

Oceanographic research with Citizen sciences and Open Source instruments



Charlotte Nirma

Cost effective and citizen science Workshop

14-15 novembre 2023



**ASTROLABE
EXPEDITIONS**

Citizen communities (Sailors & Open Laboratories)



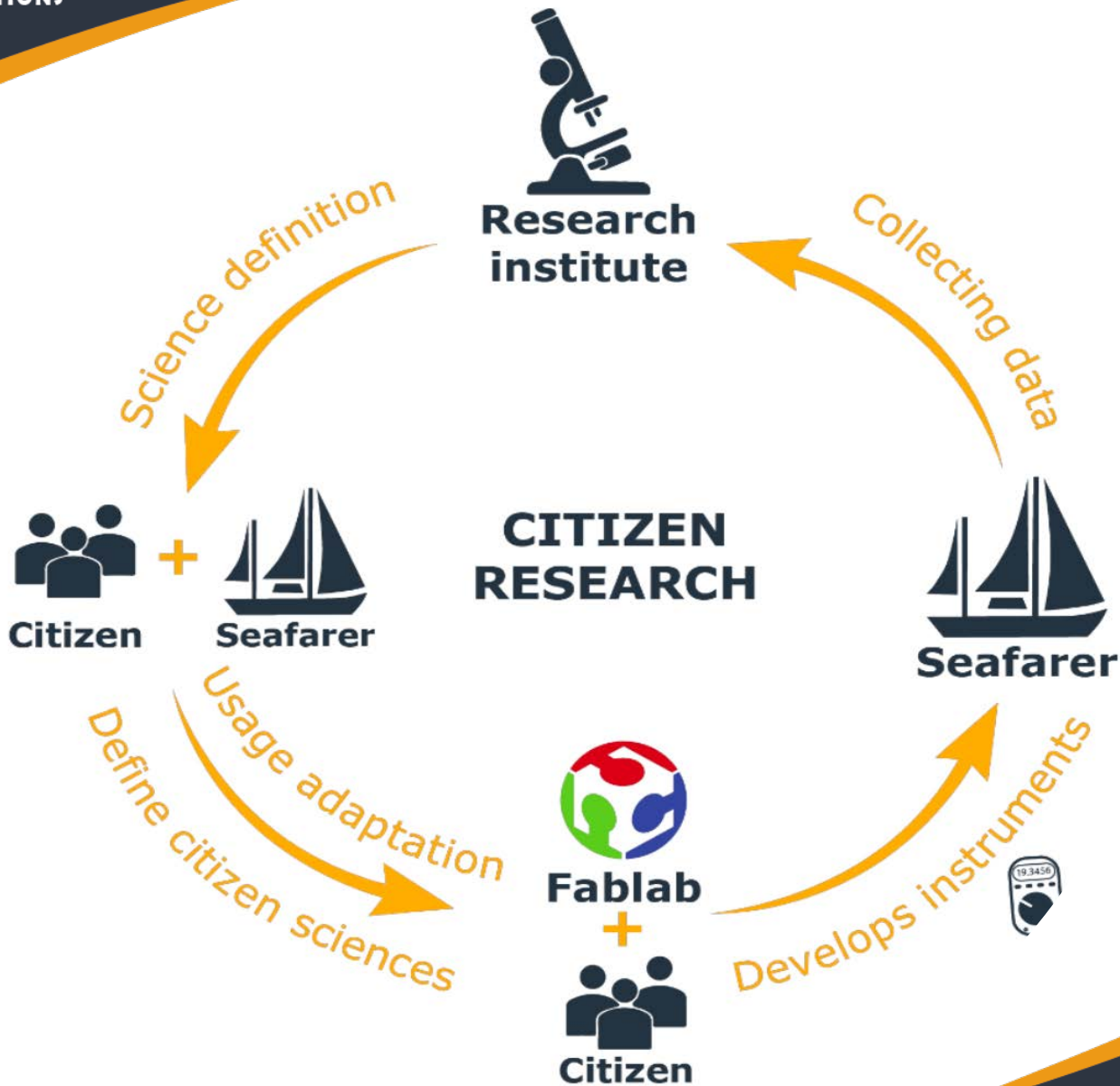
Cornell 2002, Astrolabe Expédition 2017

14 000 Sailing boats
in the high sea



Source :
www.makery.info

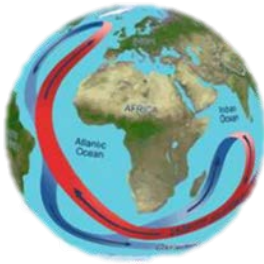
More than 1000
Fablabs in the world



Citizen science programs

SensOcean

Ocean's physical parameters



LittObs

Physical parameters in coastal areas



CosmicSail

Cosmic particles at sea



SargaSea

Collecting and identifying holopelagic Sargassum



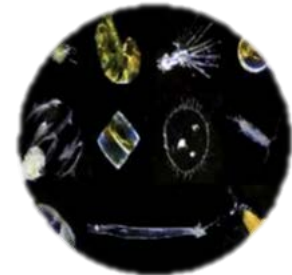
Ketos

Observation and identification of cetaceans (acoustic)



Ichtyos

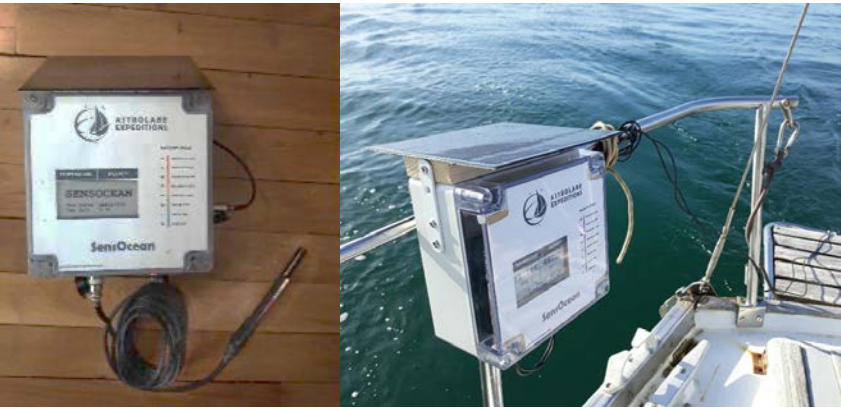
Collecting and identifying ichthyoplankton



Innovative oceanographic instruments

Open source and low cost

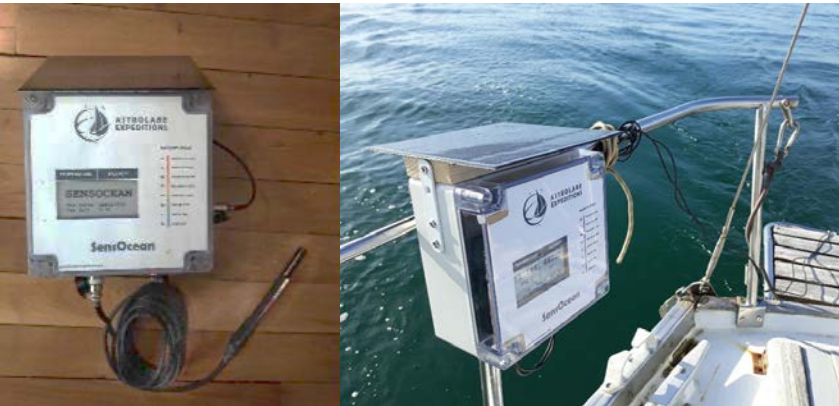
TSG : ThermoSalinoGraph



Innovative oceanographic instruments

Open source and low cost

TSG : ThermoSalinoGraph



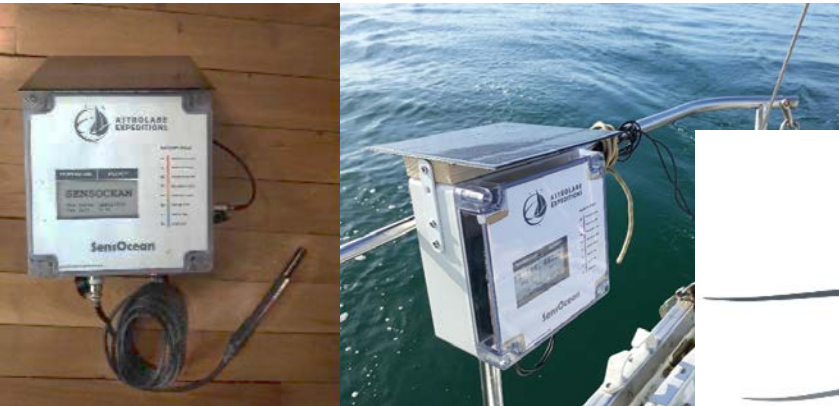
CTD : Conductivity Temp Depth



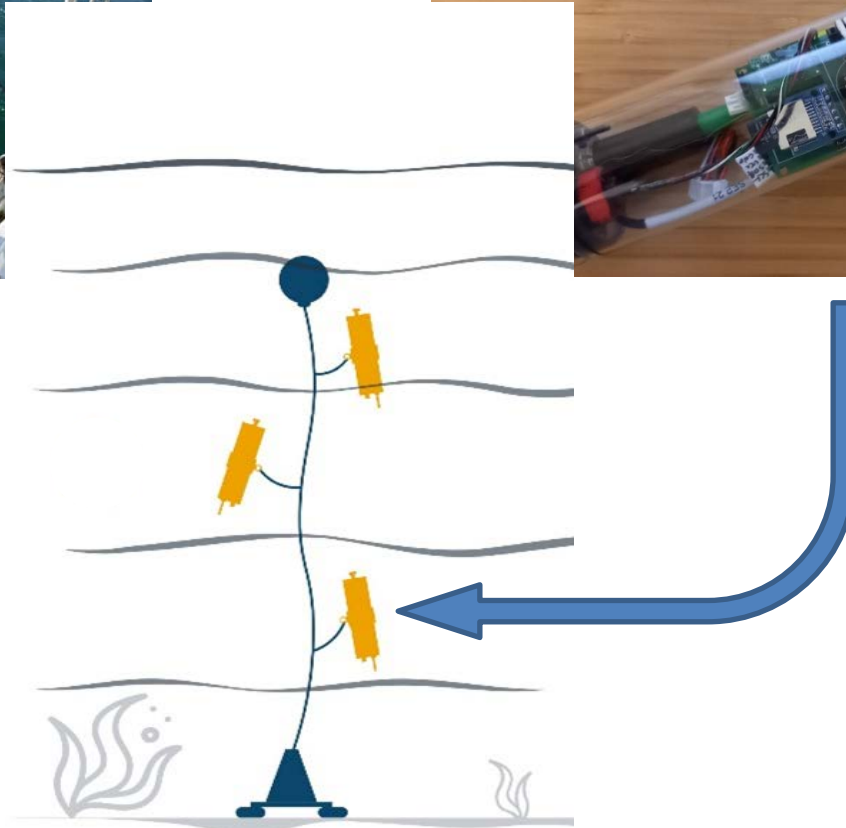
Innovative oceanographic instruments

Open source and low cost

TSG : ThermoSalinoGraph



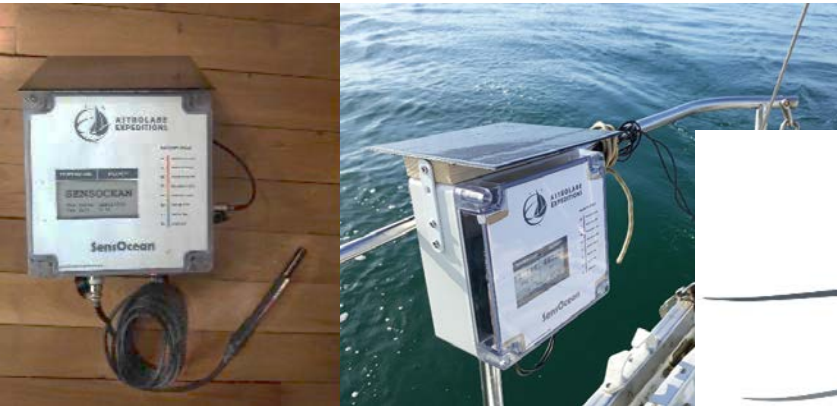
CTD : Conductivity Temp Depth



Innovative oceanographic instruments

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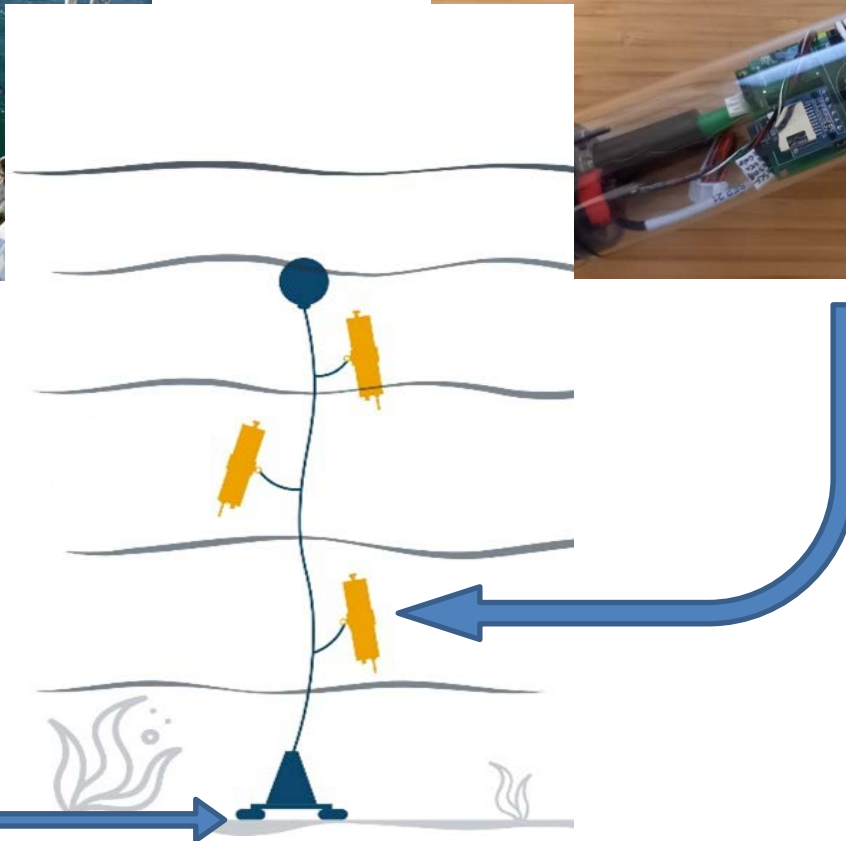
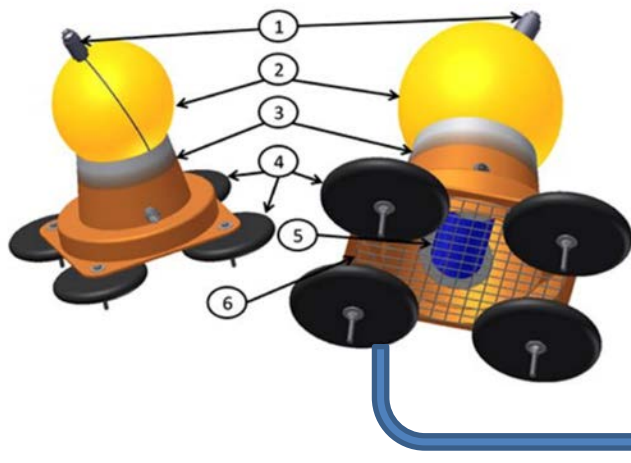
TSG : ThermoSalinoGraph



CTD : Conductivity Temp Depth



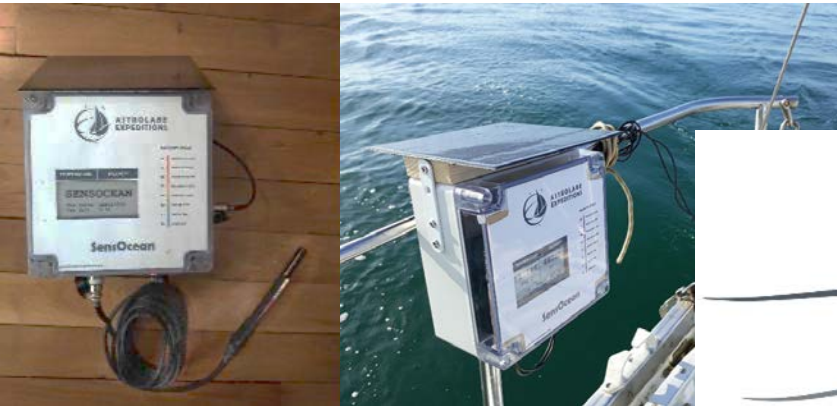
Mooring system (Mastodon 1D)



Innovative oceanographic instruments

Open source and low cost

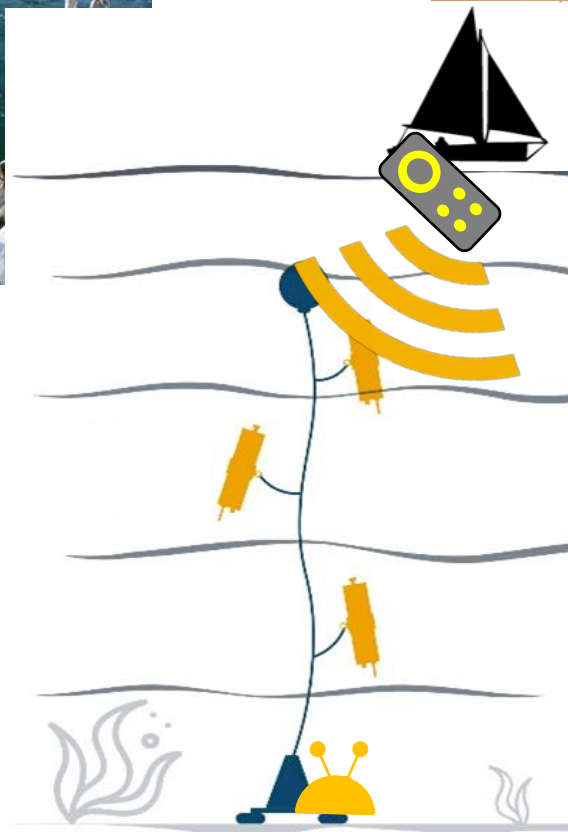
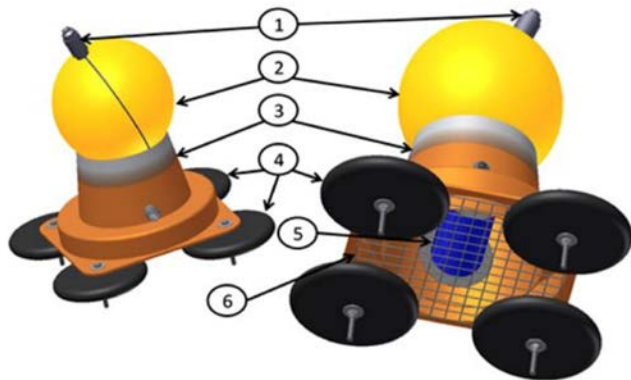
TSG : ThermoSalinoGraph



CTD : Conductivity Temp Depth



Mooring system (Mastodon 1D)



Acoustic release system

Innovative oceanographic instruments

Open source and low cost

TSG : ThermoSalinoGraph



CTD : Conductivity Temp Depth



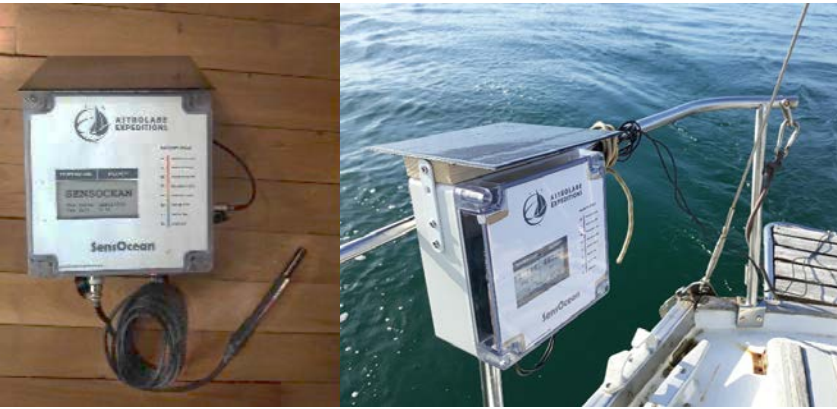
Open Fluorimeter



Innovative oceanographic instruments

Open source and low cost

TSG : ThermoSalinoGraph



CTD : Conductivity Temp Depth



Open Fluorimeter



Muons sensor : cosmic particle detector



Etc...



Innovative oceanographic instruments

Open source and low cost



AZ-GPS Module GPS
type Ublox

10,00 €

AZ Delivery
az-delivery.de

GPS

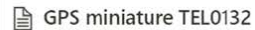


GPS TEL0094

20,00 €

DFRobot
gotronic.fr

GPS



GPS miniature TEL0132

20,00 €

DFRobot
gotronic.fr

GPS



GPS Grove Air 530

15,00 €

Seed studio
gotronic.fr

GPS



GPS Grove

30,00 €

Seed studio
gotronic.fr

GPS



Fast Temp

90,00 €

Blue Robotics
syera.fr

Temperature



Bar 100

370,00 €

Blue Robotics
syera.fr

Pressure



Bar 30

85,00 €

Blue Robotics
syera.fr

Pressure Temperature



Conductivity solution

20,00 €

Atlas Scientific
robisol.nl

Conductivity



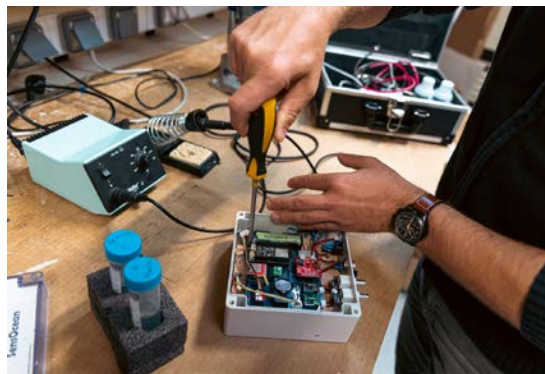
Temperature probe
PT1000 EZO-RTD

30,00 €

Atlas Scientific
robisol.nl

Temperature

Constructing oceanographic instruments in partner Fablabs



Know-how:
appropriation of the
instrument



A co-constructed and adapted protocol



Answer to the scientific question



Designed for non-scientists



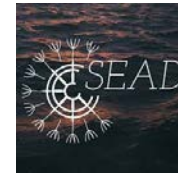
Adapted to sailboats



Sailing expeditions



11 offshore expeditions in 2022 :



Etc...

What about the data?

Citizen research: large scale data production



IMT Atlantique
Bretagne-Pays de la Loire
École Mines-Télécom

Data processing interface
(to centralise)

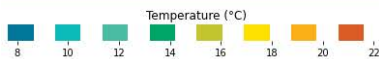


Develop a tool to visualise
physical ocean data
(interactive map)

Sea Temperature - Iceland, NorthAbout, Aout-Sep 2021



Visualising the data collected:
consolidating citizen commitment



Citizen research : volunteers and partners

Partenaires scientifiques

SensOcean & LittObs



Ketos



Ichtyos



MaqSail



CosmicSail



DeepCor



SargqSea



Fablabs



Partenaires financiers



Thank you for attention!

contact@astrolabe-expeditions.org



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EXPEDITIONS**