



Università di Trieste
LAUREA MAGISTRALE IN GEOSCIENZE
Curriculum Geofisico
Curriculum Geologico Ambientale

Anno accademico 2016 – 2017

Geologia Marina

Parte II

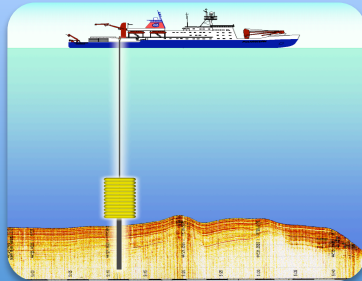
Modulo 2.3 Metodi diretti: Sondaggi superficiali ed analisi dei sedimenti

Relatore

Dr. Renata G. Lucchi

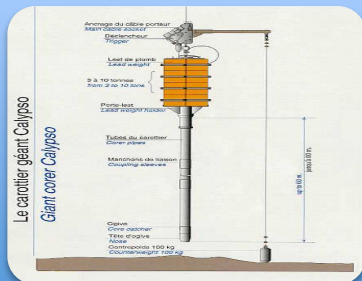
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BOTTOM SAMPLING SYSTEMS



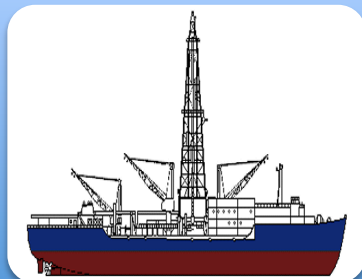
Gravity corer

- classic gravity corer (Emery and Dietz, 1941; Hvorslev and Stetson, 1946)
- box corer
- kastenlot corer
- multi-corer



Piston corer

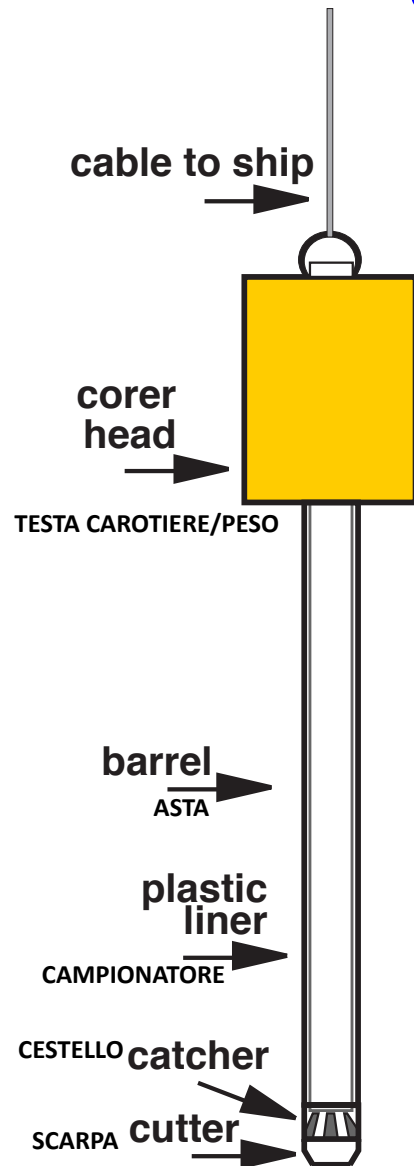
- classic piston corer (Kullenberg, 1947; 1955)
- long piston corer
 - Calypso piston corer (e.g. R/V Marion Dufresne, G.O. Sars)
 - Jumbo piston corer (e.g. R/V Araon)



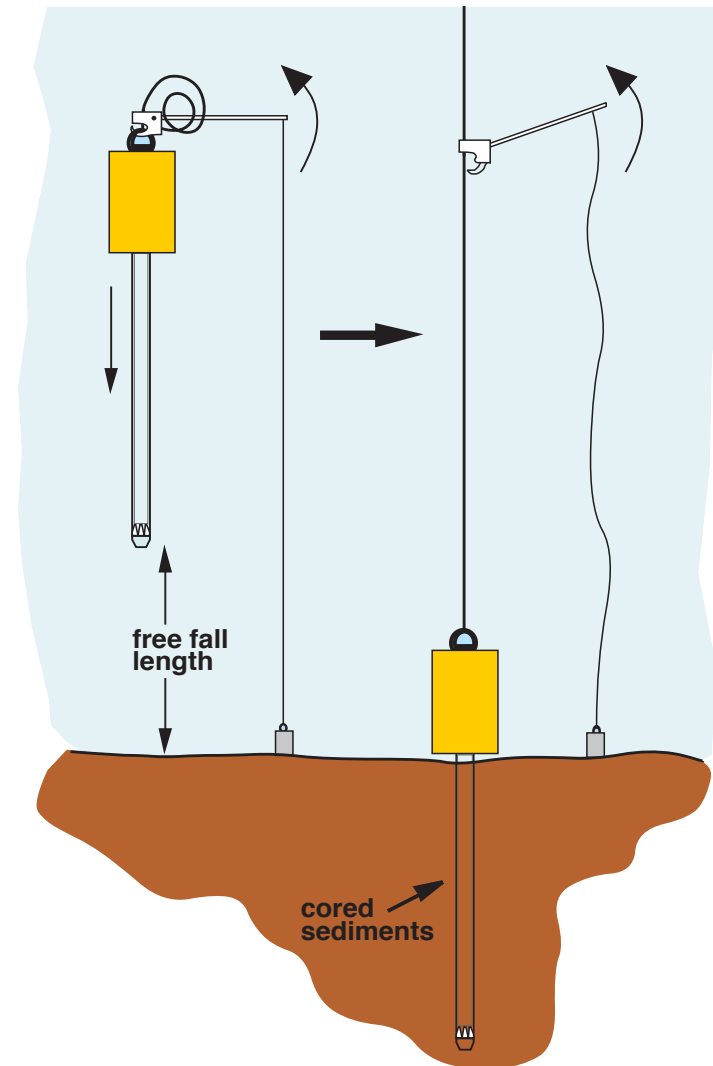
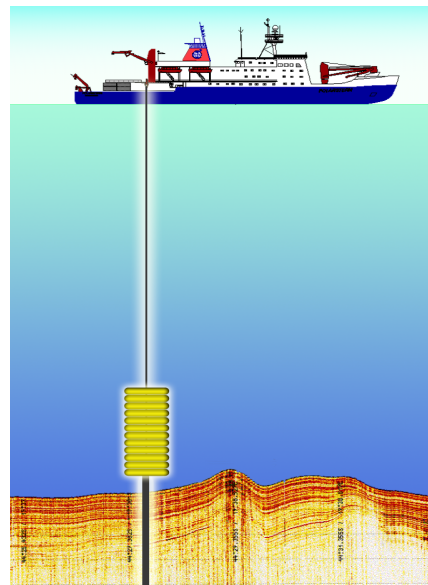
Drilling systems

- ocean floor drilling systems (e.g. IODP-drilling vessels & semi-automated MeBo system)
- ice drilling systems (e.g. EPICA-European Project for Ice Coring in Antarctica & NorthGRIP- North Greenland Ice Core Project)

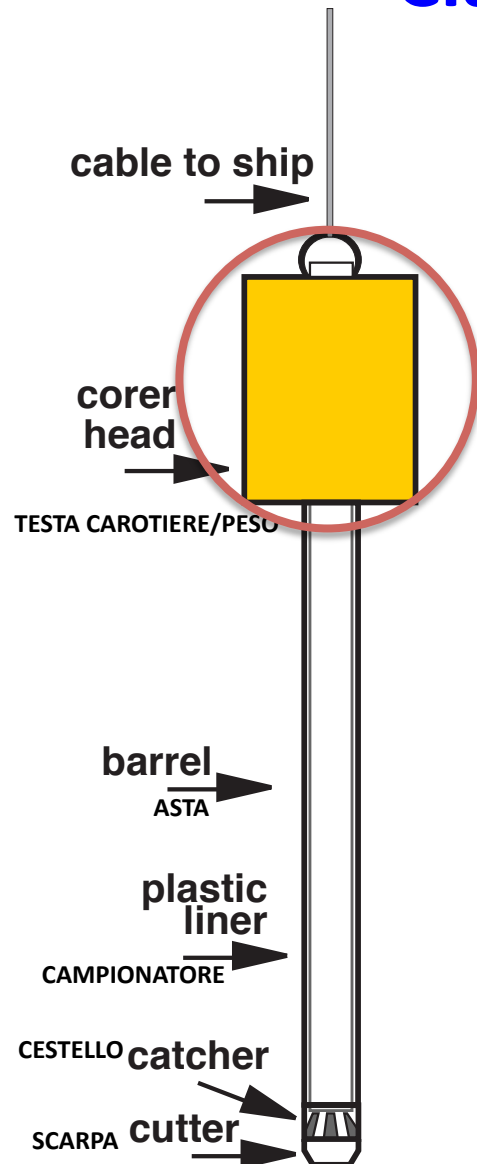
Classic gravity core system (Emery and Dietz, 1941)



It is the simplest coring device in which the weight of the coring equipment is used to force the barrel into the sea bottom. This system can work with or without a triggering system (sistema di sgancio)

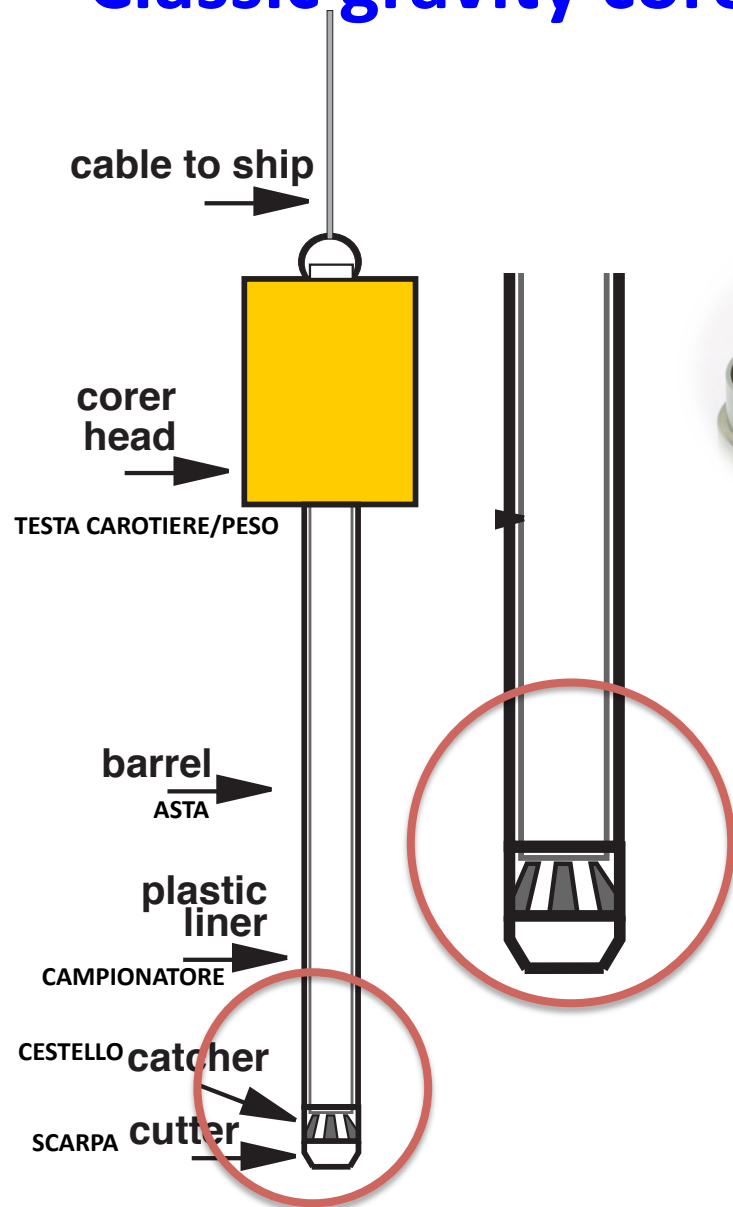


Classic gravity core system: corer head



weight 600-800 kg
6000 kg

Classic gravity core system: **core catcher and cutter**



core catcher
(cestello)



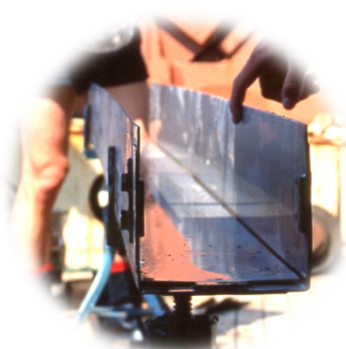
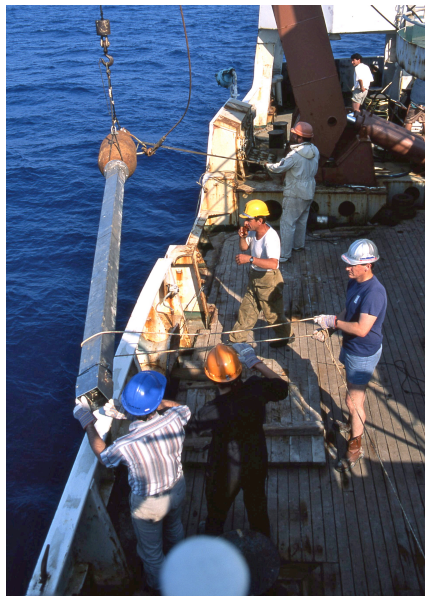
core cutter
(scarpa)



core cutter
with sediments

Additional gravity core systems: **Kastenlot corer**

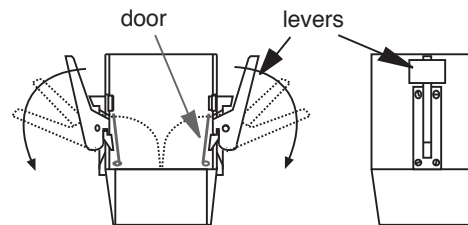
The kastenlot (kastens) corer was originally designed by Kögler (1963) it was improved and modified by Zangger and McCave (1990). The barrel, of variable lengths, is square in section (15x15 cm) and it contains a base plate that can be raised to reveal a new cleaned core surface



Square section
of barrel



Core cutter and catcher



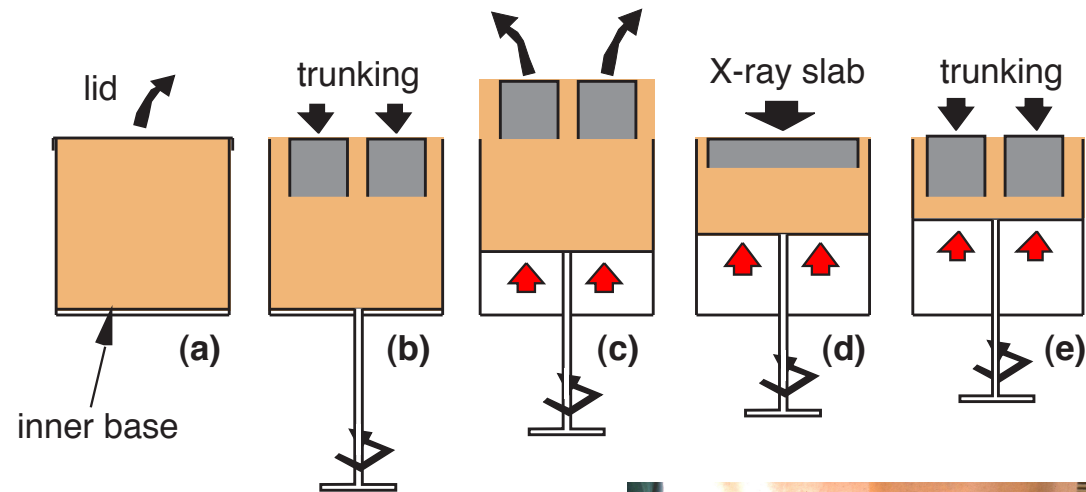
Head of
kastens
corer



The core catcher has a shutter-like closure consisting of two square doors held under tension and blocked in a retracted position by two levers located on the outside. During the corer pullout, the pressure of the surrounding sediments pushes down the two levers closing the doors.

Sampling of Kastens cores

- (a) removal of the barrel lid to reveal the core surface;
- (b) two PVC trunkings are pushed into the sediments
- (c) the inner base is moved upward to expose the trunkings that are cut at the base and removed from the main core using a cheese wire;
- (d) sampling with x-ray slabs, and a further set of trunkings (e). Each time the sediments are lifted upward and withdrawn with a cheese wire



Additional gravity core systems: **BOX-corer**

Designed for minimum disturbance of the sediment surface, ideal for coarse/stiff sea floor sediments, it allows the recovery of bottom waters.



lateral surface



coral sampling

sampling of
glacigenic
sediments

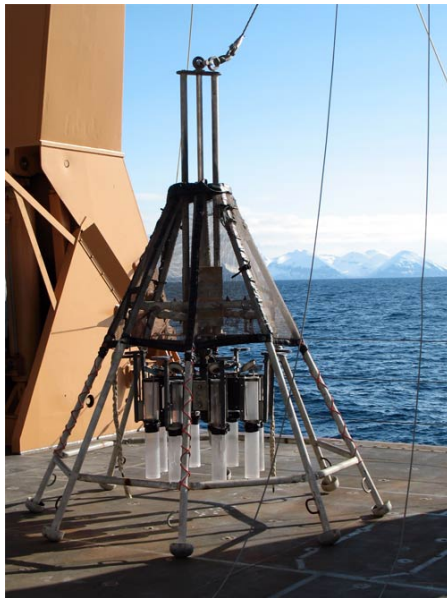


Box core sampling



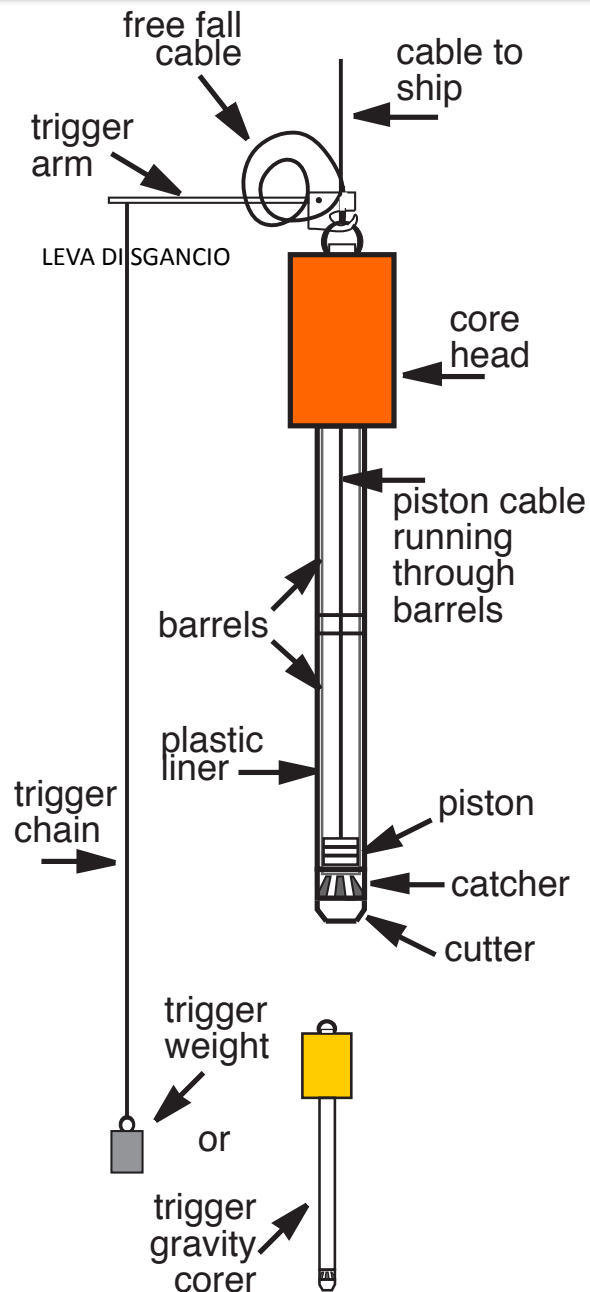
Additional gravity core systems: **Multi-corer**

Especially designed for the sampling of sea bottom sediments-water interface, it permits to recover low disturbance sediment. Ideal for geochemical and biological sediment and water analysis.

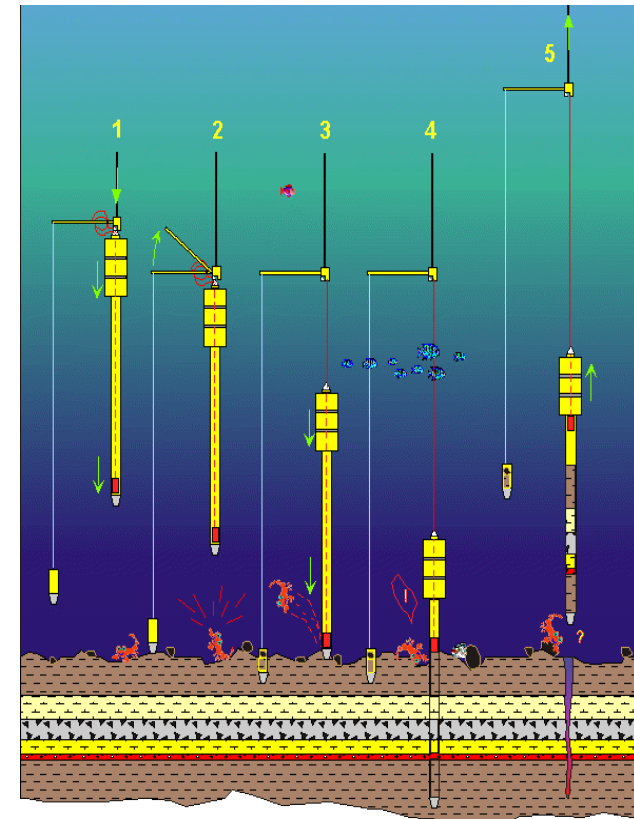


Kullenberg piston corer system

Standard assemblage for piston coring. The core barrel penetration is maximised by the action of a piston located in the lower barrel (or into the lower plastic liner if present) that helps to overcome the friction between sediments and the coring tube by generating Vacuum behind the cutter. The sediment cores obtained are less compacted and distorted than gravity cores. This system is always used coupled with a trigger mechanism.

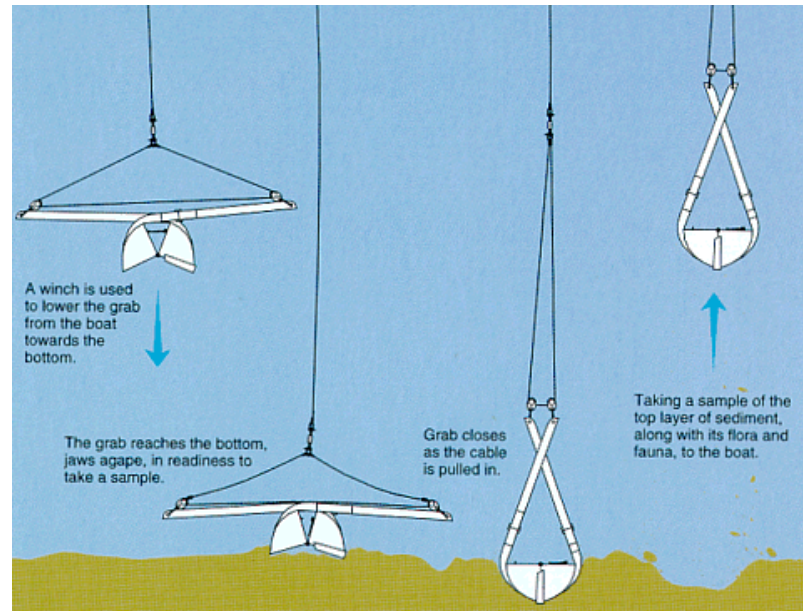


Specifications	Kullenberg piston corer	Long piston corer
headweight	600 kg	6000 kg
barrel length	6 m	13 m
barrel inner diameter	65 mm	140 mm
barrel thickness	5 mm	5 mm
plastic liner outer diameter	63 mm	113 mm
plastic liner thickness	3 mm	5 mm
maximum cable length	5000 m	10000 m
cable diameter	12 mm	30 mm
freefall	4-5 m	1.5 m



Long piston corers:
Claypso, Jumbo etc.

Grab (benna)



Dredge (draga)

