TECHNOLOGICAL INNOVATIONS

CHALLENGING PROFILING FLOATS CAPABILITIES

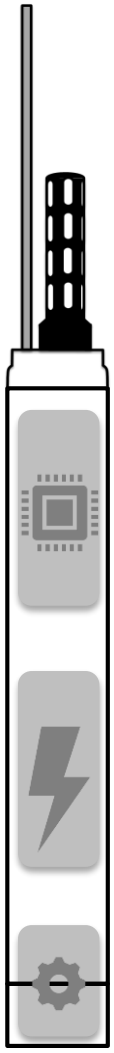
7th Euro-Argo Science Meeting
Athens

Presented by Xavier ANDRÉ
23 October 2019

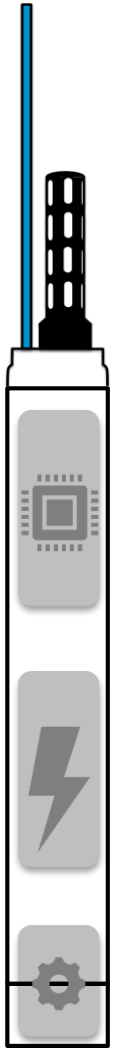
Plan

- Platforms from head to toes
- Applications
- Conclusion

From head to toes

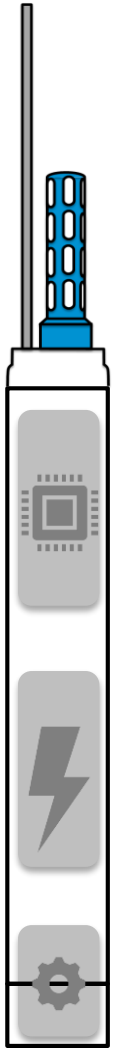


From head to toes



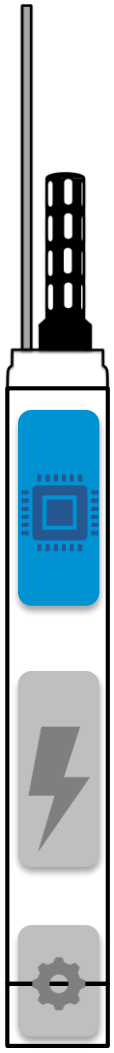
Transmissions

From head to toes



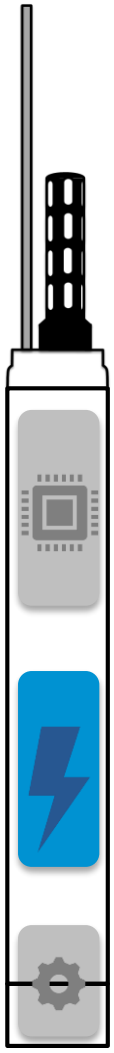
CTD

From head to toes



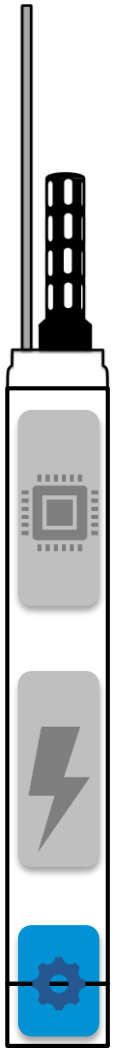
Hardware & software

From head to toes

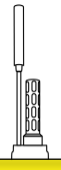


Batteries

From head to toes



Hydraulic system



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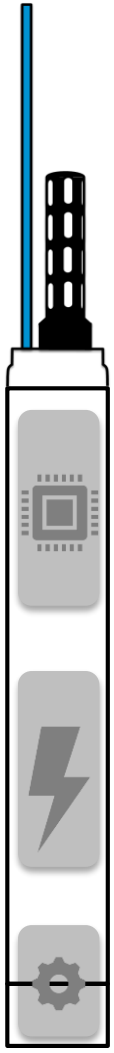


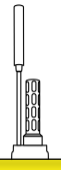
Argos vs. Iridium

iridium Everywhere

ARGOS CONNECTED. PROTECTED.

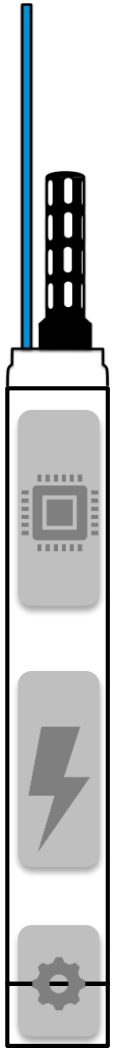
72* % of the fleet

Argos-2

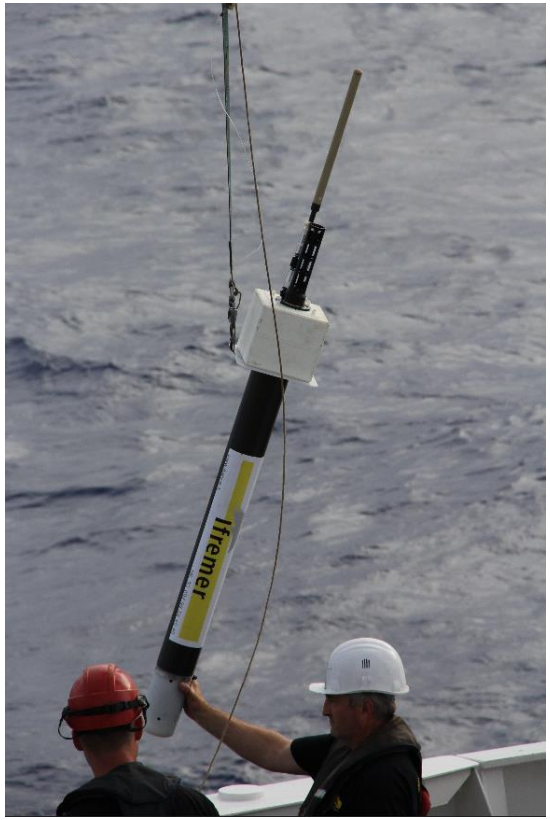


* Source : JCOMMOPS, 26/08/2019

Transmissions



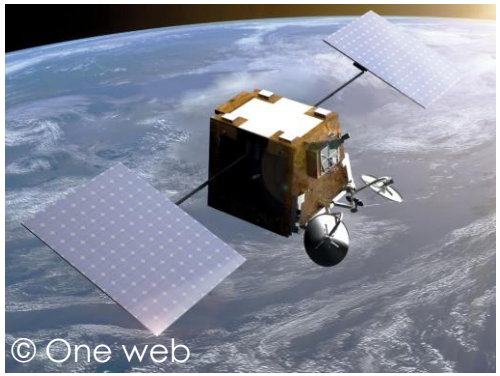
Argos-3/4 & Kineis

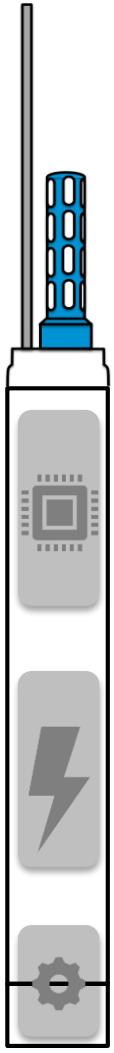


Arvor Argos-3
© Ifremer

Iridium Next

Internet everywhere

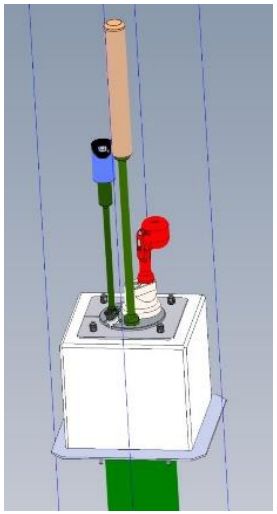




RBR CTD

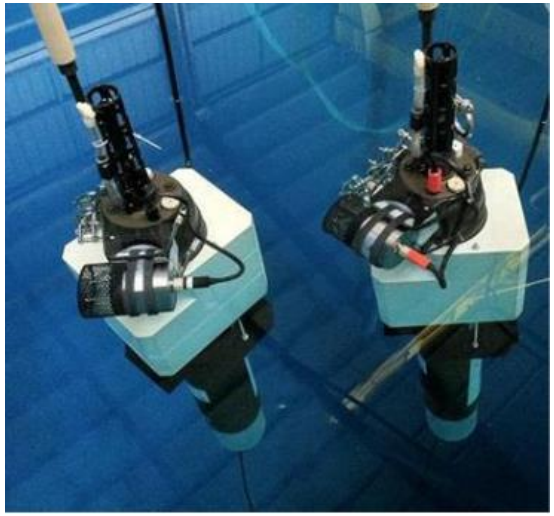
TWR APEX
© RBR

MRV Alamo
© RBR



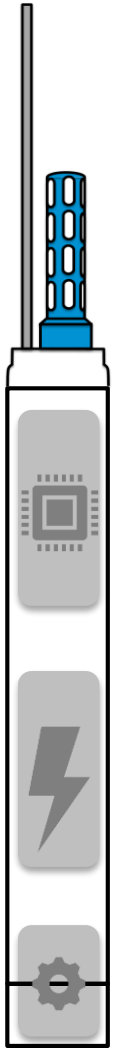
Arvor
© Ifremer

NOSS density sensor

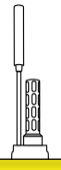


Provor NOSS
© nke instrumentation

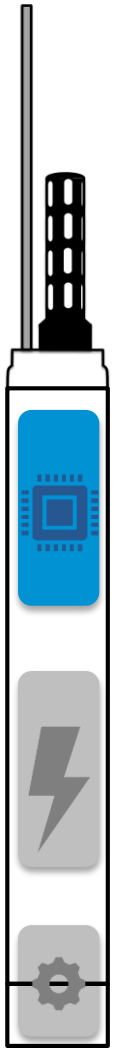
CTD



- Surface measurements
  - Risk: biofouling of sensor
- Bottom measurements
  - Systematic grounding

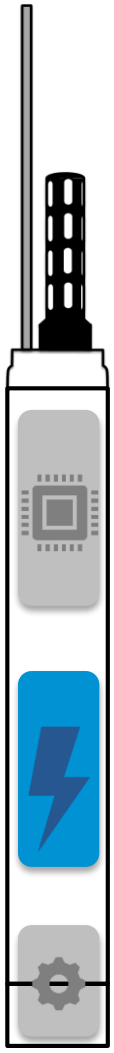


Software



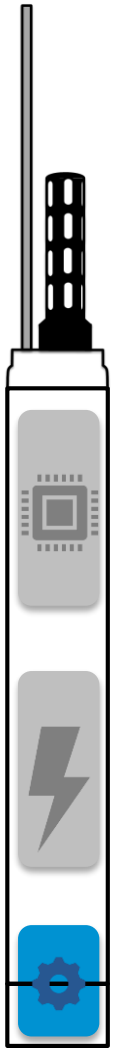
- Embedded intelligence
  - Artificial intelligence & machine learning
  - Hardware capacity!

Batteries

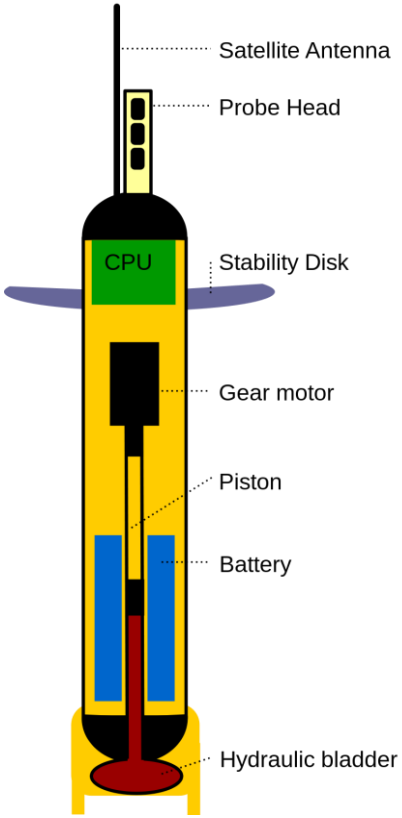


- Life extension
  - Tadiran on APEX & SOLO
  - Energy recovery ?

Hydraulic systems

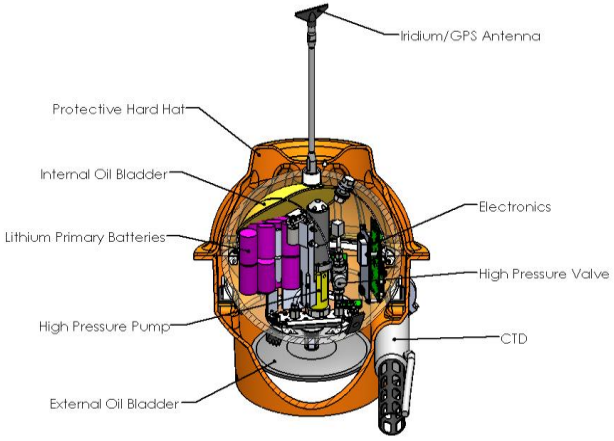


Piston

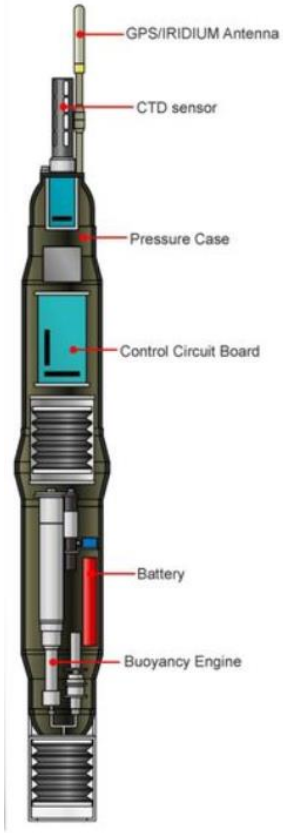


APEX
© TWR

Pump & valve

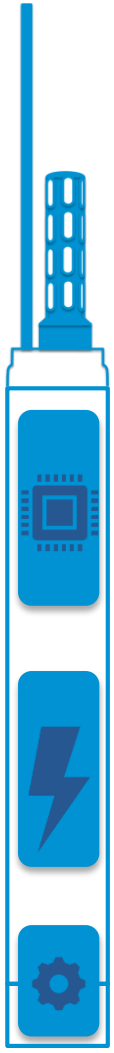


Deep SOLO
© MRV

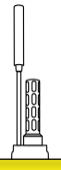


Deep NINJA
© JAMSTEC

Environmental impact



- Pollution due to profiling floats
  - Less polluting materials
  - Recovery



Plan

Platforms from head to toes

Applications

Conclusion

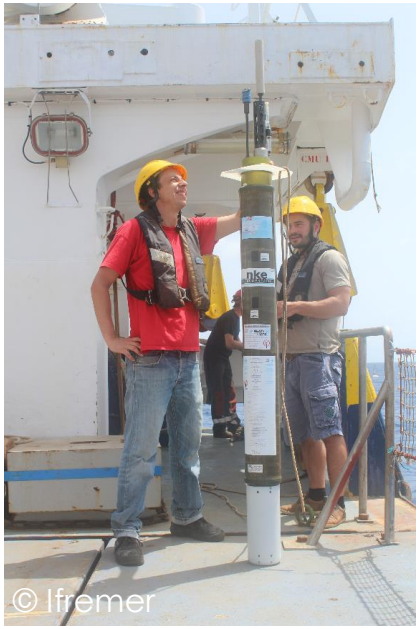
Deep-Argo

Sphere

Deep APEX

Deep SOLO

Cylindar



Deep Arvor

Deep Ninja
© TSC

BGC-Argo

Up to 6 external sensors

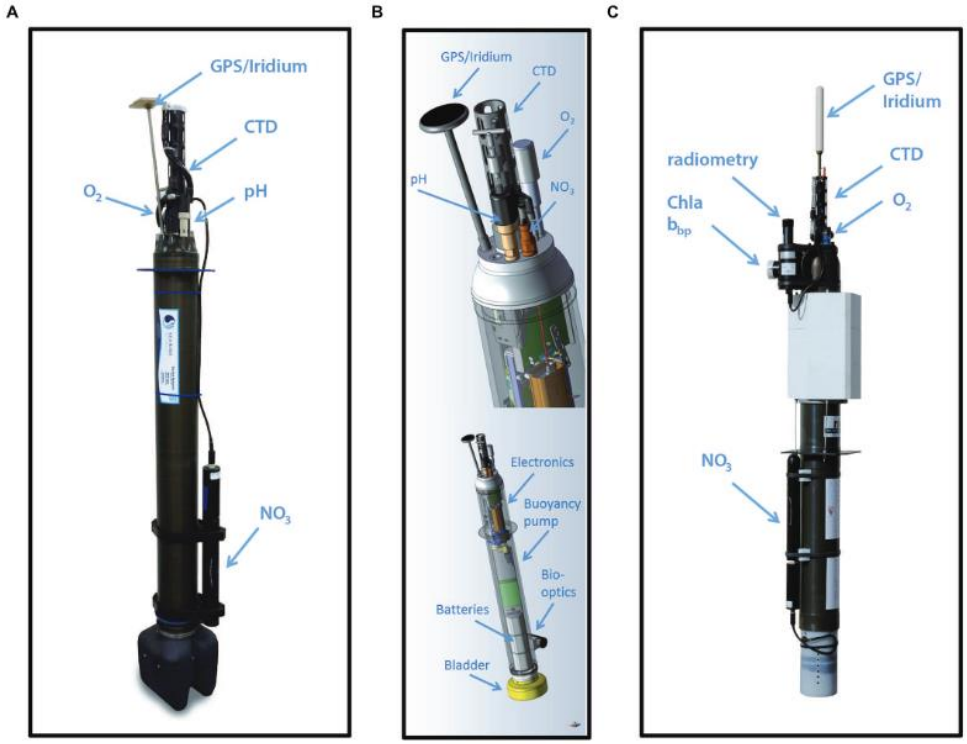


FIGURE 1 | The three main models of BGC-Argo floats presently in use include **(A)** Navis, **(B)** APEX, and **(C)** PROVOR.

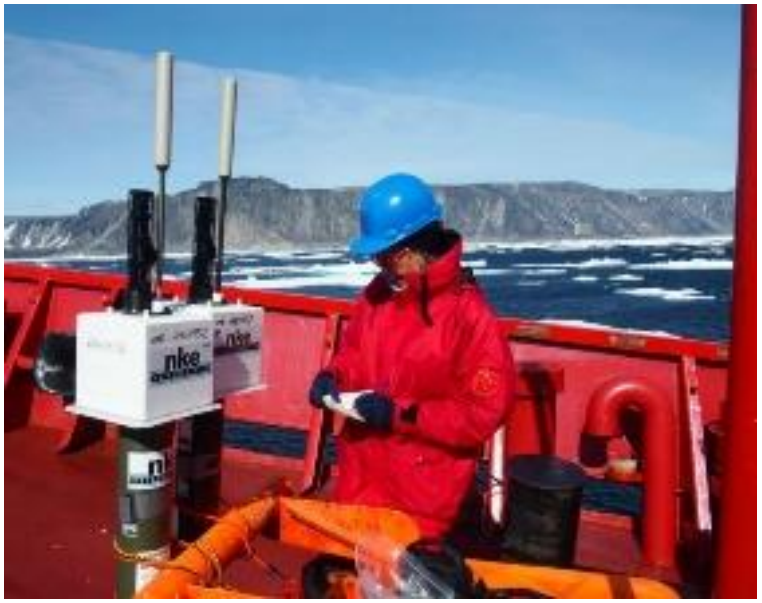
Roemmich Dean et al., On the Future of Argo: A Global, Full-Depth, Multi-Disciplinary Array, Frontiers in Marine Science, Vol. 6, 2019, p439

Polar-Argo

Ice detection

- >45,000* profiles
- Bi-di transmissions
- Ice Sensing Algorithm
  or Upward Looking Sonar

- Challenge:
  better location under ice



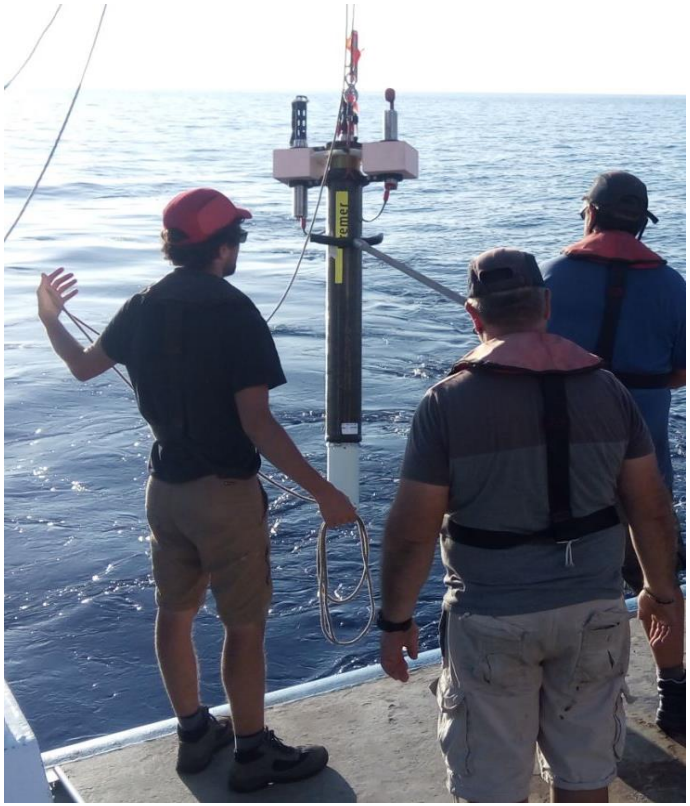
© Takuvik

* Source : http://www.argo.ucsd.edu/Polar_Argo.html

Specific developments

Comparison platforms

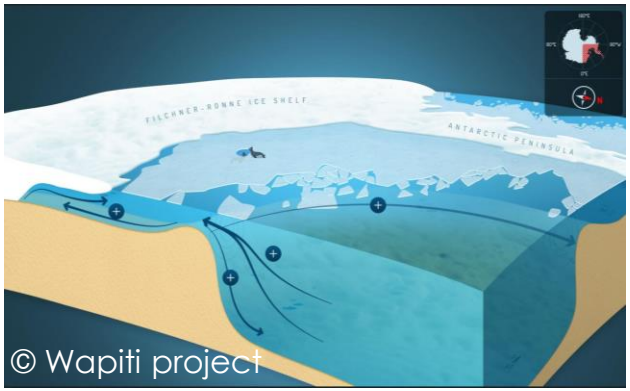
- SBE61 – SBE41 – RBR concerto



3-heads deep-Arvor
© Ifremer

Specific developments

Deep additional sensors



© Wapiti project

ADCP deep-Arvor
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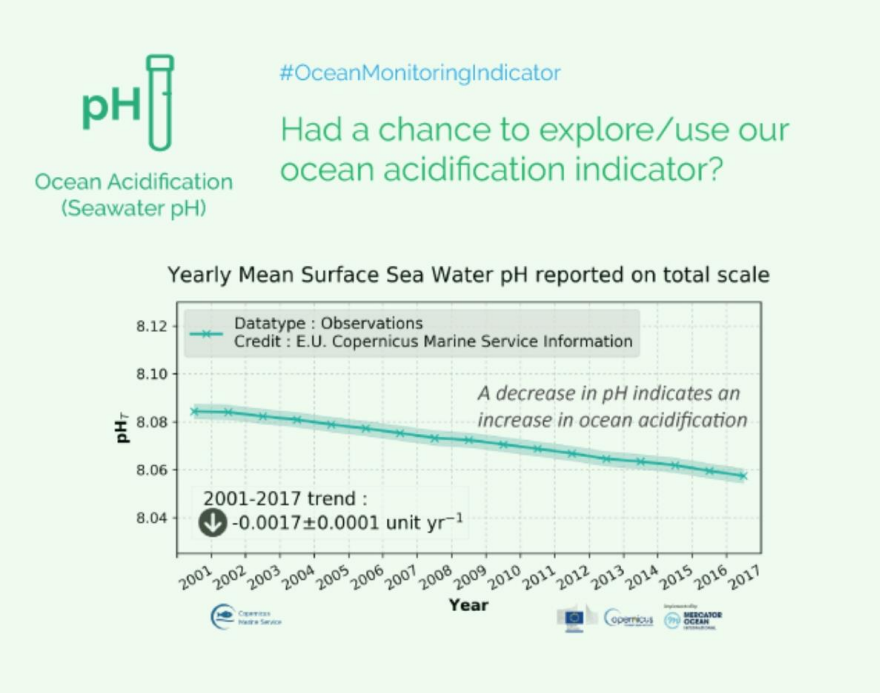
This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n°637770.

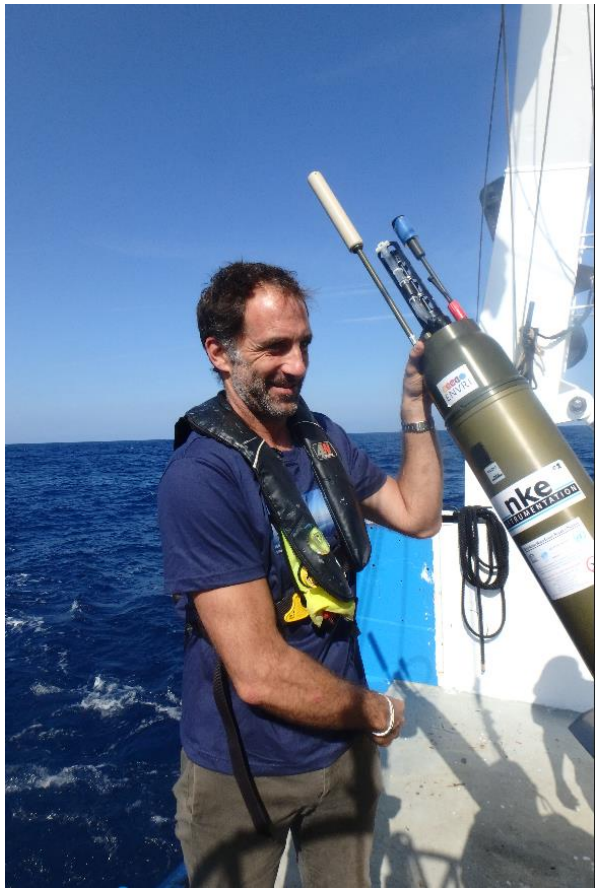
New challenges

pH



Source: Copernicus Marine Service Ocean Monitoring Indicator (OMI).

pCO2



© Emilie Diamond

Plan

Platforms from head to toes

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Conclusion

Technology

should adapt to the **science** needs,

and not the contrary!

Poster session

This presentation has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement n°824131 and n°637770.

Thank you for your attention!

Questions?

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