



## CORE LOGGING LAB

LABORATORIO PER ANALISI NON DISTRUTTIVE DI SEDIMENTI MARINI

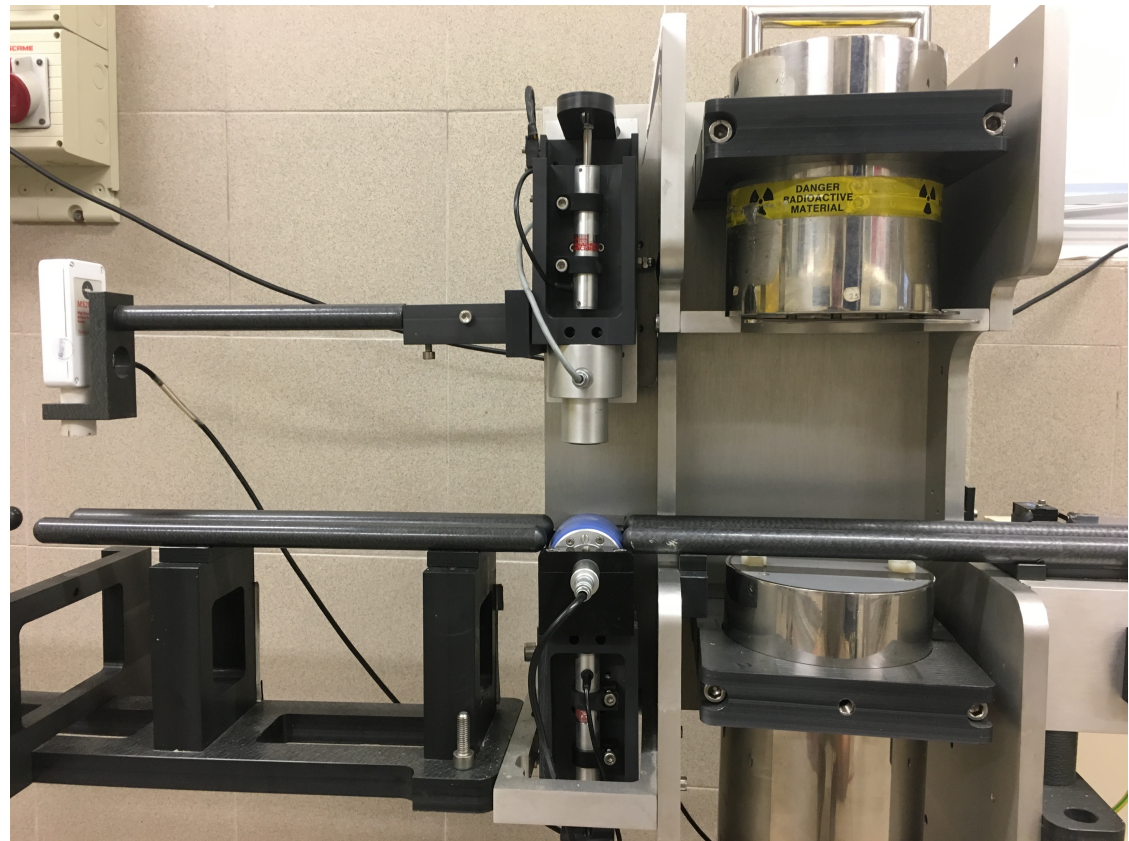
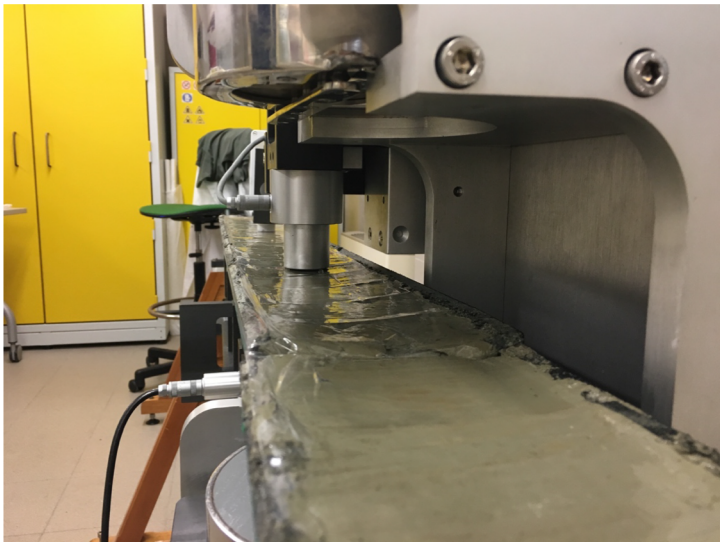


# Multi-Sensor Core Logger (MSCL) GEOTEK

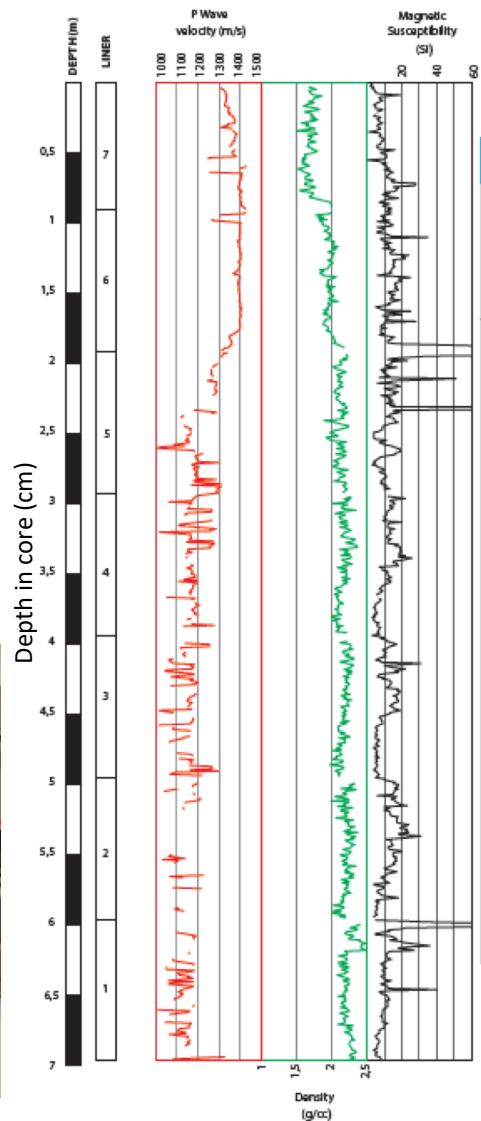
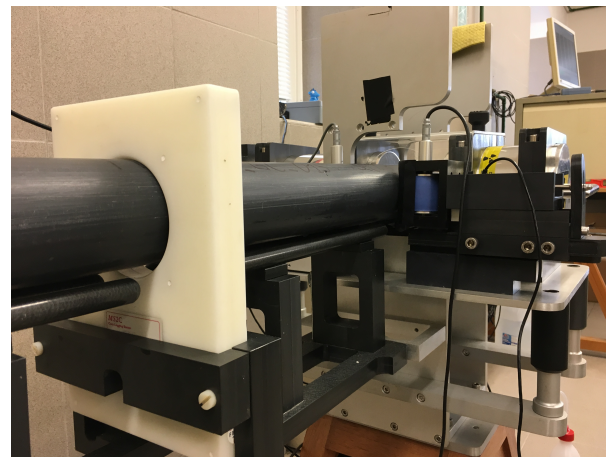
The MSCL offers a non-destructive mode of measurement on a fully automated system.

Provides high resolution whole-core and split-core logging data including:

- gamma density,
- *P*-wave velocity,
- magnetic susceptibility







Proprietà misurate	Applicazioni
Attenuazione raggi gamma	<ul style="list-style-type: none"> <li>• misurazione della densità di massa</li> <li>• correlazione stratigrafica tra diversi campioni</li> <li>• misurazione della porosità</li> <li>• misurazione del contenuto in acqua</li> </ul>
Velocità onde P	<ul style="list-style-type: none"> <li>• correlazione sismica</li> <li>• correlazione stratigrafica</li> <li>• costruzione sismogrammi sintetici</li> <li>• controllo qualità dei carotaggi</li> <li>• determinazione delle variazioni litologiche</li> </ul>
Suscettività magnetica	<ul style="list-style-type: none"> <li>• indicatore di materiale di origine terrigena</li> <li>• correlazione stratigrafica tra diversi campioni</li> <li>• identificazione e correlazione di eventi torbiditici</li> <li>• studio dei cicli climatici glaciali-interglaciali</li> </ul>



# GEOSCAN V LINESCAN IMAGING GEOTEK

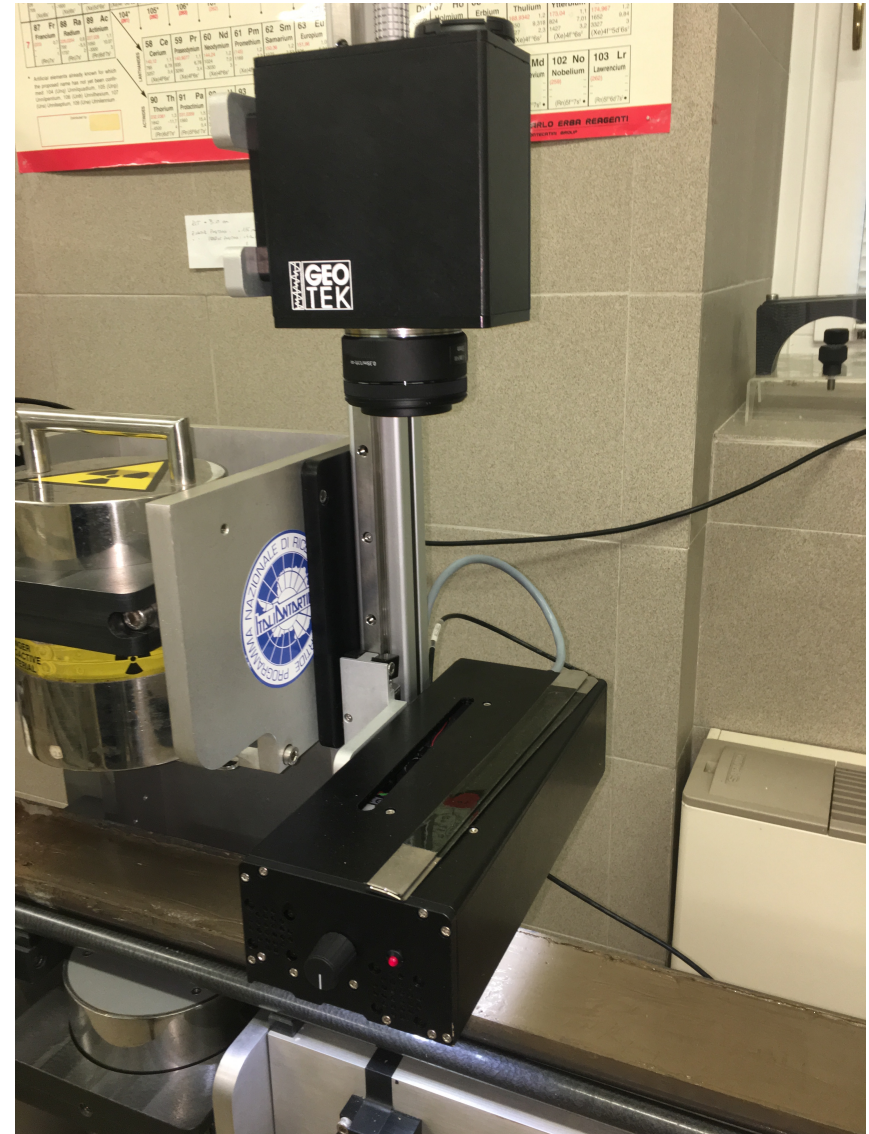
High resolution photography of sediment cores are collected by using a digital camera with a dedicated lighting system.

## TRUE COLOUR SEPARATION

The camera has a massive c.5340 pixel CCD. Incoming light is passed through a set of **RED**, **GREEN** and **BLUE** filters to produce true colour separation. RGB values are measured and saved in a separate file to facilitate quantitative comparison.

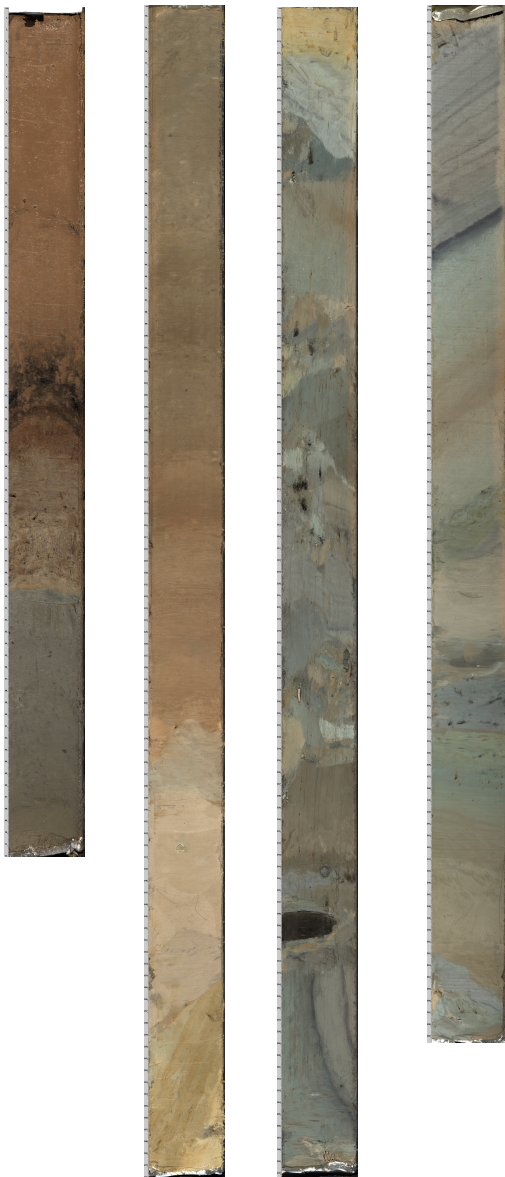
## HIGH RESOLUTION

Images can be collected between 100 and 1000 lines per centimeter, corresponding to 100 and 10 micron pixel size respectively.





# GEOSCAN V LINESCAN IMAGING GEOTEK



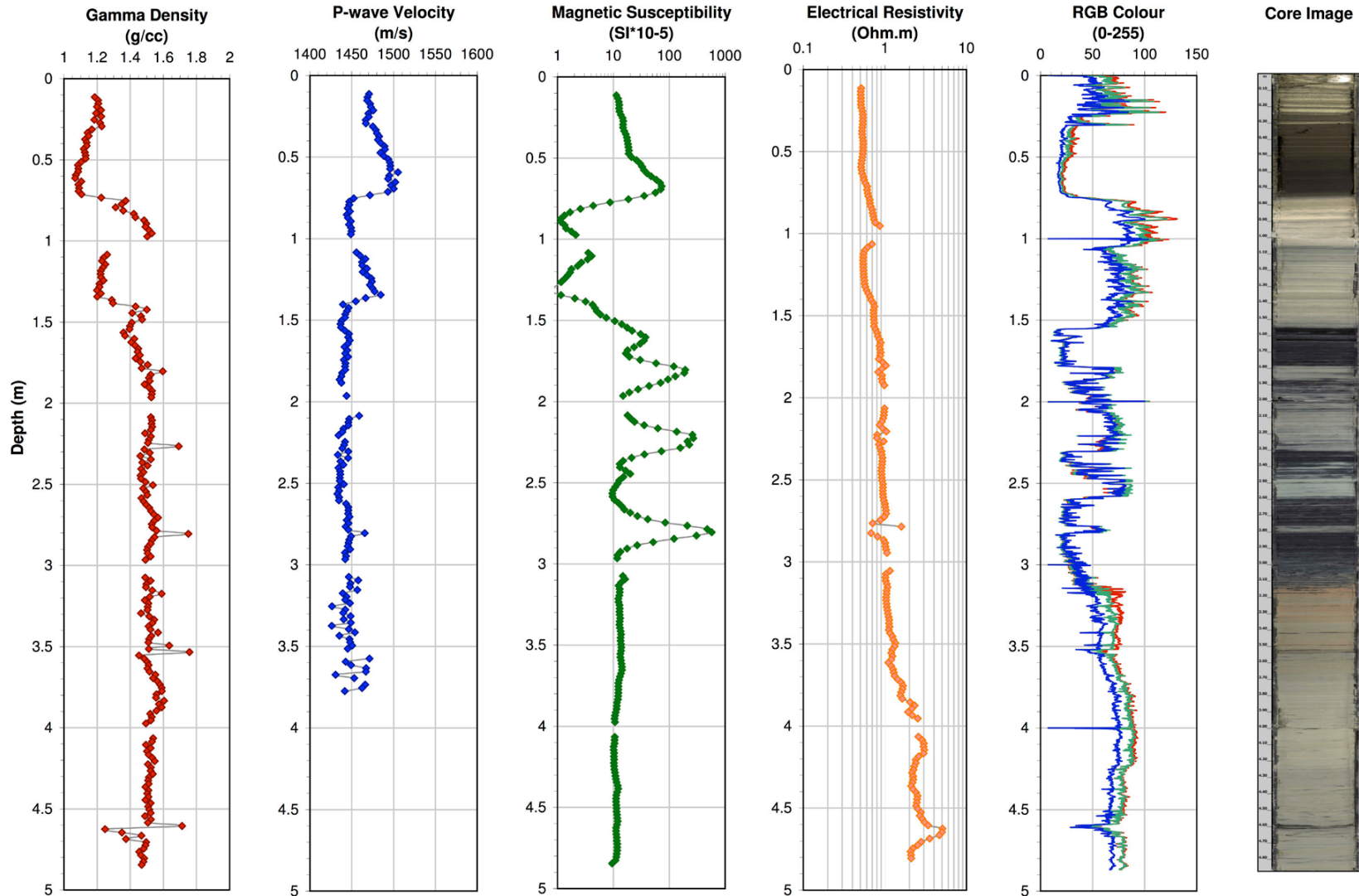
## APPLICATION

- Stratigraphic corelation
- Core photographic archiving
- Core quality assesment
- Colour analysis
- Cores correlation
- Mineralogy

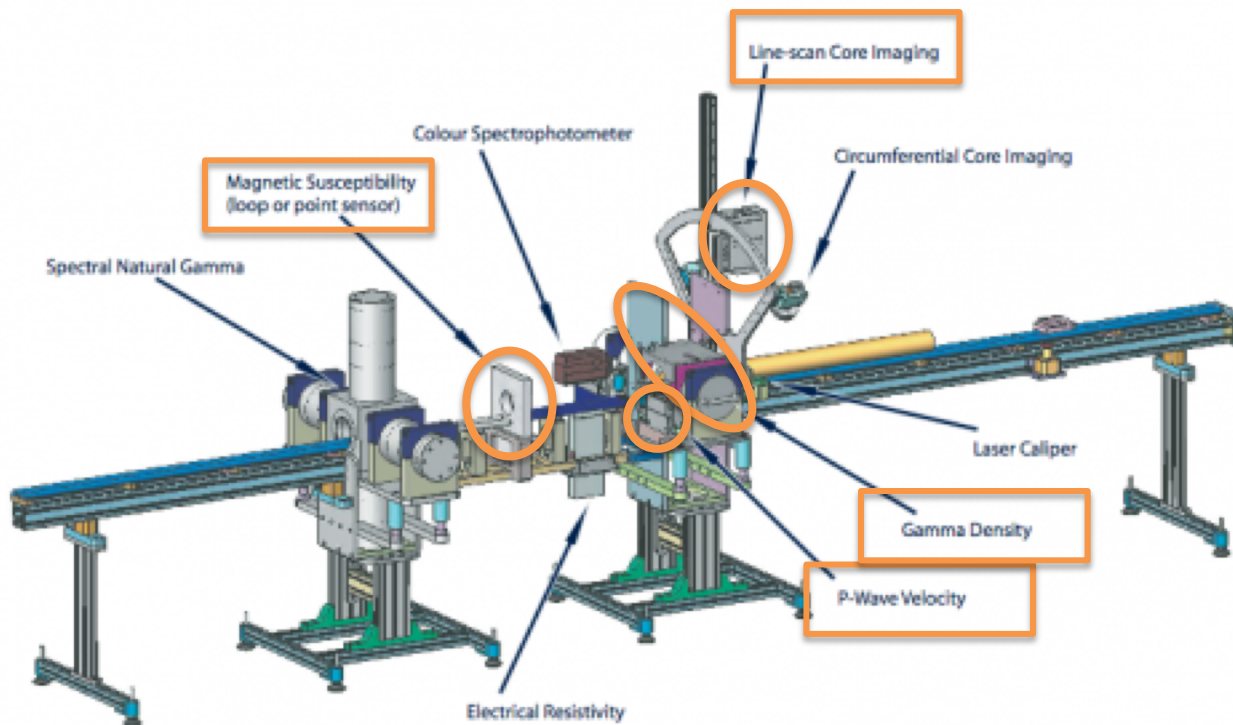




# MSCL and Photography



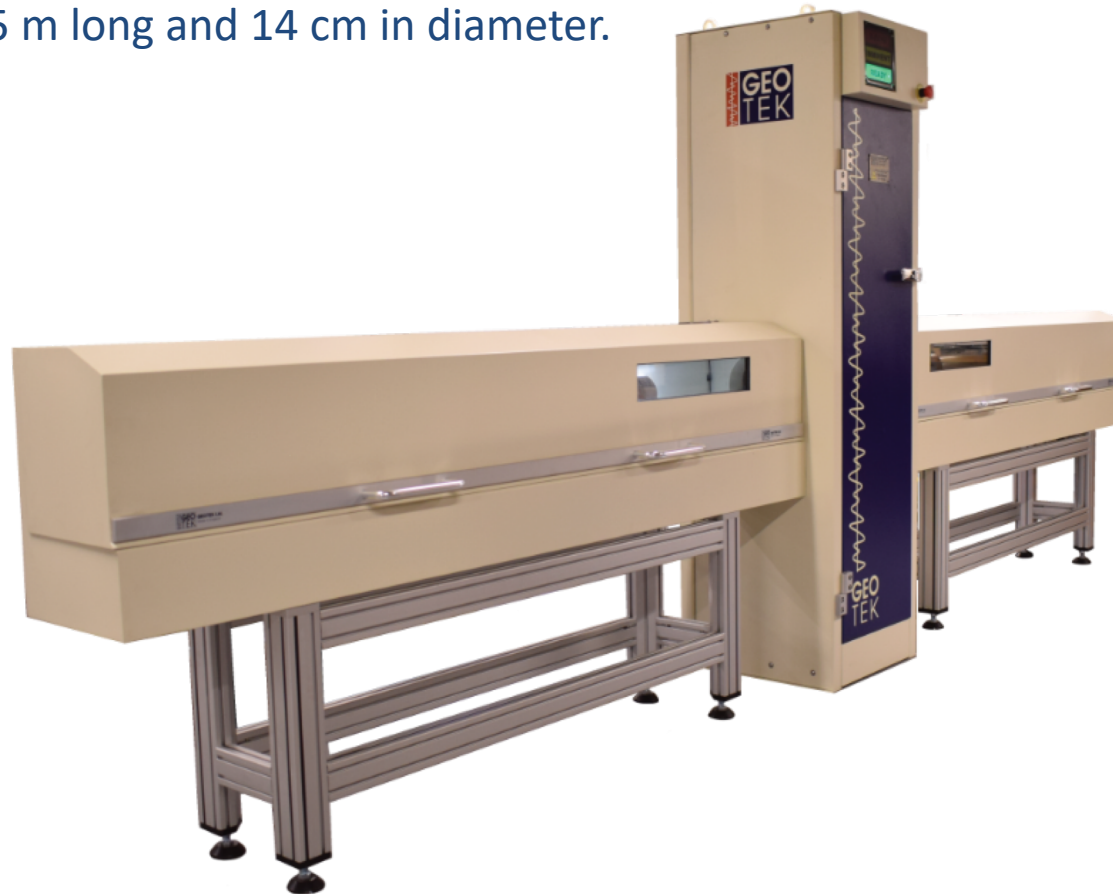




# XCT: Standard X-RAY CT System **GEO TEK**

The XCT is a cabinet based lead-lined system designed to fully enclose an X-ray source, detector and core sample to be imaged.

The Geotek® X-ray CT instrument will be specifically calibrated for different core samples, and will collect images on split or whole cores, through plastic or metal liners, on cores up to 1,5 m long and 14 cm in diameter.



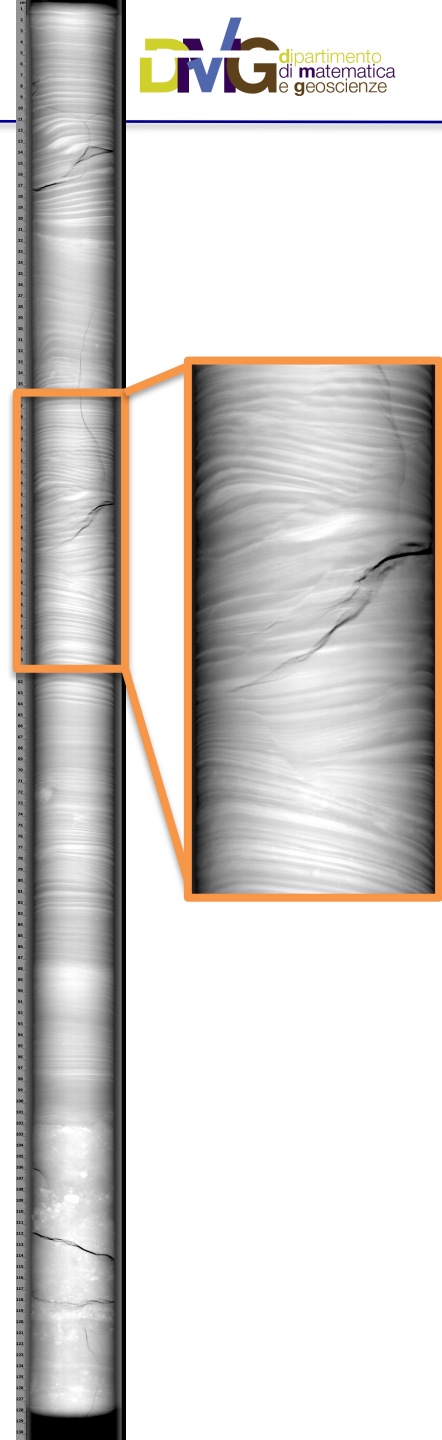


# XCT: Standard X-RAY CT System GEOTEK

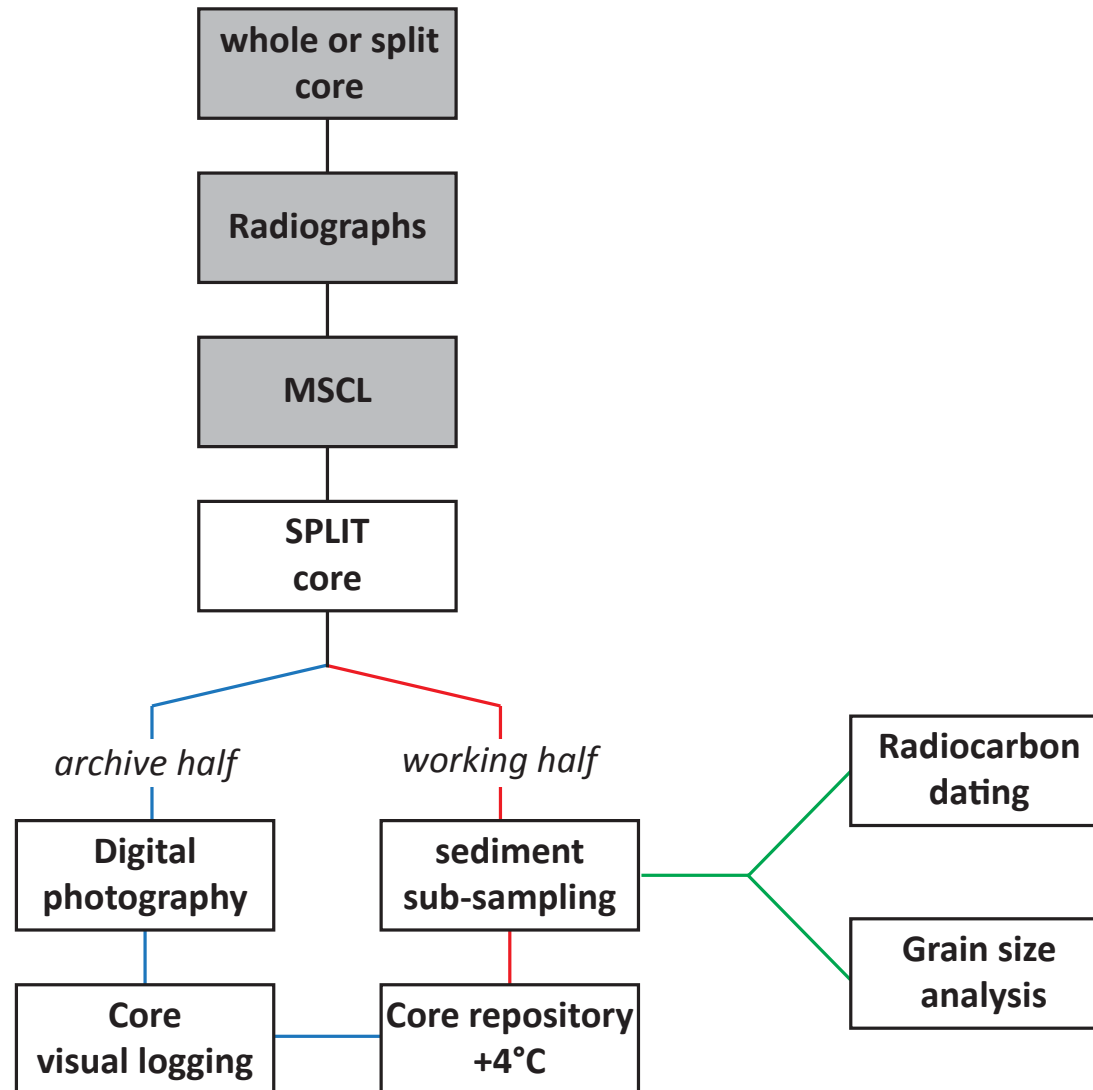
## What types of applications are benefiting from the use of the XCTsystem?

The system is used for both research and private companies jobs. Applications benefitting from the use of the instruments are:

- **Geohazard** – identification of fracturing, bedding, slumps and slides deposits
- **Stratigraphy** – identification of stratigraphic units, improving the identification/understanding of depositional processes
- **Paleoclimatic studies** - determination of paleocurrent activities, identification of glacial and ice rafted debris deposits to study the glacial dynamic, identification of lake floodings on coastal



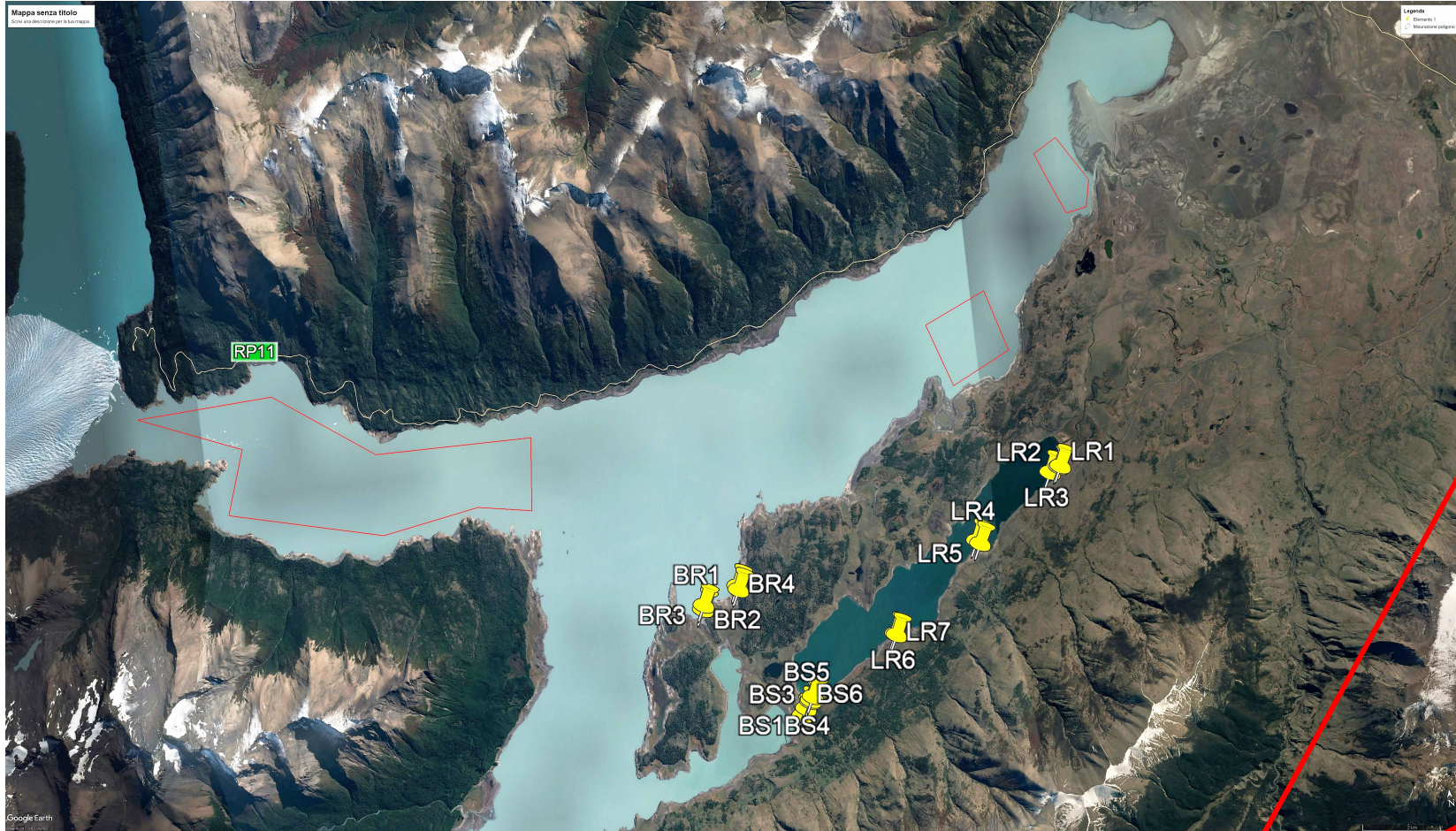
# Core Logging workflow



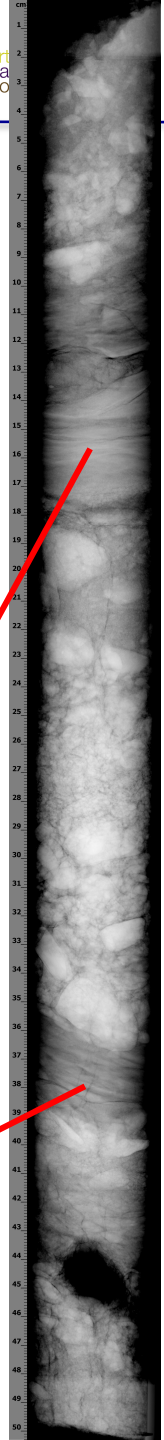


Case study-1

Paleoclimatic studies



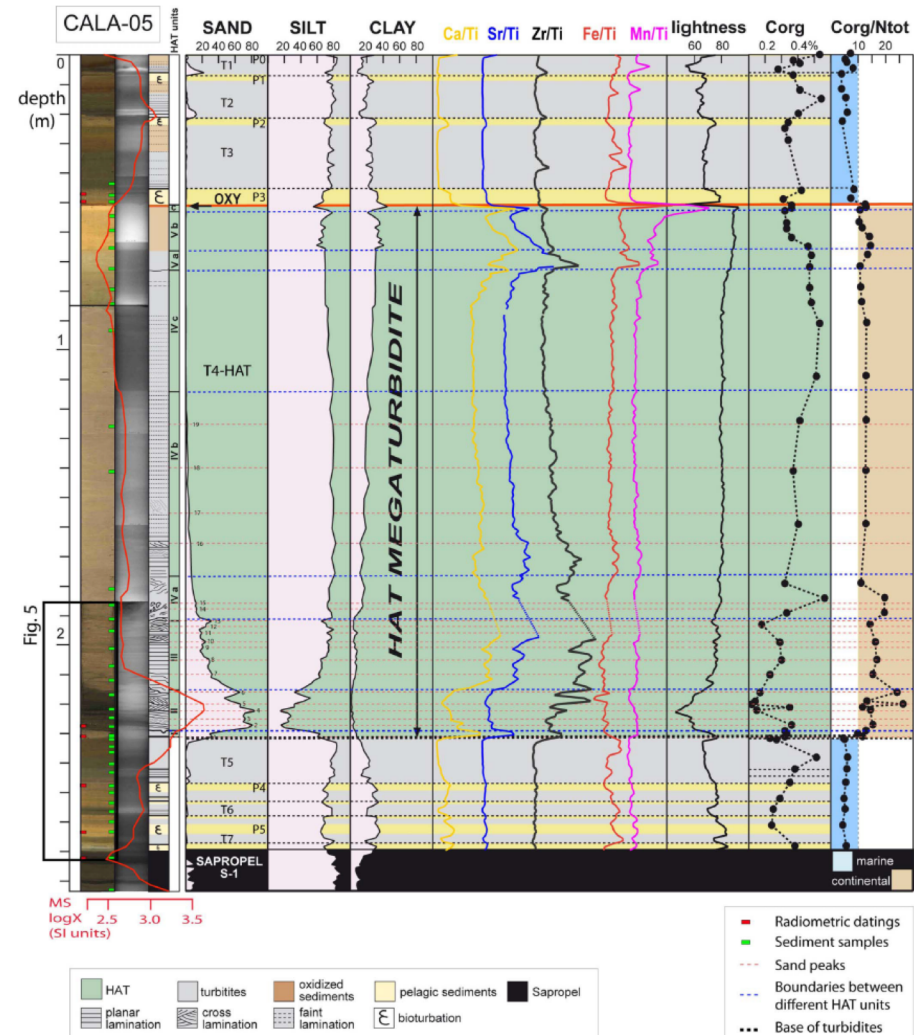
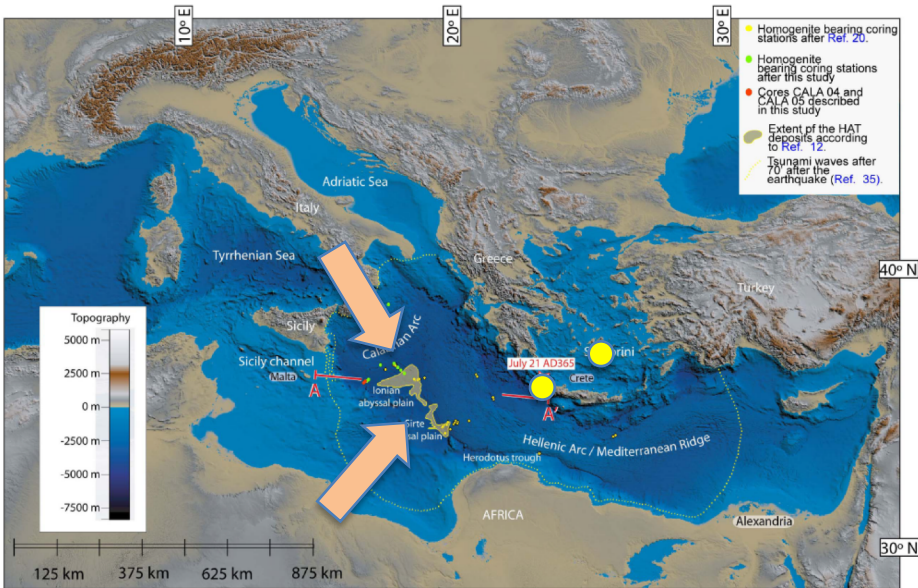
lake flooding deposits due to glacier advancement over the coastal soil in a south-american subglacial lake





Case study-2

# Volumetric assessment of the “Homogenite” mega-turbidite in the Ionian Sea



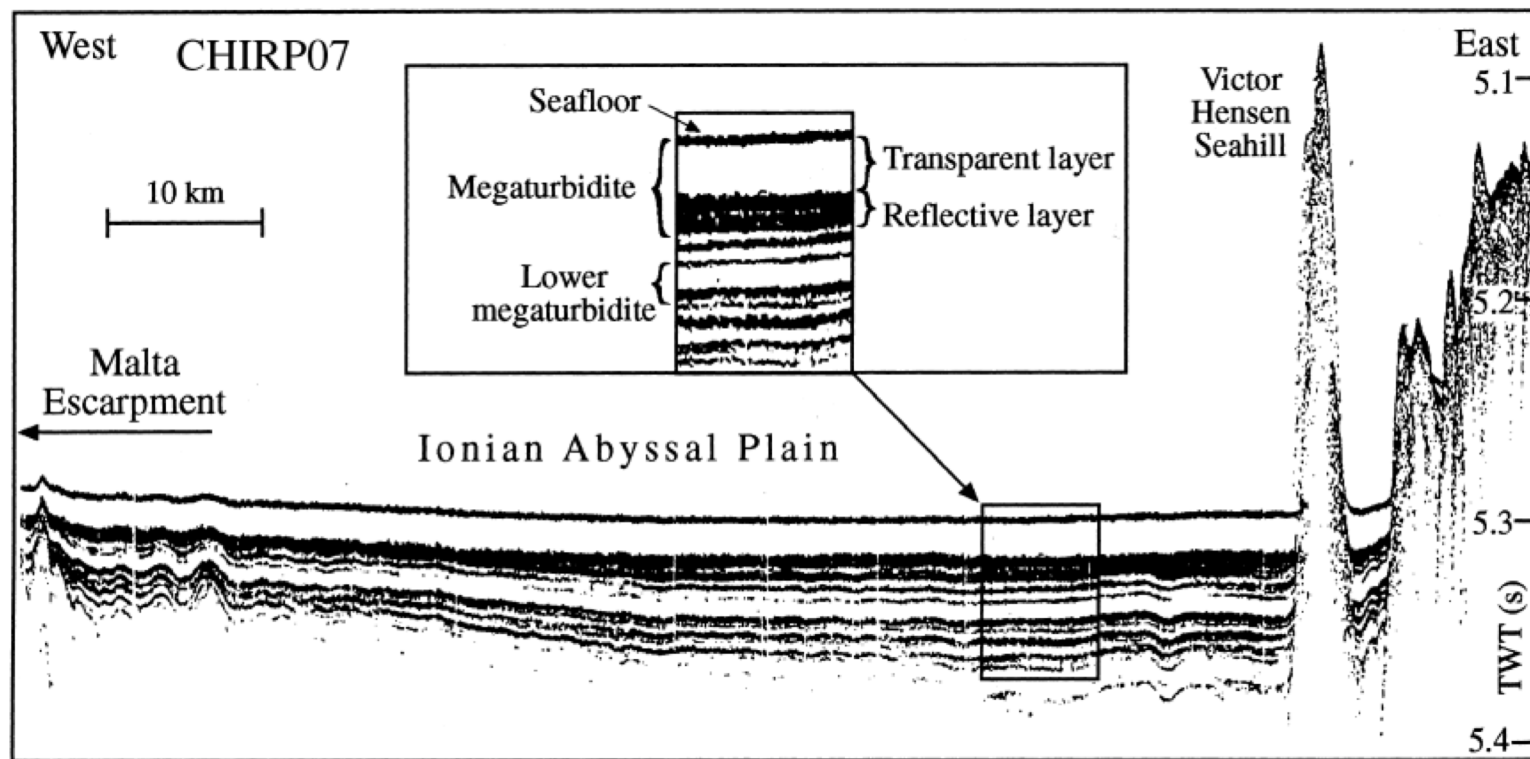
Tsunami-induced submarine mass transport deposit (Mega-turbidite) originate by:

- Santorini Caldera Collapse ca 3500 bp (old hypothesis)
- Mega Earthquake in the Hellenic Trench in 365 ad (Alexandria of Egypt destruction)



## Case study-2

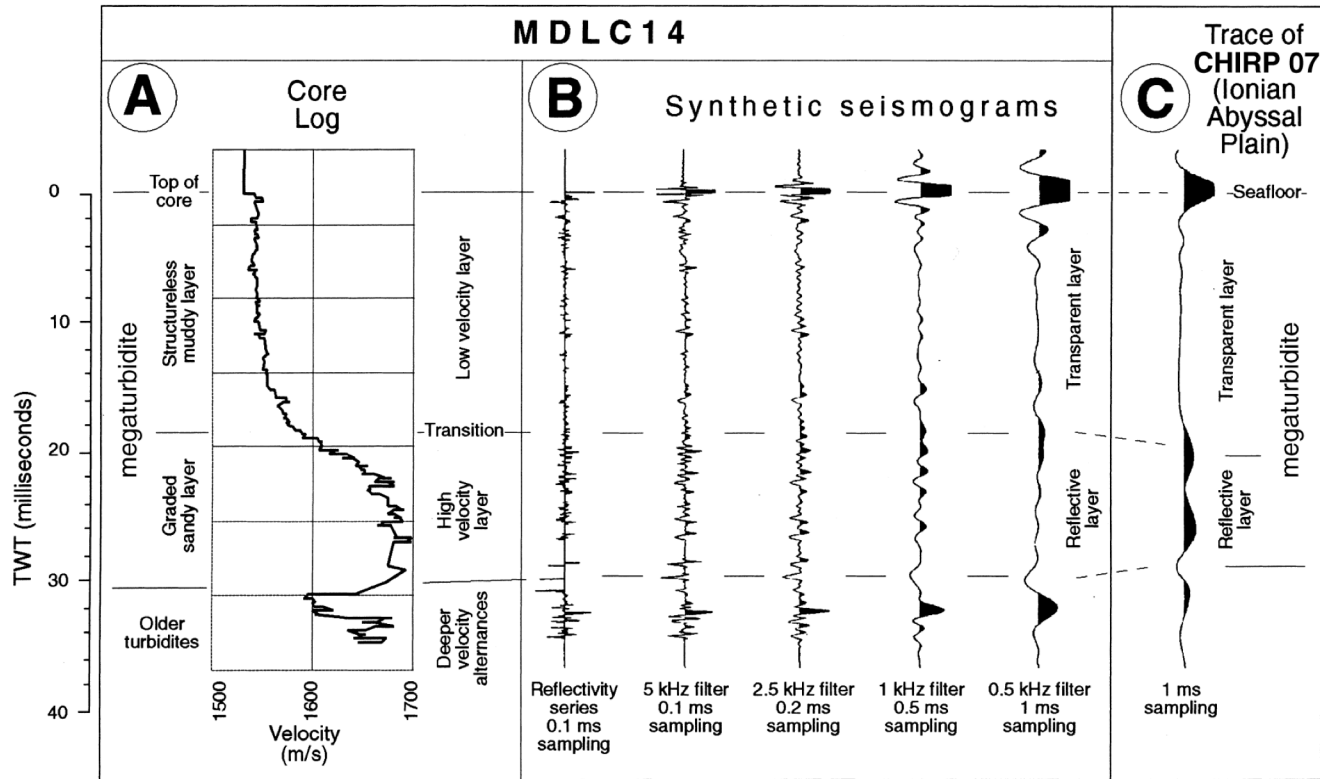
## Volumetric assessment of the “Homogenite” mega-turbidite in the Ionian Sea



Rebesco et al., 2000

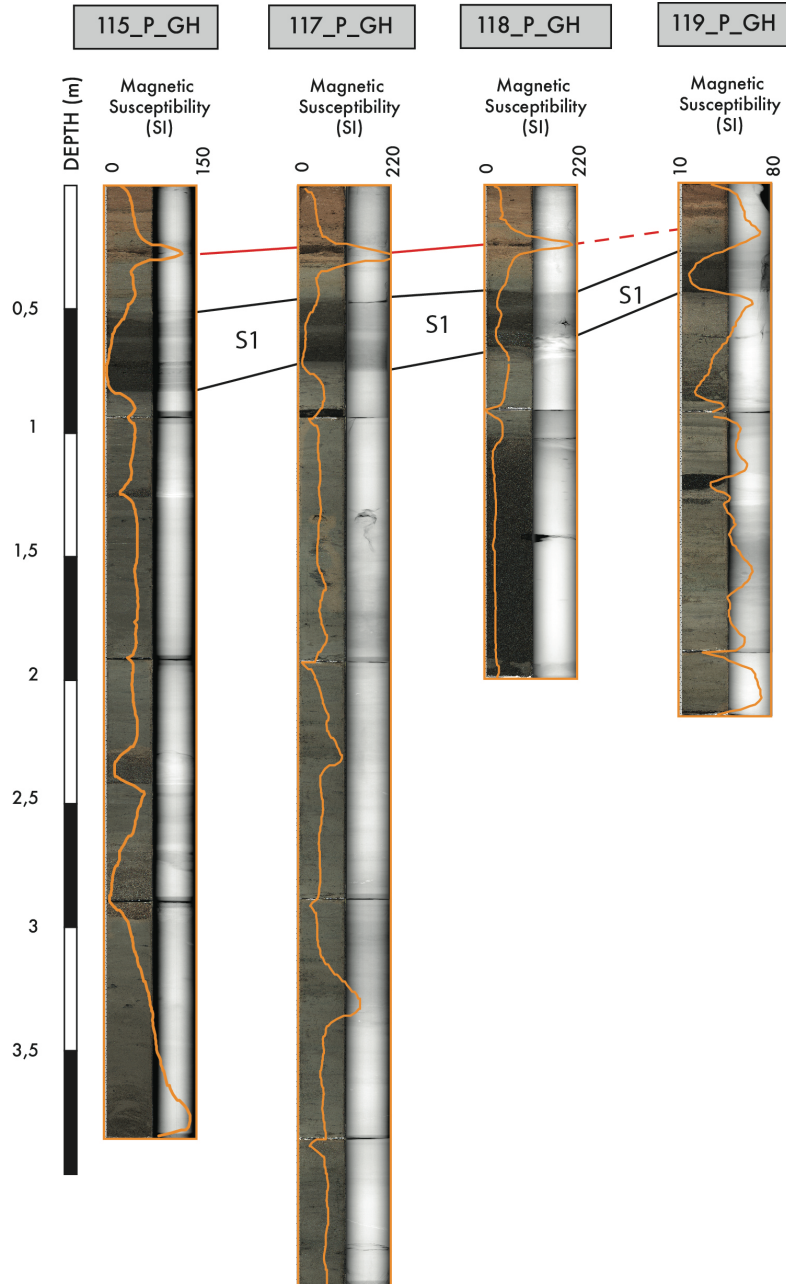
## Case study-2

## Volumetric assessment of the “Homogenite” mega-turbidite in the Ionian Sea



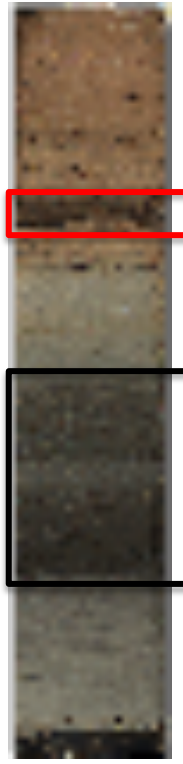
Rebesco et al., 2000

The study has provided an estimate of about  $162 \pm 10 \text{ km}^3$  for the megaturbidite.



Case study-3

# Stratigraphy – Tephra and Sapropel levels correlation



**Tephra:**  
The term *tephra* (ash) as originally defined was a synonym for pyroclastic materials, but it is now used in the more-restricted sense of pyroclastic materials deposited by falling through the air rather than those settling out of pyroclastic flows. For example, ash particles that fall from a high eruption cloud to form widespread layers downwind from a volcanic eruption are referred to as tephra and not as a pyroclastic flow deposit.

**Sapropel:**  
Dark coloured sediments that are rich in organic matter. Sapropels develop during episodes of reduced oxygen availability in bottom waters (anoxic events).





# OPPORTUNITIES

- **TIROCINI FORMATIVI**

Possibilità di svolgere tirocini formativi all'interno del corso di laurea o successivamente (extra-curriculare), in base alla disponibilità di materiale.

- **TESI DI LAUREA**

*Contact person:*

*Andrea Caburlotto*

*OGS*

*Borgo Grotta Gigante 42/c  
34010 Sgonico (Trieste), Italy*

*Phone: +39 0402140482*

*e-mail: [acaburlotto@inogs.it](mailto:acaburlotto@inogs.it)*

