



Royal Netherlands Institute for Sea Research



## Sea Technology & Instruments



### NIOZ:

Base: sea and oceans,  
academic and  
fundamental

- Geology
- Biology
- Chemistry
- Oceanography
- Deep Sea Technology

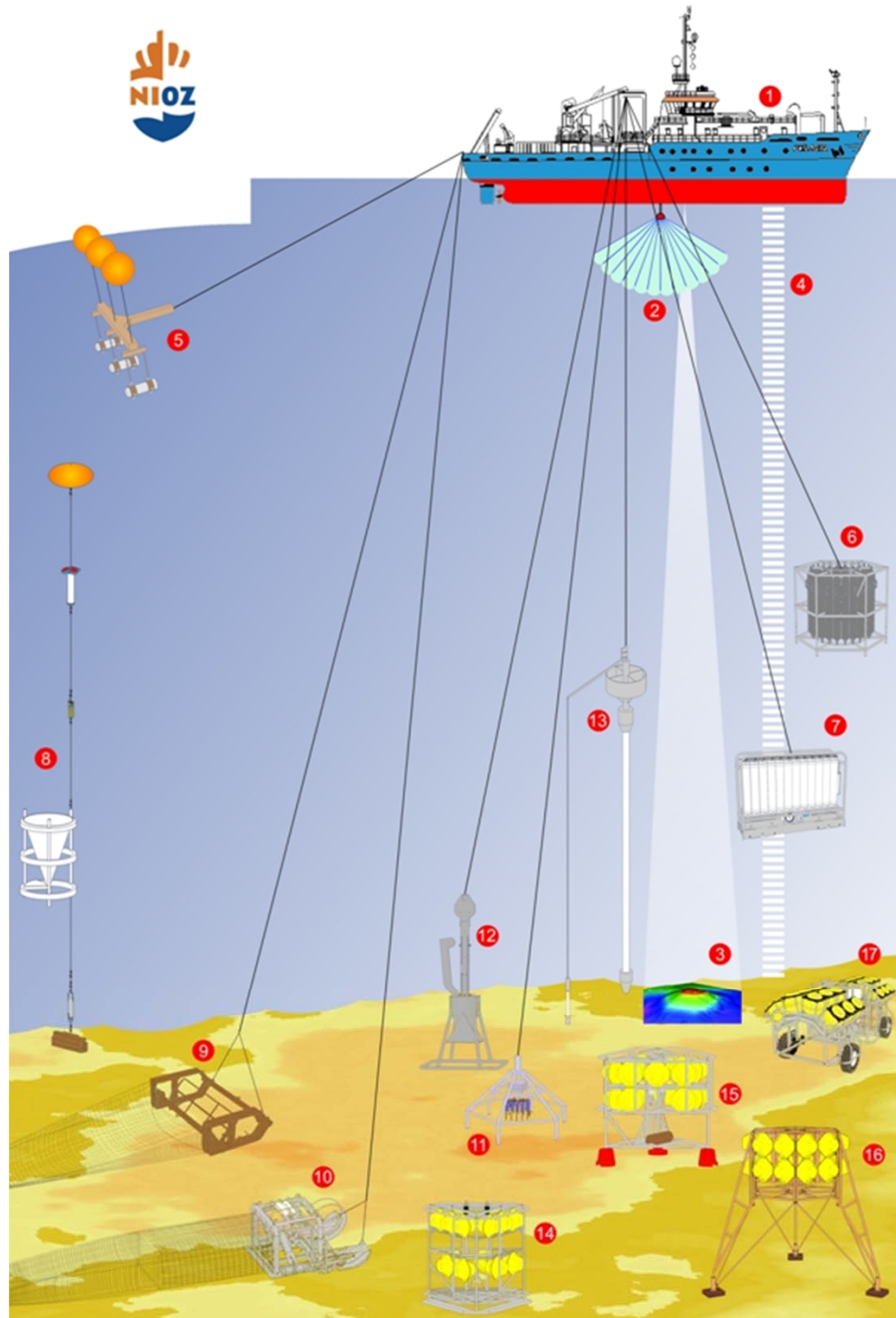
### Marck Smit

10 oktober 2012

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## Legend

- 1 R/V Pelagia
- 2 Hipap 100 USBL acoustic direction finder
- 3 Kongsberg EM-302 Multibeam Echosounder
- 4 Bottom penetrating echosounder
- 5 Seismic Array (Sleeve Guns)
- 6 CTD-Rosette frame with water samplers
- 7 Ultra-clean-CTD Frame 'Titanium' with Pristine® water samplers
- 8 Deep Sea Mooring with ADCP, current meter and Sediment Trap
- 9 Agassiz Trawl for quantitative deep-sea bottom trawling
- 10 Deep Digging Dredge (Triple-D) for sampling benthic macrofauna
- 11 Multi-Corer for multiple small samples of surface sediments
- 12 Box Corer for large samples of surface sediments
- 13 Piston Corer for sampling long (10-20 m) sediment cores
- 14 Altrap Bottom Lander with larvae collector





## Which aspects are second nature to us?

- Corrosion
- Pressure
- Working at sea
- No radio-contact
- Limited visibility



“Deep Sea = Hot!”

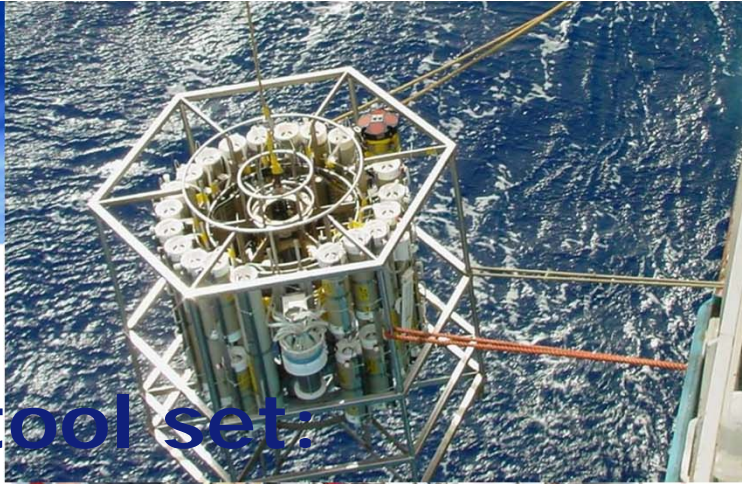
- Deep Sea Oil & Gas
- Deep Sea Mining  
(grondstoffen-schaarste, rare earth metals)





## Basic tool set:

- CTD's
- Boxcorers
- Multicorers
- Lab containers
- Piston corers
- Seismics
- Winches
- Etc.





## Bottom sampling



Vibro Coring

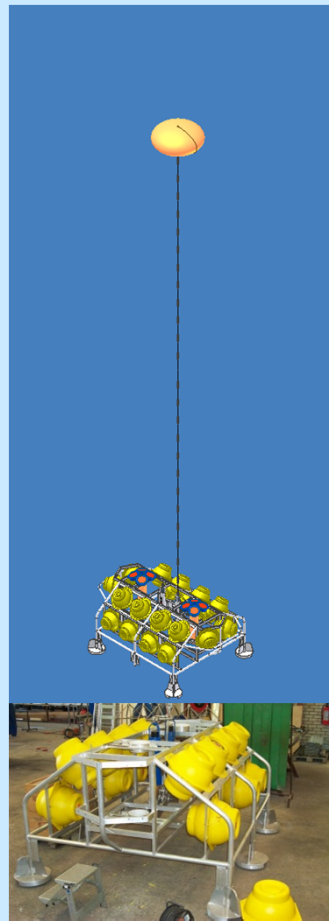


Piston Coring



Small scale  
seismics

## Bottom landers



ADCP-lander +  
thermistor string  
mooring



bottom and  
boundary  
layer research



Bio fouling on  
shallow  
water/high  
current lander

## Moorings



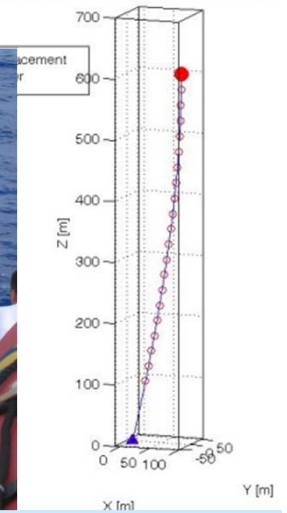
Hydrodynamic shaped  
buoyancy units



KM3-2, differs only in current speed from KM3-1, speed raise



Sediment trap  
mooring







# Some examples of Instrument Developments



P. Smit,  
Den Helder

Piston Coring



JMS, Dirksland

4 Antarctica labs

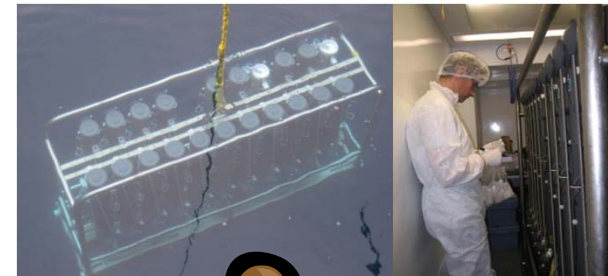


MOVE crawler



Doeschot,  
Alkmaar

XRF core scanner



Div. fima's

Ultra clean titanium water sampling system



FTD, Drachten

Pressure retaining deep sea sampler

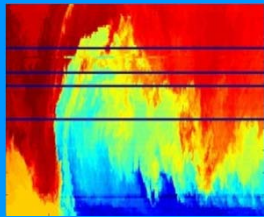


FTD, Drachten

Fast, accurate and wireless thermistor string



# Tools/options . . .



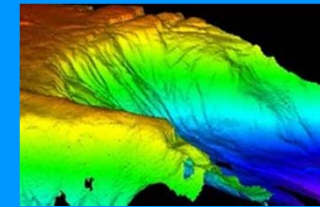
Sub sea currents



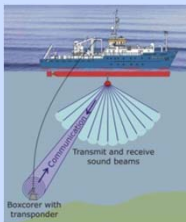
Sub sea stations



Slib transport



7.000 m MBES



10 km range USBL



Sediment coring



Vibro coring



Video grabs



Video surveys



Gas hydrates



6.000 m crawler



Hyperbaric tank 600 bar



OEM deep sea cable



Seismics, SBP



Sub sea connectors



European/global equipment access