Università di Trieste
Corso di Laurea in Geologia

Anno accademico 2016 – 2017

Geologia Marina

Parte I

Modulo 2.1 **S**ingle **B**eam **E**cho**S**ounders

Docente
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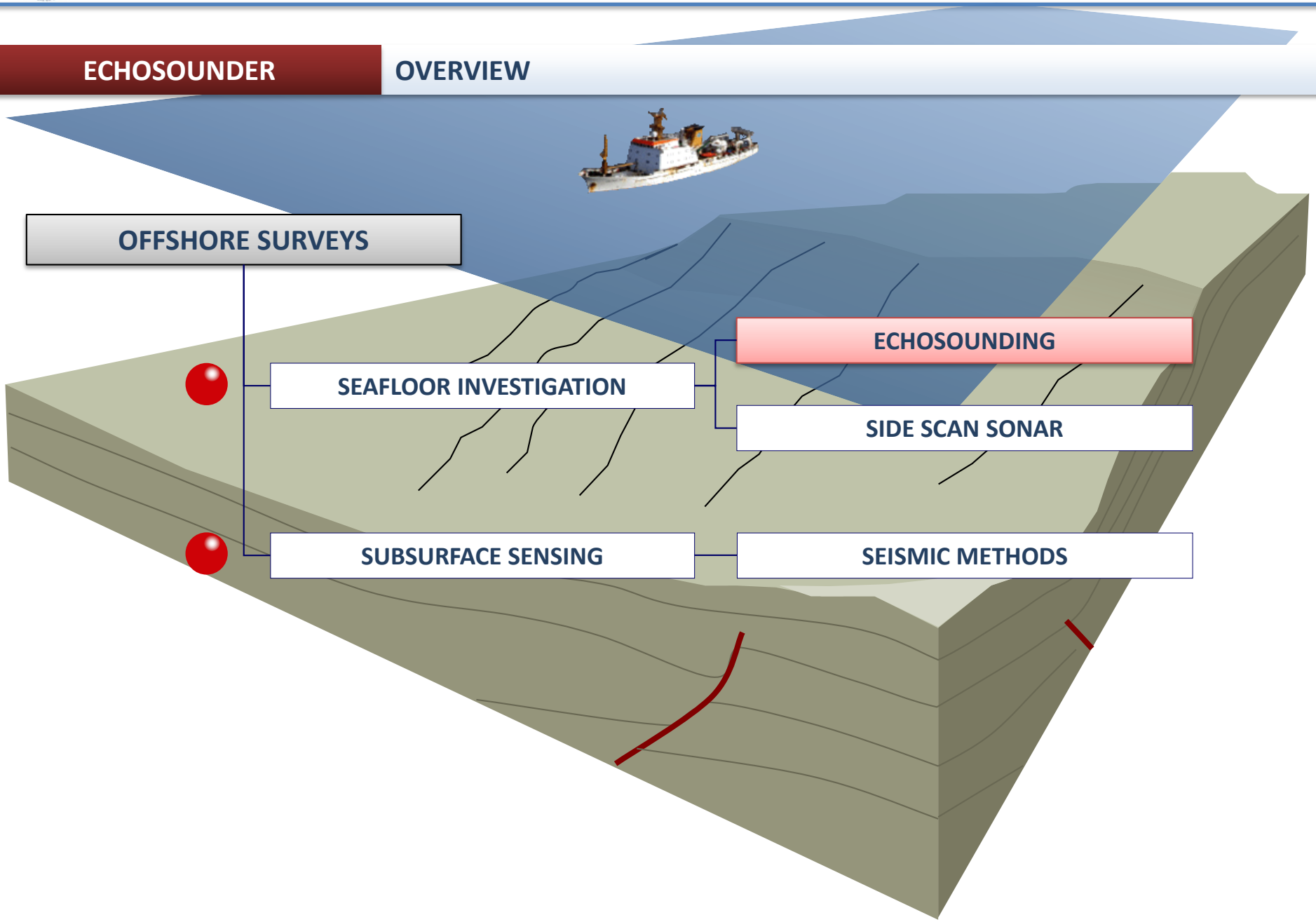
ECHOSOUNDER

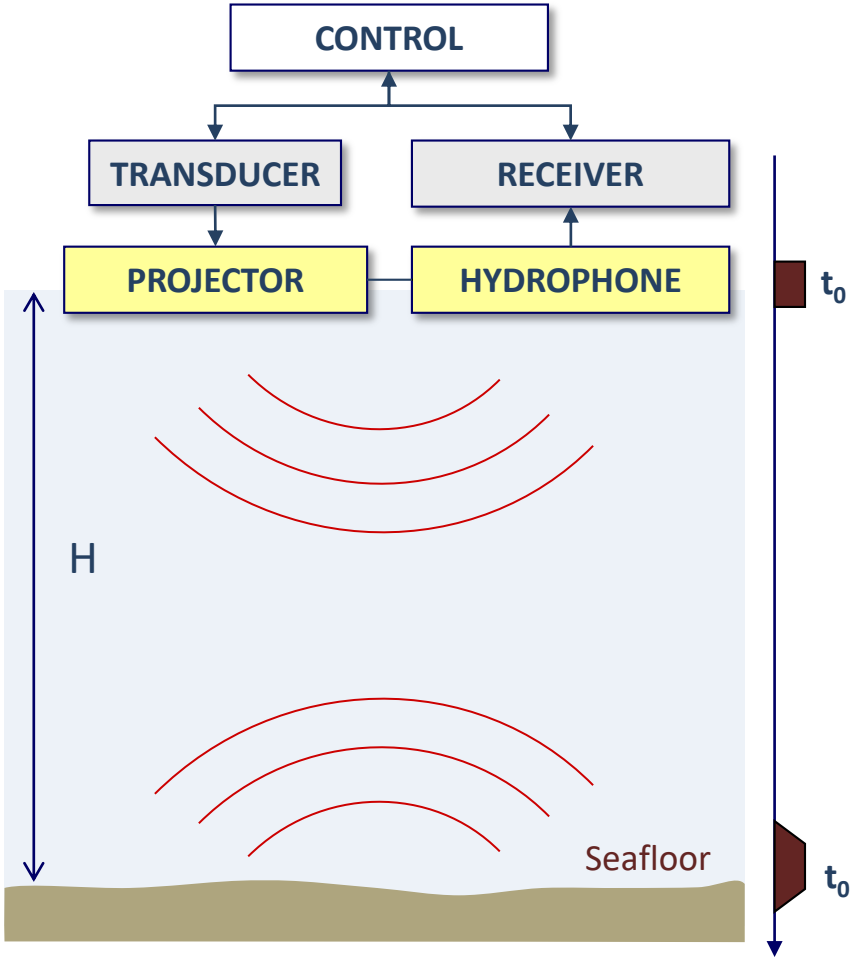
OVERVIEW



ECHOSOUNDINGS

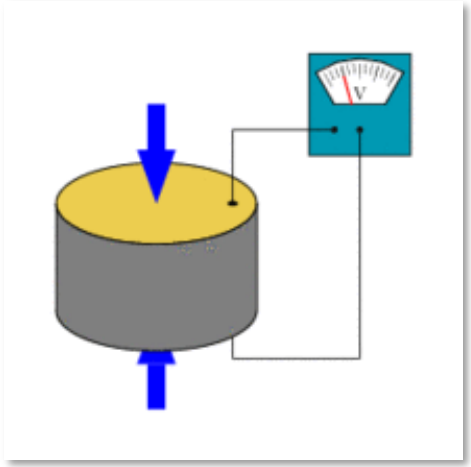
BASIC CONCEPTS

The sonar system generates a short pulse of sound into the water, known as a "ping", and then receives return energy from the target (the sea floor or a target in the water column).



range (H) = ½ * speed of sound * echo time

The "ping" is generated by applying a voltage pulse to the piezoelectric ceramic elements in the transducer projector. The ceramics then respond by oscillating at the frequency of the ceramics. This physical oscillation causes a series of compressions and rarefactions in the surrounding water and produces a sound pressure wave.

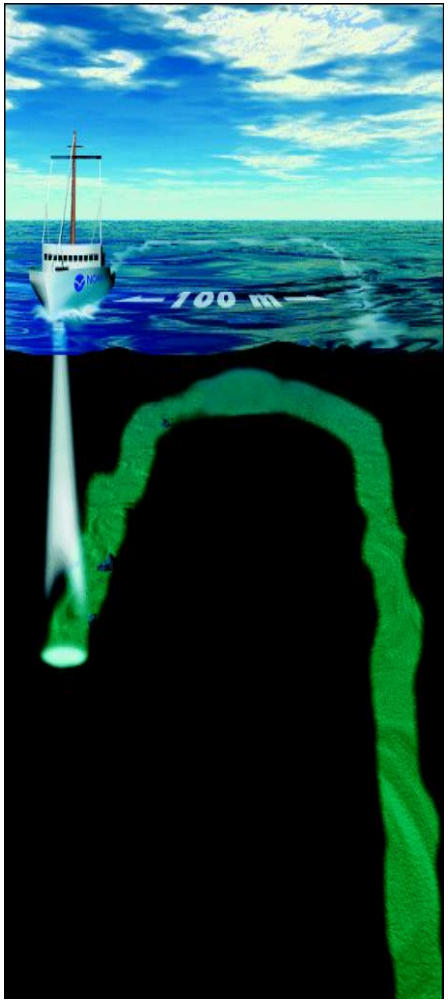


ECHOSOUNDNGS

SINGLE BEAM ECHOSOUNDERS

LIMITATIONS

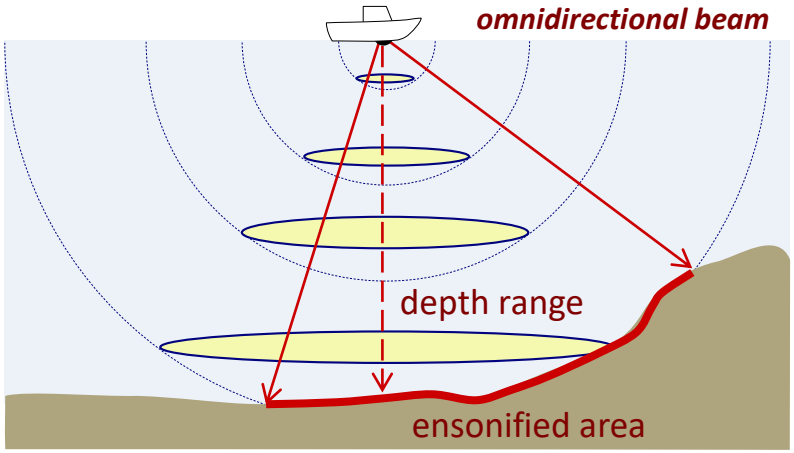
- Only one depth calculation for each ping cycle. In deep water, it can take up to 10 seconds to receive the echo signal.
- The low sounding density produces poor feature definition unless the vessel is operated at very low speed and very narrow line spacing is used.
- Narrow beam transducers are required for high accuracy. These are very large, expensive and heavy



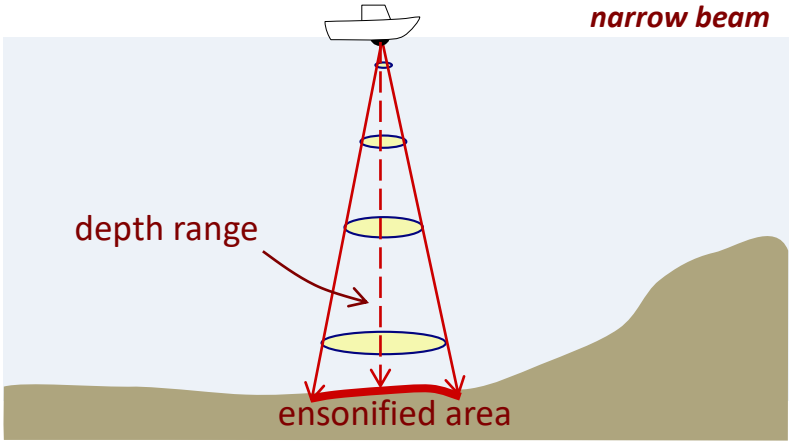
ECHOSOUNDNGS

ISOTROPIC VS DIRECTIONAL SOURCE

ISOTROPIC SOURCE



DIRECTIONAL SOURCE



LIMITATIONS

Inaccurate measurement of depth (spherical spreading)

Ensonified area (resolution) depends on depth
A = solid angle * depth^2)

Measurement influenced by wave motion (pitch and roll)