A white network diagram is overlaid on the blue background. It consists of several white dots connected by thin white lines. Some dots are grouped into concentric circles, suggesting specific nodes or clusters within the network. The diagram is positioned on the left side of the slide, extending from the top towards the bottom.

DEEP ARVOR

PROFILING FLOAT

HIGH PAYLOAD CAPACITY

Arvor & Provor Workshop

Presented by Xavier ANDRÉ & Martin AMICE
January 29, 2020

Outline

 **Deep-Arvor**

 **ADCP deep-Arvor**

 **3-headed deep-Arvor**



Context



Argo network extension (> 2,000 m)



Formation

of deep water masses



Circulation



Context



50 years: 90 % of heat excess
has been captured by the ocean



0 – 2,000 m : + 0.8 °C since 1950

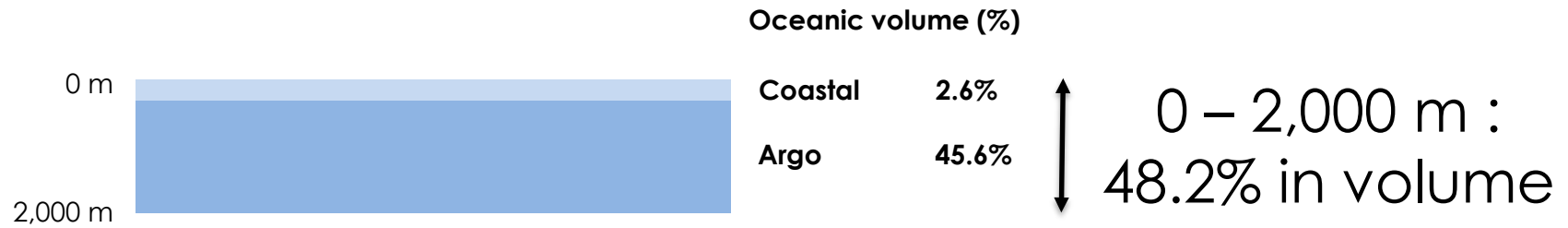


Scientific questions:

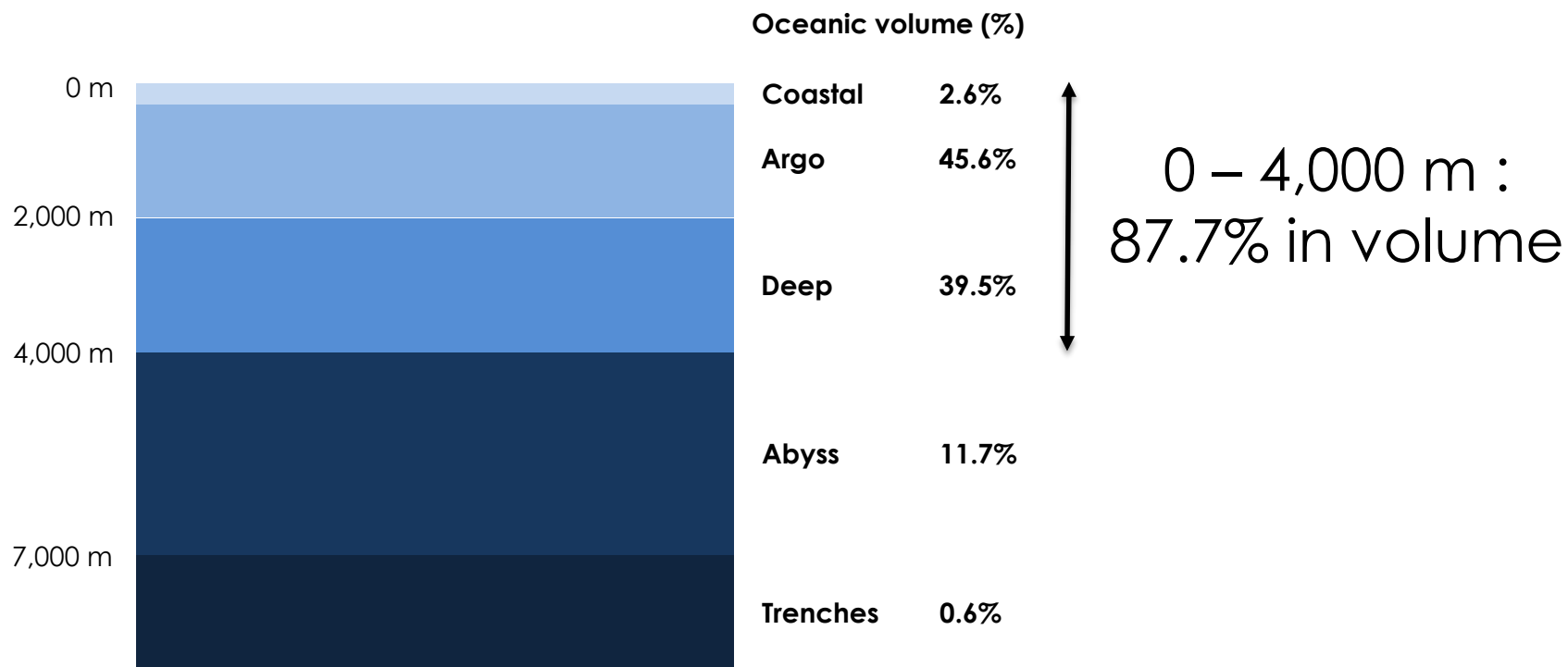
- Penetration of heat excess in the ocean?
- Impact on deep water masses?
- Impact of deep water masses on climate change?



Volume of the ocean



Volume of the ocean



Characteristics



max **4000**
meters depth

26 kg

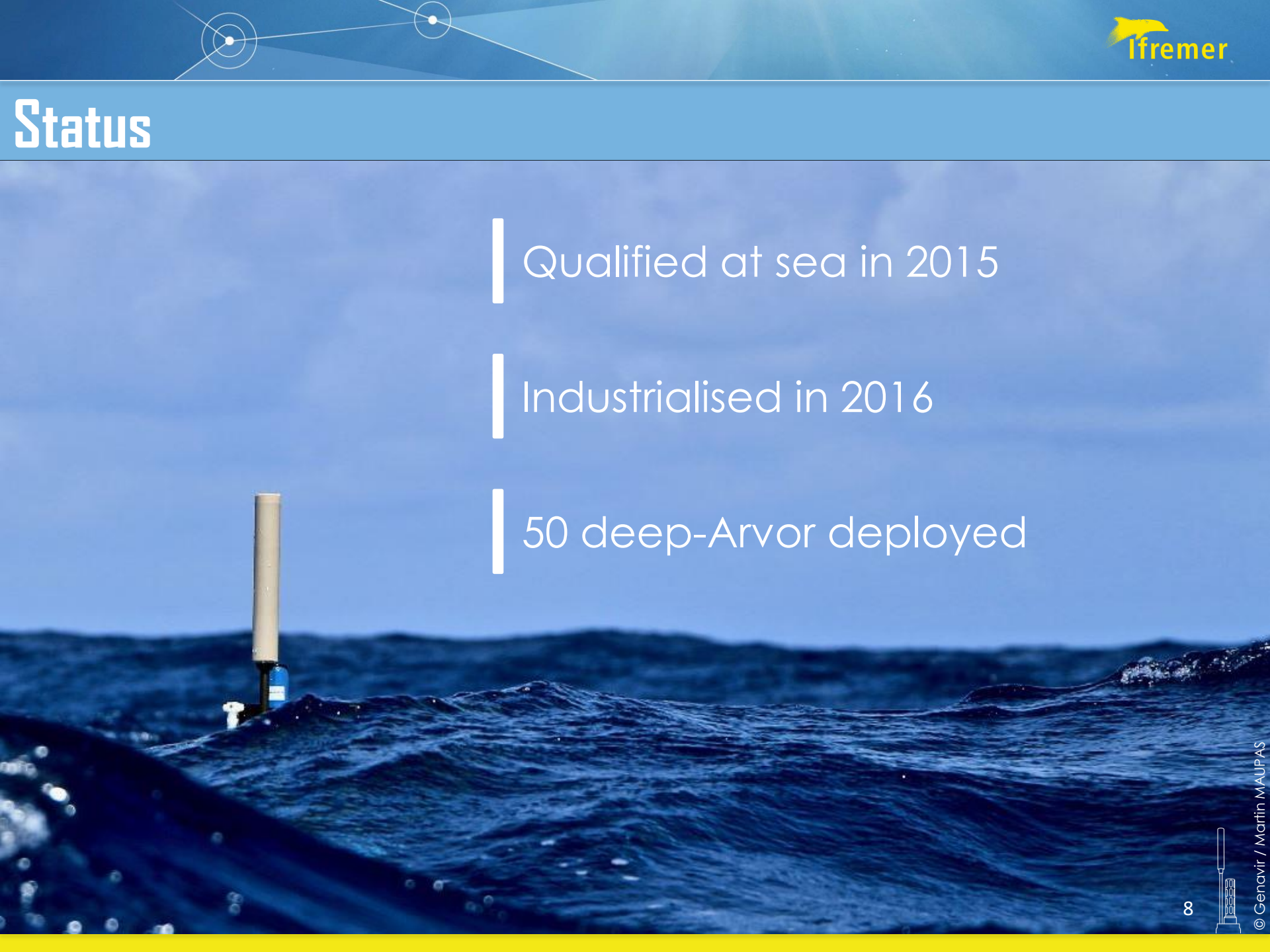
up to **200**
CTD cycles

150 in continuous pumping



Status

- | Qualified at sea in 2015
- | Industrialised in 2016
- | 50 deep-Arvor deployed



Status

Youth hydraulic weakness

Grounding management optimisation

2020: 20
2021: 30

deep-Arvor to be deployed

Status



Deep-APEX



Deep-SOLO



Deep-Arvor



Deep-NINJA



Characteristics

Deep-Arvor
High payload capacity



Wapiti ADCP Deep-Arvor
ADCP

3-headed Deep-Arvor
SBE41 – SBE61 – RBR



Outline



 Deep-Arvor

 **ADCP deep-Arvor**

 3-headed deep-Arvor



Context

-  Monitor formation & pathways of watermasses in the Weddell sea (Antarctic)
-  Observe the bottom boundary layer down the continental slope



UPMC
SORBONNE UNIVERSITÉS

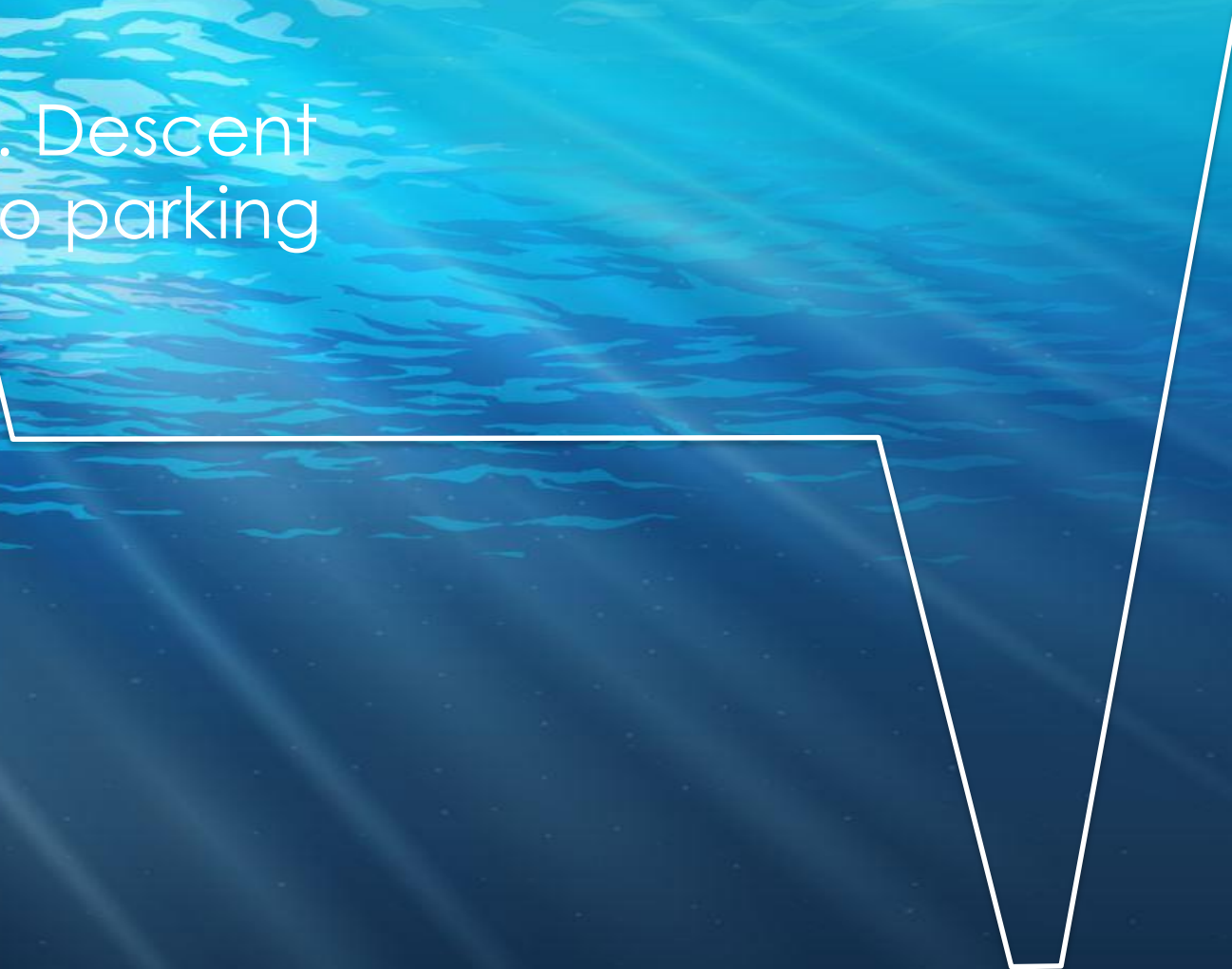
Scientist: J.-B. SALLÉE



Principle – standard deep-Arvor



1. Descent
to parking



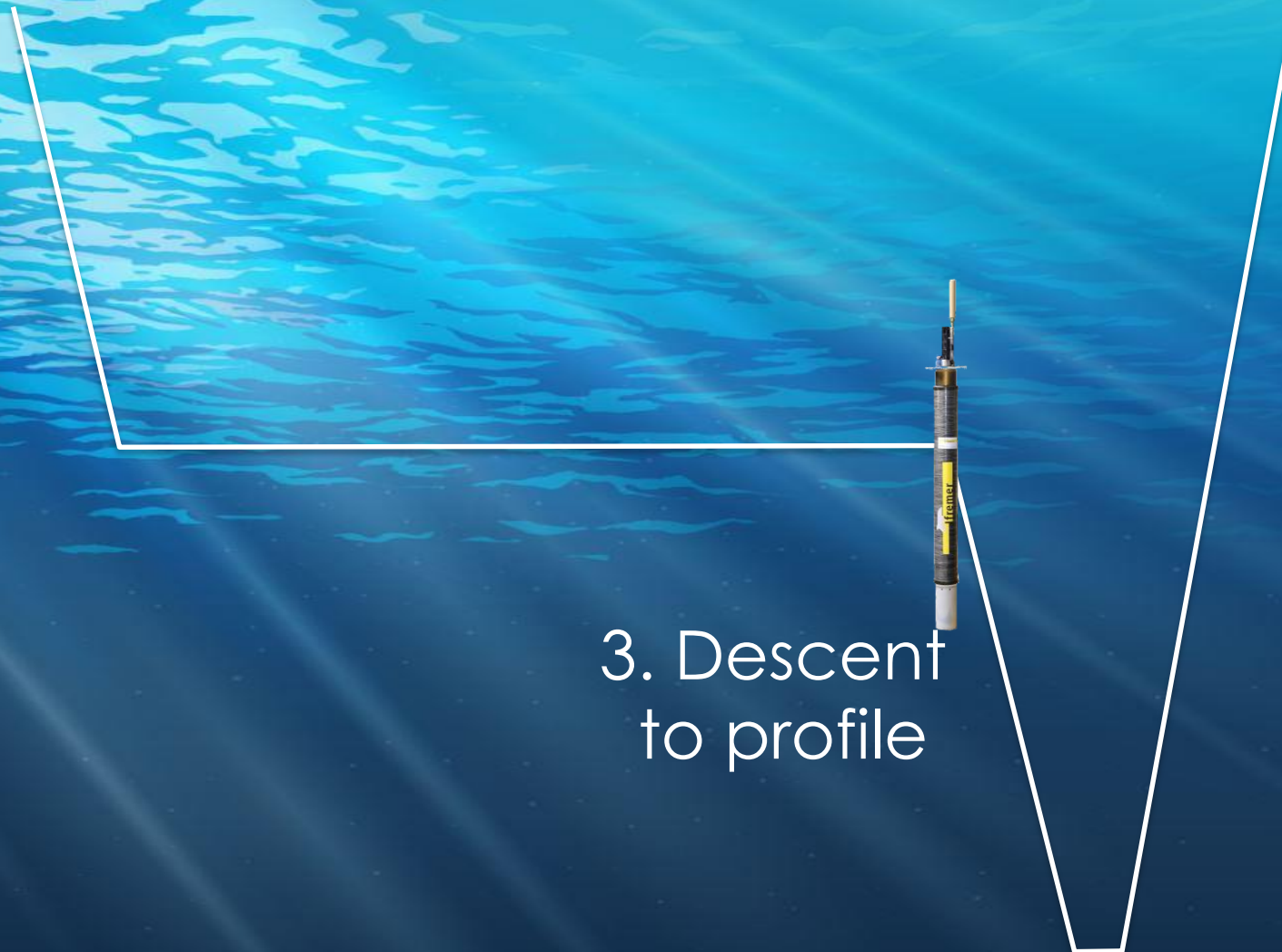
Principle – standard deep-Arvor



2. Parking

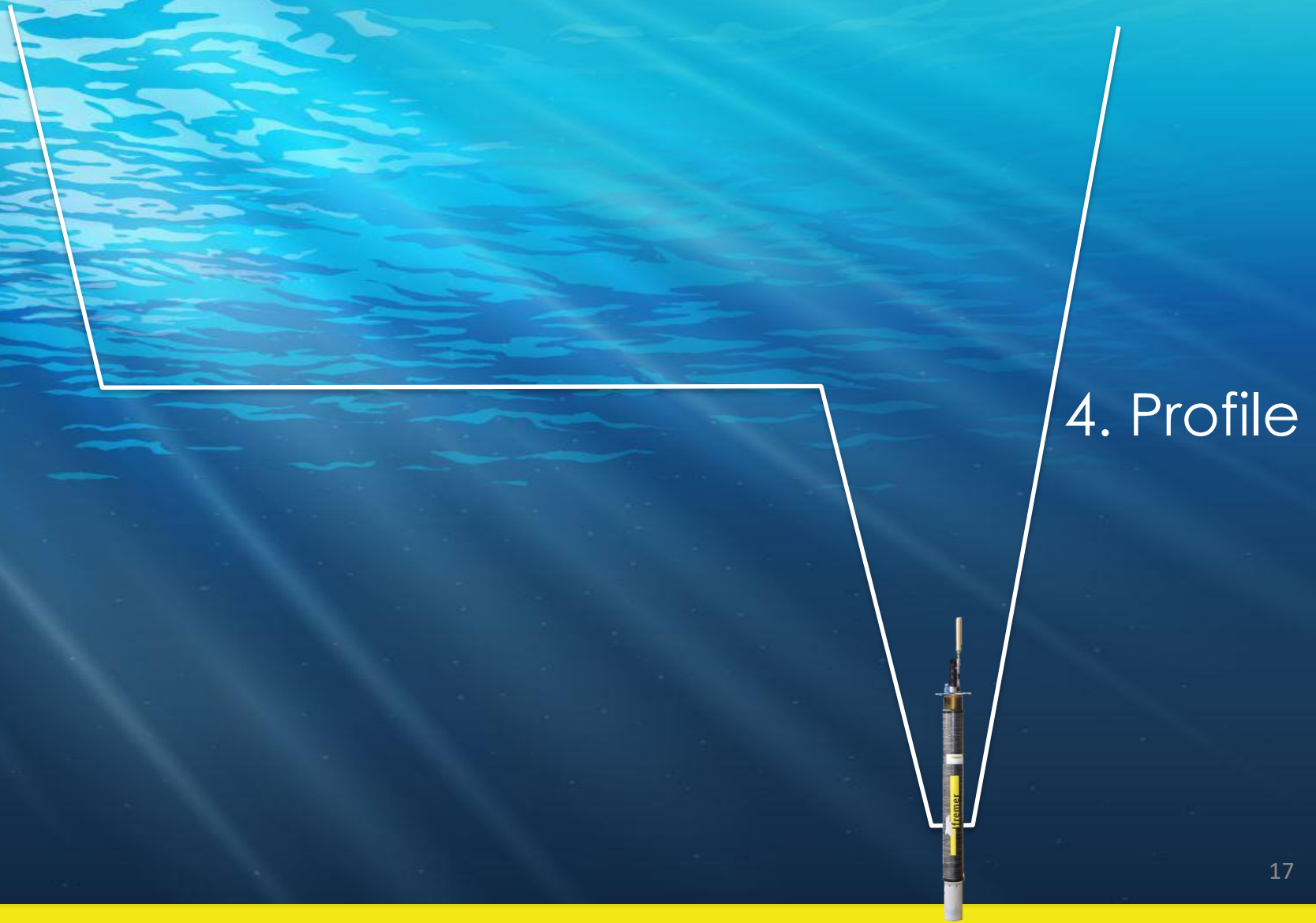


Principle – standard deep-Arvor



3. Descent
to profile

Principle – standard deep-Arvor



Principle – standard deep-Arvor

5. Tx



Principle – Wapiti ADCP deep-Arvor

Integration of an ADCP:

Altimetry control

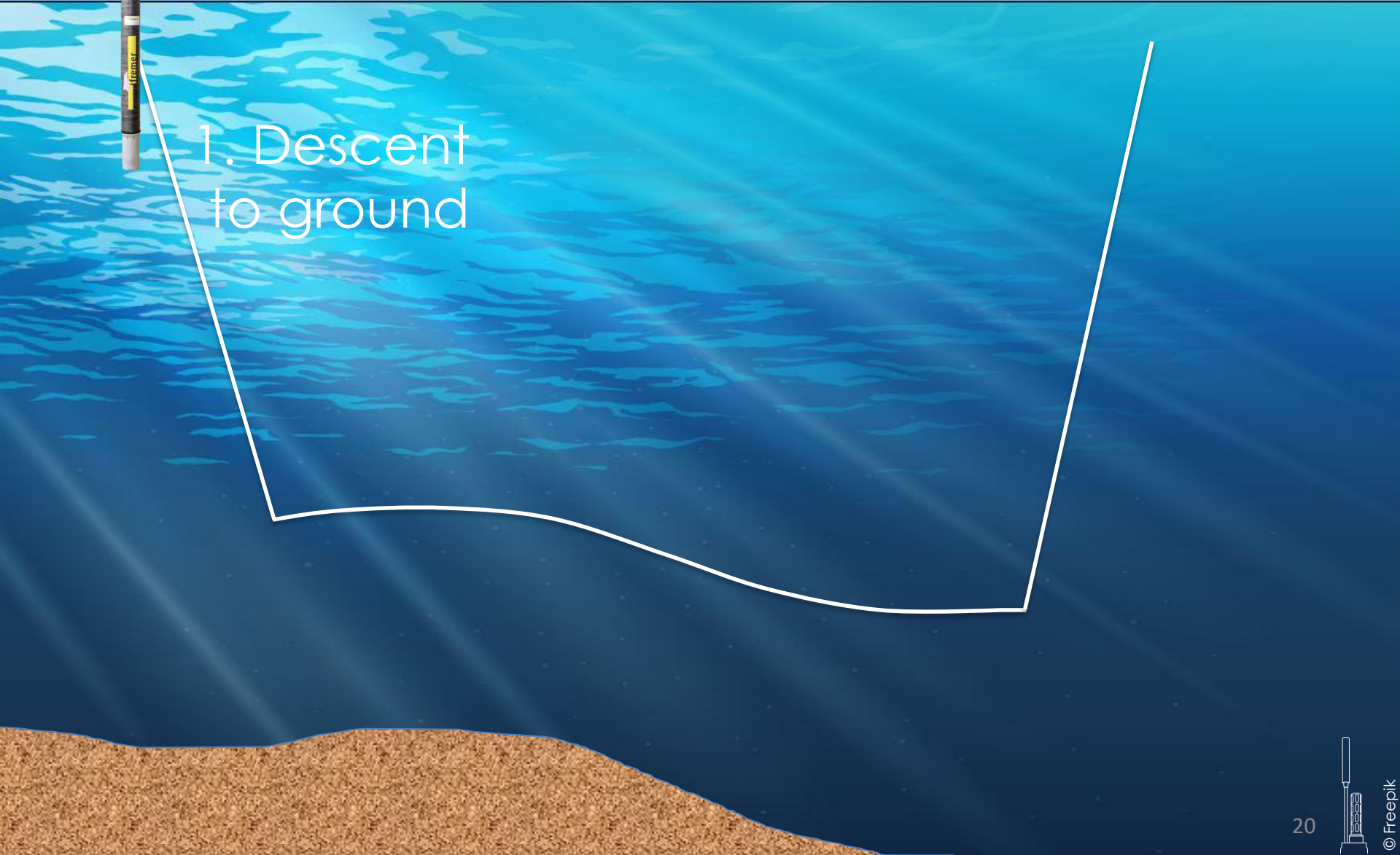
Bottom tracking
« speed of ground » & direction



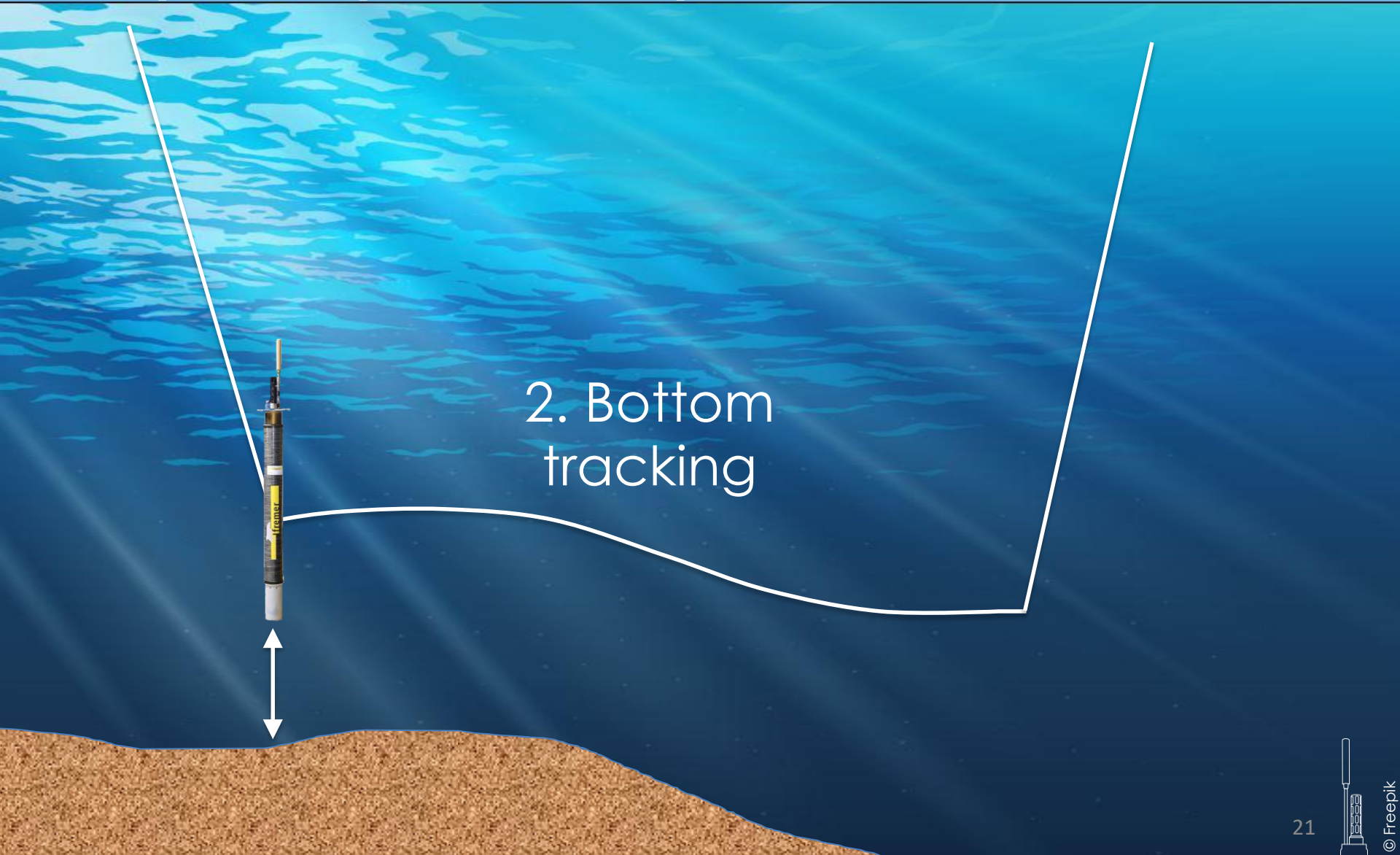
Principle – Wapiti ADCP deep-Arvor



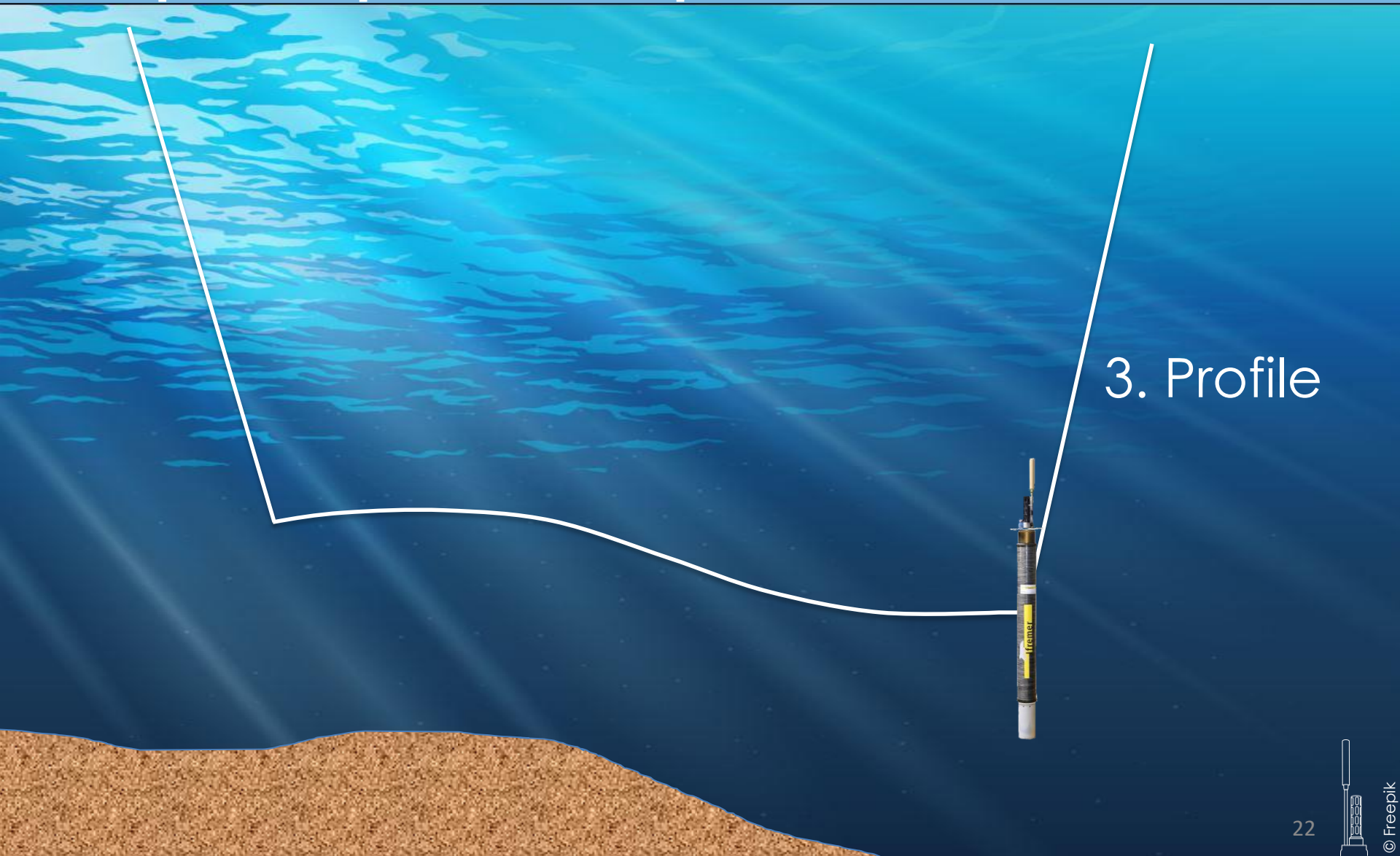
1. Descent
to ground



Principle – Wapiti ADCP deep-Arvor



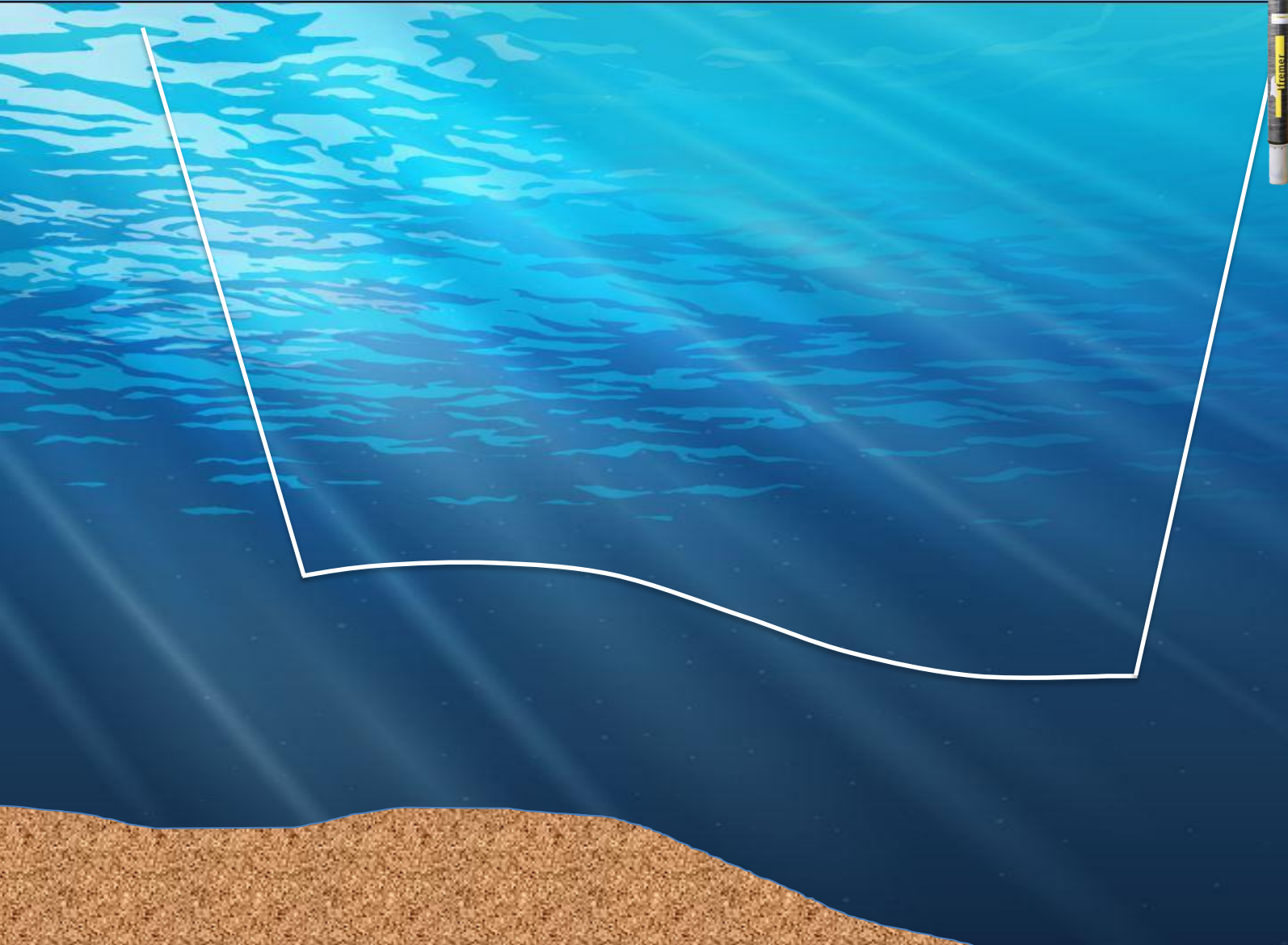
Principle – Wapiti ADCP deep-Arvor



Principle – Wapiti ADCP deep-Arvor



4. Tx

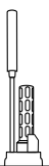


Nortek Signature ADCP

 4,000 dbar

 500 kHz

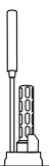
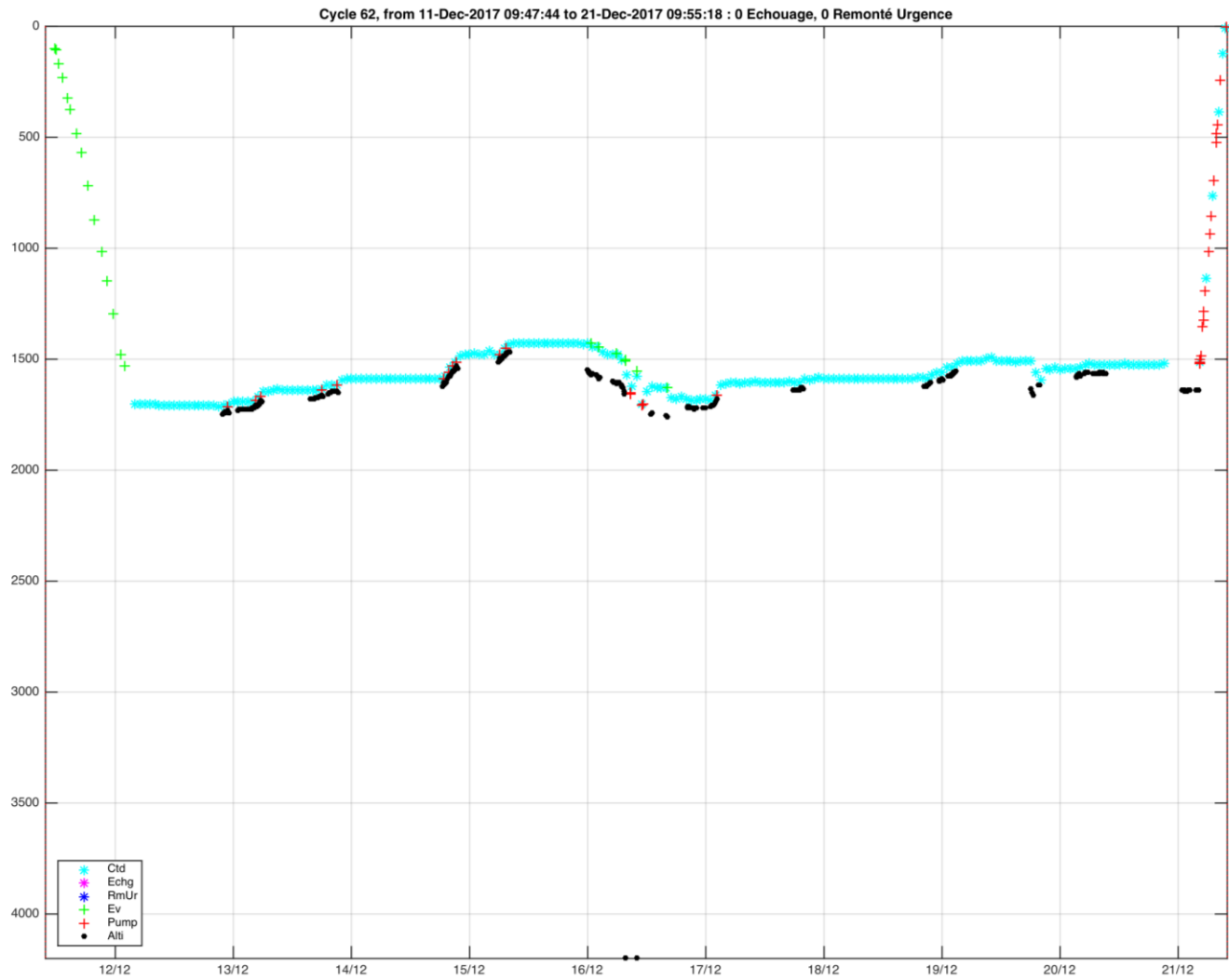
 180 m



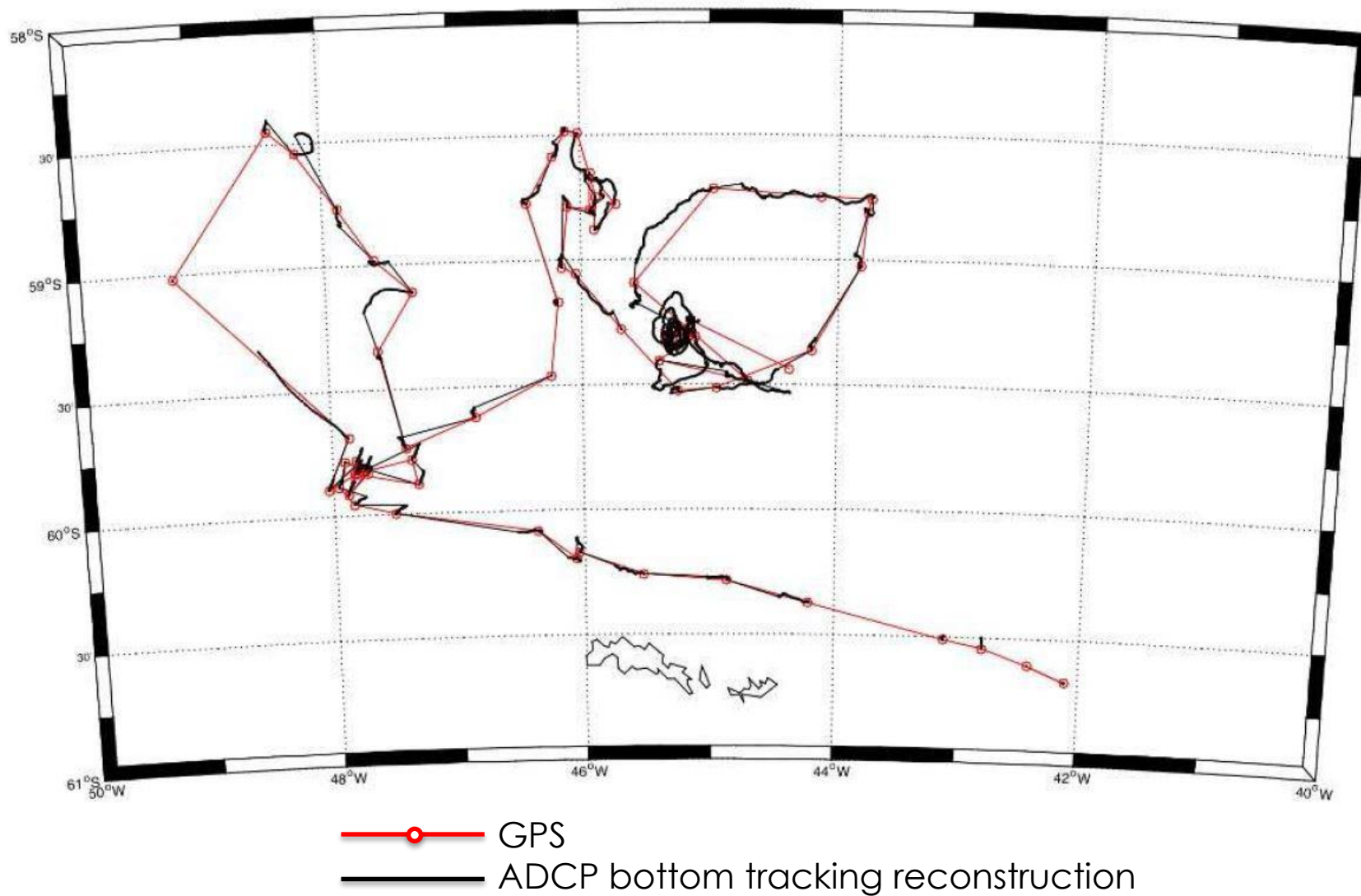
Integration



Results



Results



Outline

 Deep-Arvor

 ADCP deep-Arvor

 **3-headed deep-Arvor**



Context

- | Argo dependence on a single supplier (Seabird)
- | Willingness of Argo community to open up
- | Need for evaluation first



Deep-Arvor = test platform

- Evaluate the RBRconcerto³

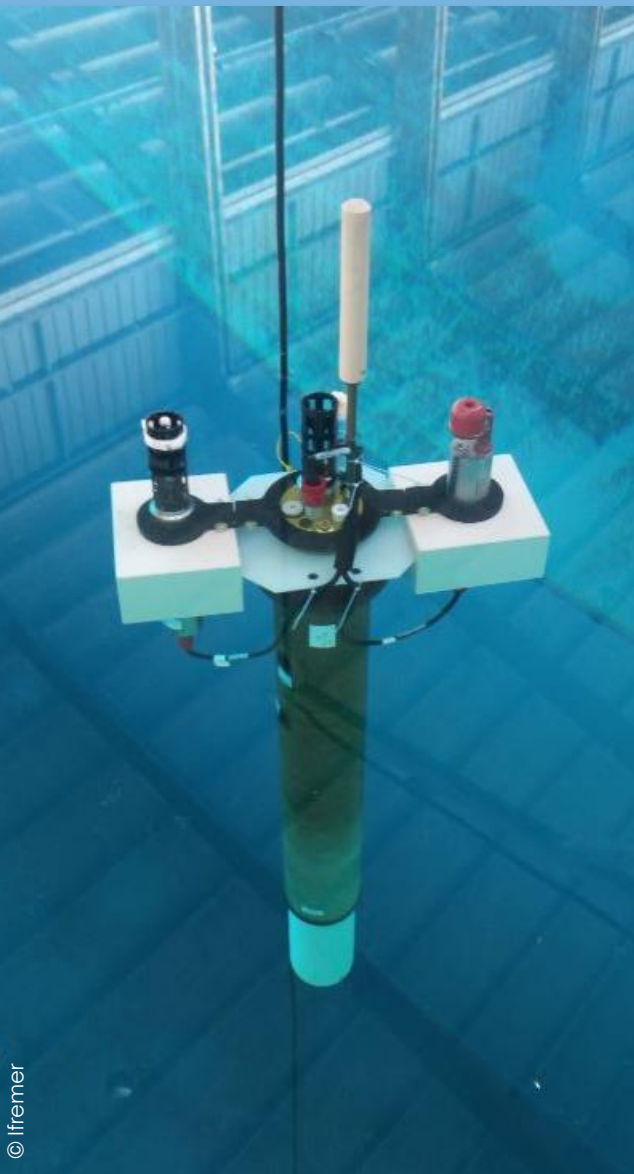


- Conclude about the SBE41 CTD quality for 4,000m depth applications

- SBE61 used as reference



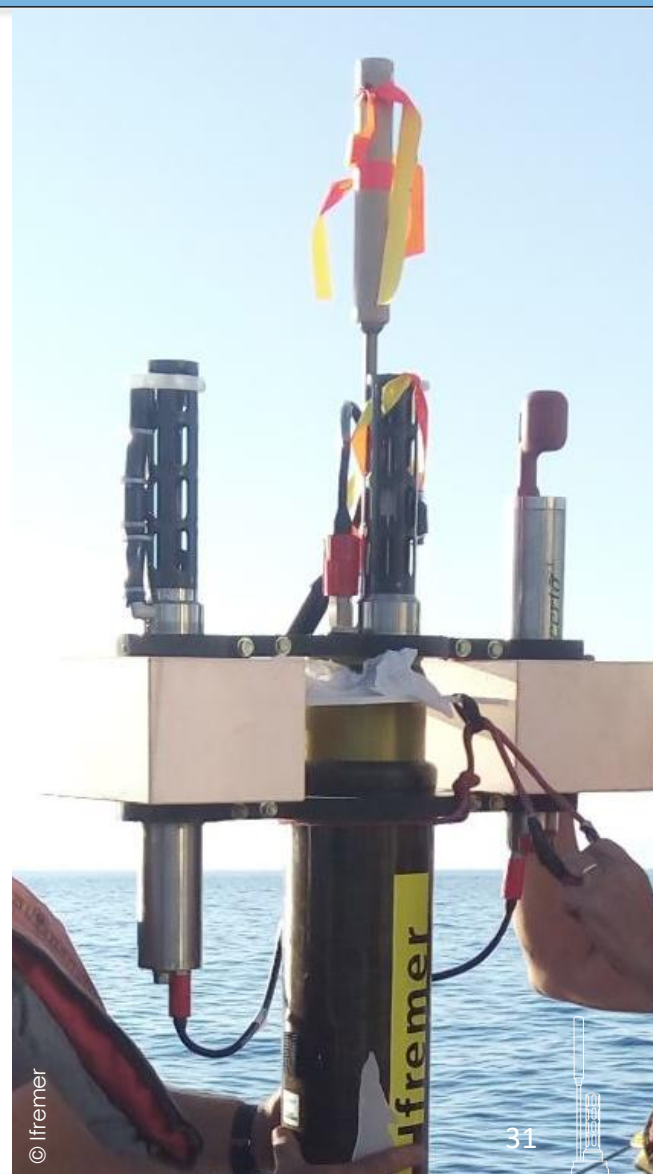
Characteristics



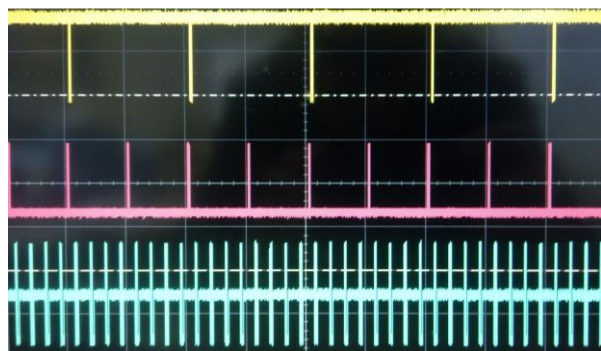
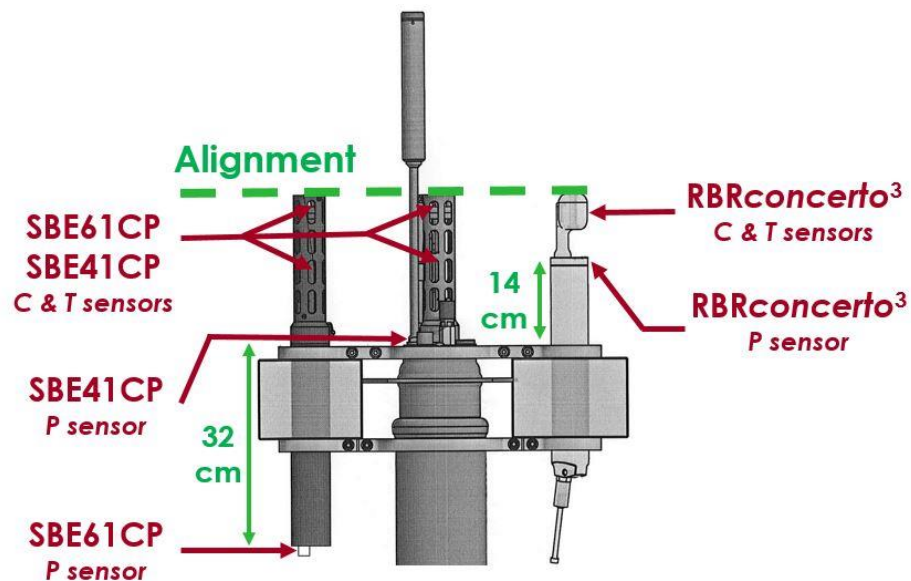
max 4,000
meters depth

1,000
points per cycle

up to 90
CTD cycles

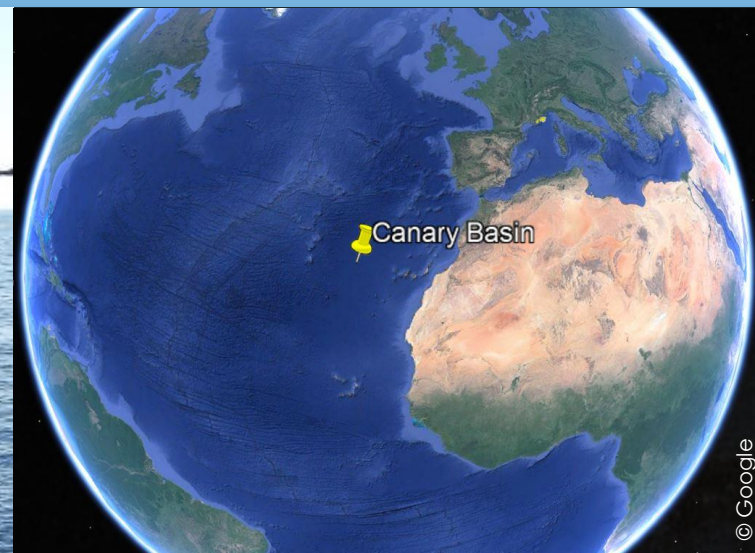
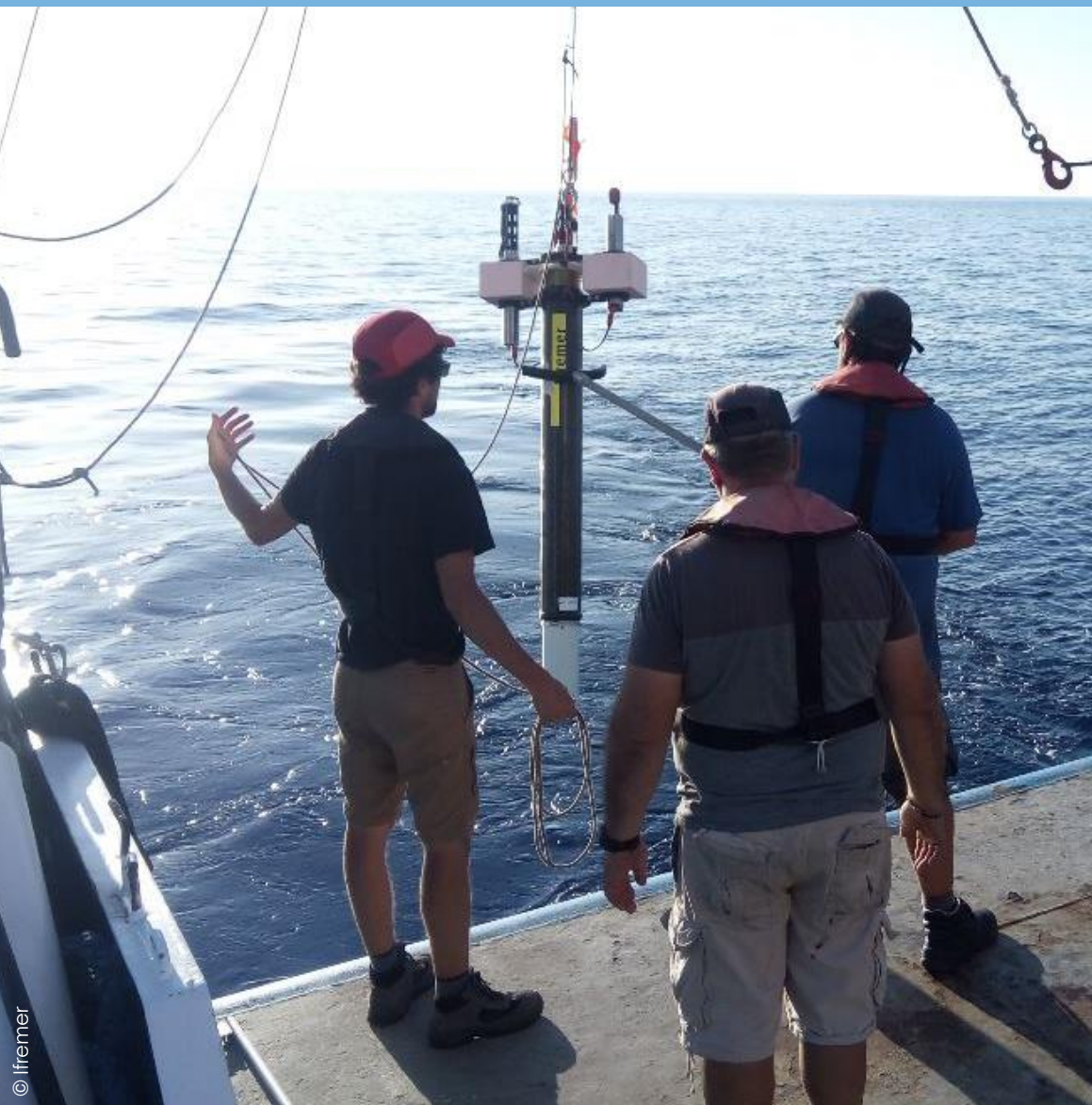


Characteristics



Dedicated acquisition board

Status



Qualified at sea
in 2018 and 2019

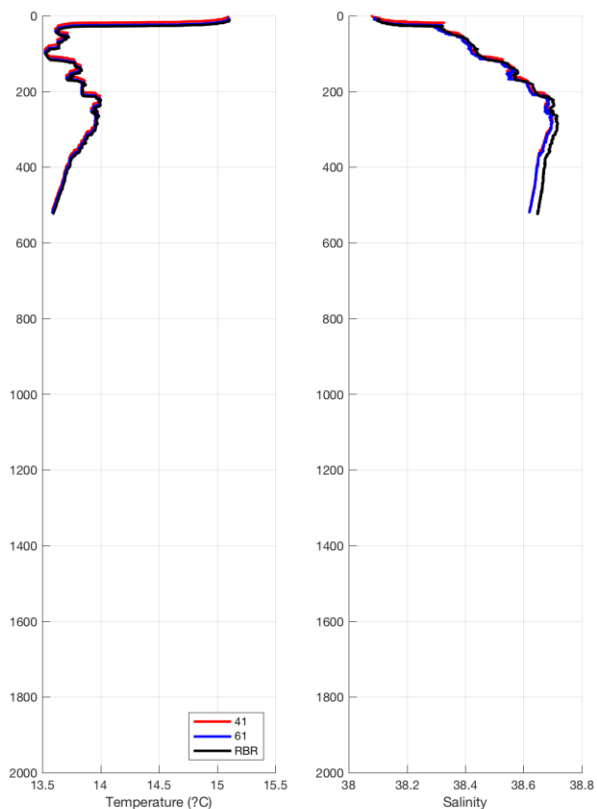
Two Three-Headed
deployments expected



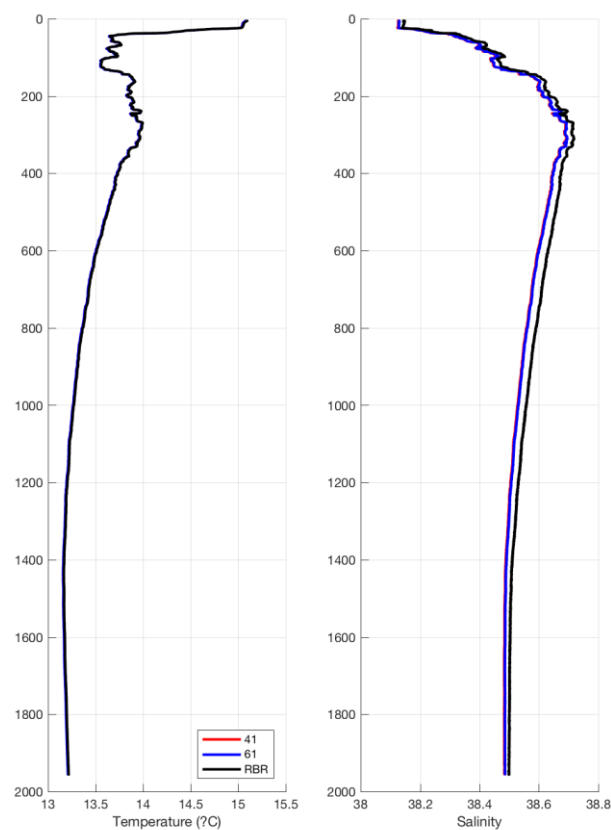
Preliminary Results (from qualifications)

Profiles 0 – 2,000m

Cycle 1 upcast



Cycle 2 upcast



Fundings

Deep-Arvor & 3-headed deep-Arvor



ANR-10-EQPX-40



Wapiti ADCP Deep-Arvor



Grant agreement 637770



Outline

A white lowercase letter 'i' inside a dark blue circle.

Conclusion



Conclusion

Deep-Arvor for deep-Argo

High payload capacity: specific applications, BGC



THANKS FOR YOUR ATTENTION!

QUESTIONS?

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martin.amice@ifremer.fr