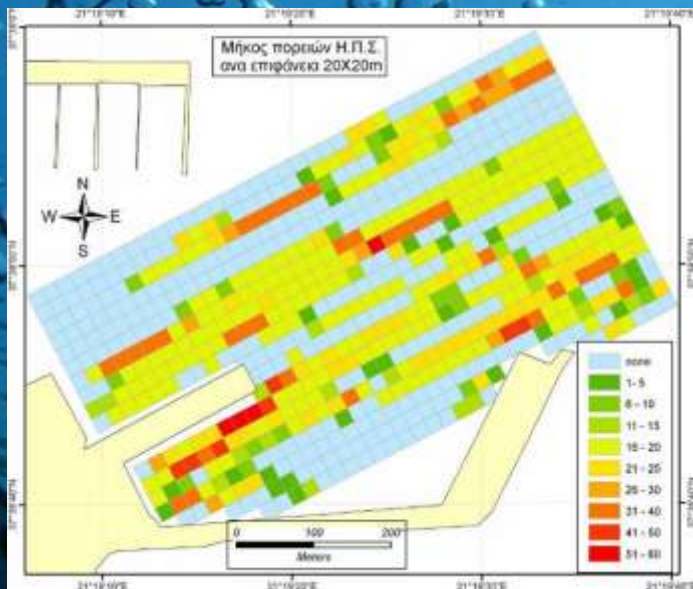


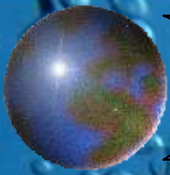






Εκτίμηση ποσότητας μεθανίου που διαφεύγει στην ατμόσφαιρα



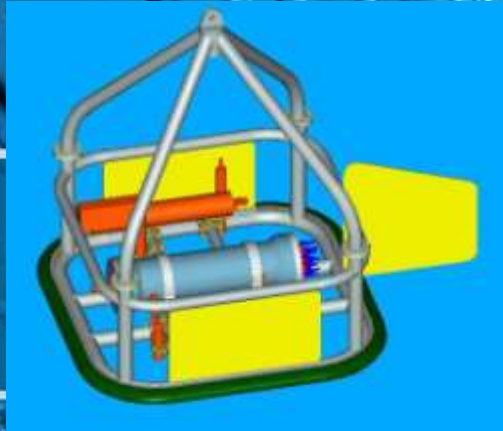


Η MEDUSA στο Κατάκολο



MEDUSA

Module for Environmental Deep-Under-Sea Analysis



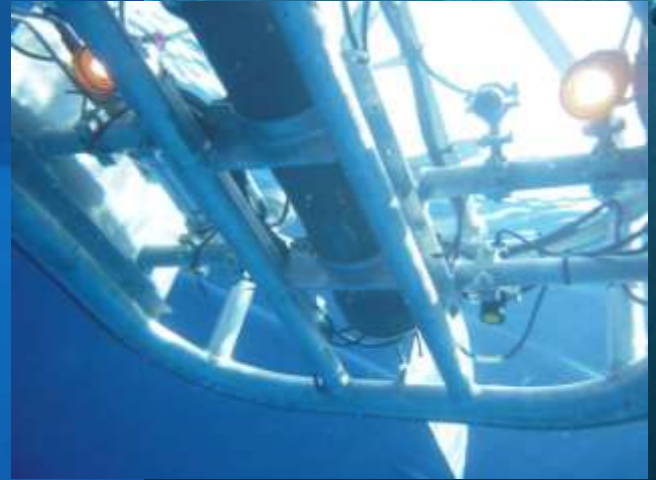
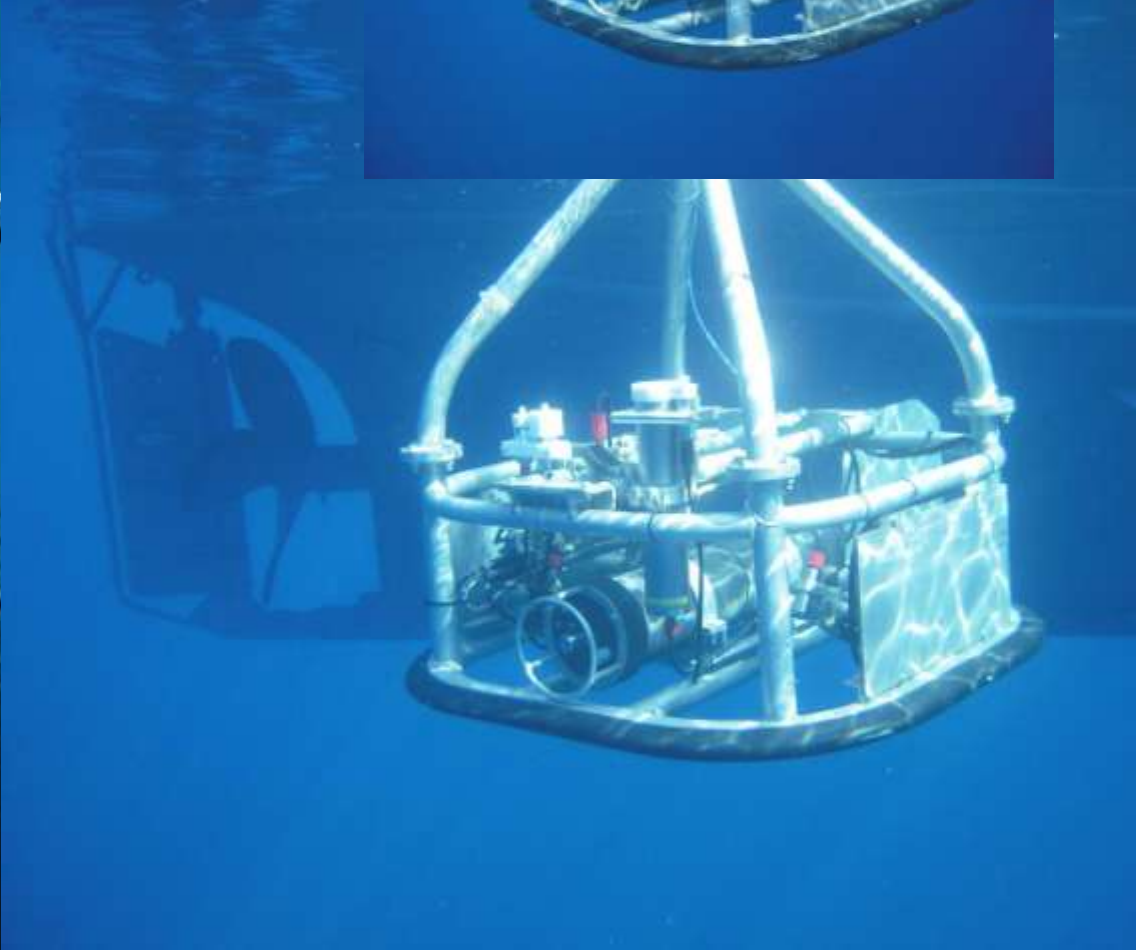
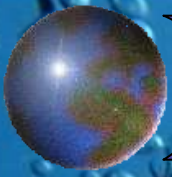
Dimensions: 1.2x1.2 m; H: 1.5m
Weight in air: 100 kg
Weight in water: 50kg

Components and sensors

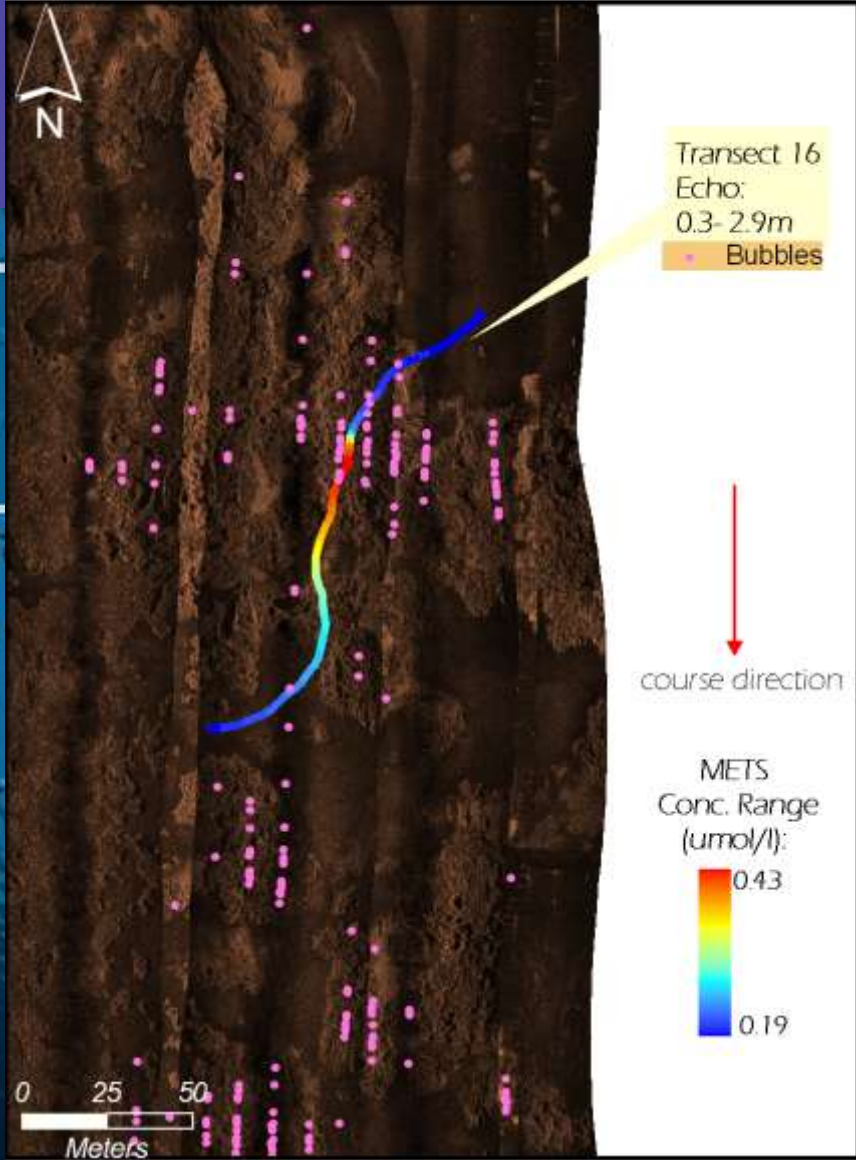
- Aluminium frame
- Vessel for electronics
- Sensors:
 - 2 methane sensors
 - 1 H₂S electrode
 - 1 oxygen sensor
 - 1 CTD
 - 1 transmissometer
 - radiometer / nuclear spectrometer
- Altimeter
- Deep Sea Power Cam & Light
- Electrical cable (500 m)
- Surface unit PC

Ship requirements

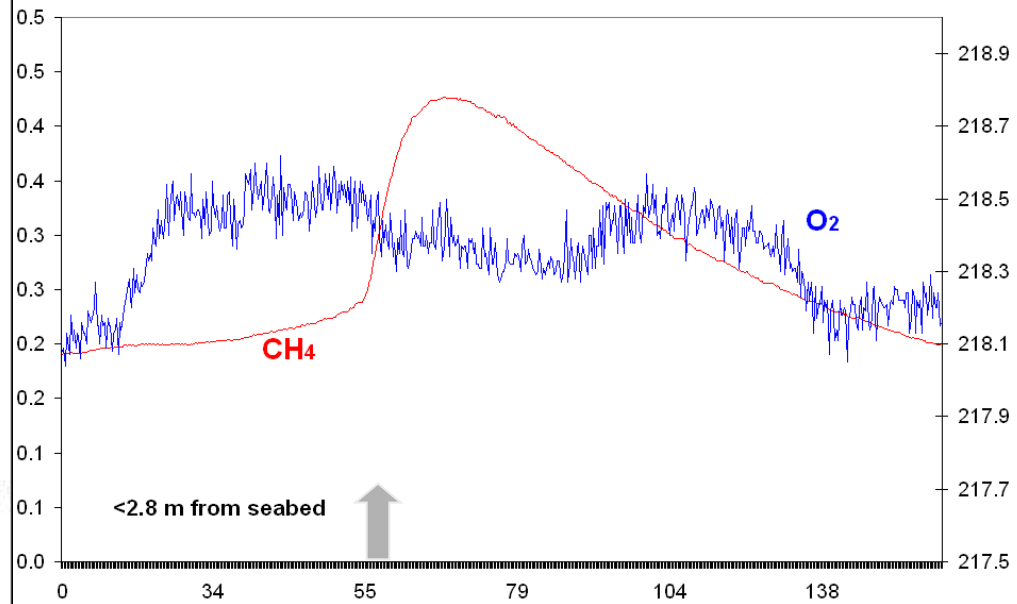
- Ship lab
- Stabilized 220 VAC
- Winch & mechanic cable



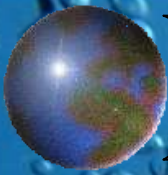
KATAKOLO SEPT 2010



Transect 16



bubble plumes observed by MEDUSA

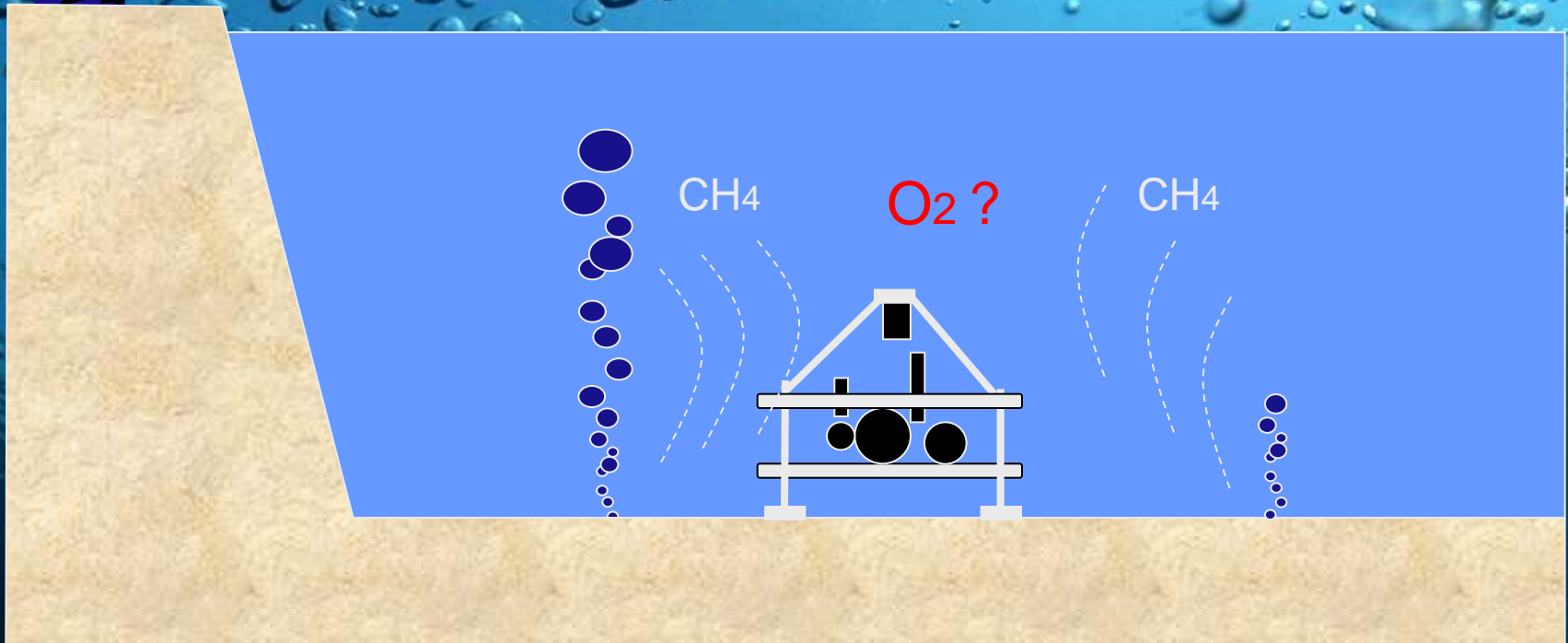


We then selected a protected seep site, where we know:

- gas flux
- gas composition and origin
- all oceanographic parameters
- meteo data



monitoring of O₂ in a thermogenic gas seep near-field



METHANE SENSORS – METS - (Franatech)



Semiconductor + membrane technology

Range: 50 nmol/l to 10 μ mol/l

Accuracy: 5-15%

METHANE SENSORS – METS - (Franatech)



Semiconductor + membrane technology

Range: 50 nmol/l to 10 μ mol/l

Accuracy: 5-15%



CTD SBE37 - (SeaBird)



Range:

Temperature: -5 to 35 °C

Conductivity: 0-7 S/m

Depth: 3500 m

Accuracy:

0.002 °C

0.0003 S/m

0.1% of full scale



H₂S microsensor – (AMT)

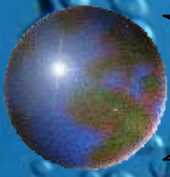


Electrode

Range: **check**
0.05 to 10 and
0.01 to 3 mg/l

A close-up photograph of the microsensor's tip, showing a small, yellow, conical electrode tip protruding from a stainless steel cylindrical housing.

Accuracy: < 2%



101 ημέρες



