



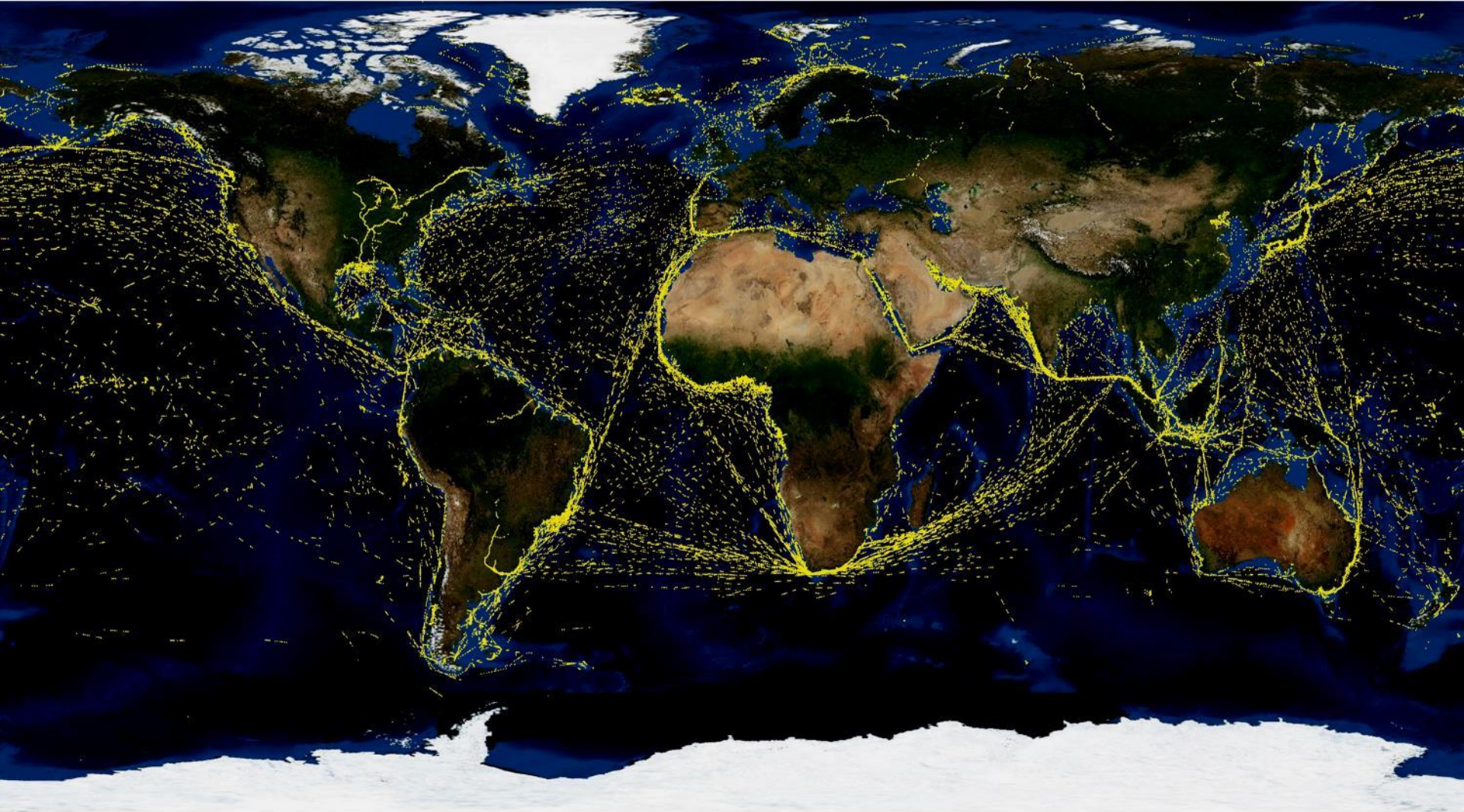
## 12<sup>th</sup> FerryBox Workshop –Helsinki 01-02 October 2024 Jana Fahning

Zukunft Meer  
sea our future





# Where are the “Ships of Opportunity” ?



All vessels worldwide  
(with kind permission ShipView AIS)



## Autonomous



## Standardized

## Industrial



## Simplified



RSV Nuyina, © AAD/Flying Focus

# OceanPack™ - A long Track Record

Large  
Icebreakers  
&  
Research  
Vessels



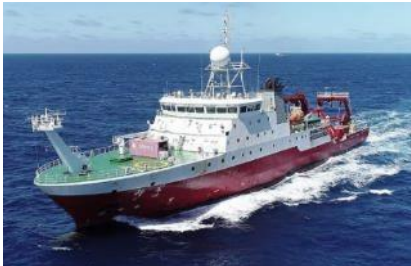
FS Polarstern © private



Xue Long 2 © PRIC



RSV Nuyina © AAD/Flying Focus



Xe Kue © IOCAS



Almostakshif RV © KISR



© Blue Star Ferries



North Pole © admship.ru



RV Belgica © Hans Hillewaert, LtCdr Peter Ramboer



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Celtic Explorer © Skipsteknisk AS



Pelagia © NIOZ



RV Cape Ferguson © AIMS



UCadiz © University of Cadiz



Xiang Yang Hong 10 © Andreas Schlatterer, SOA

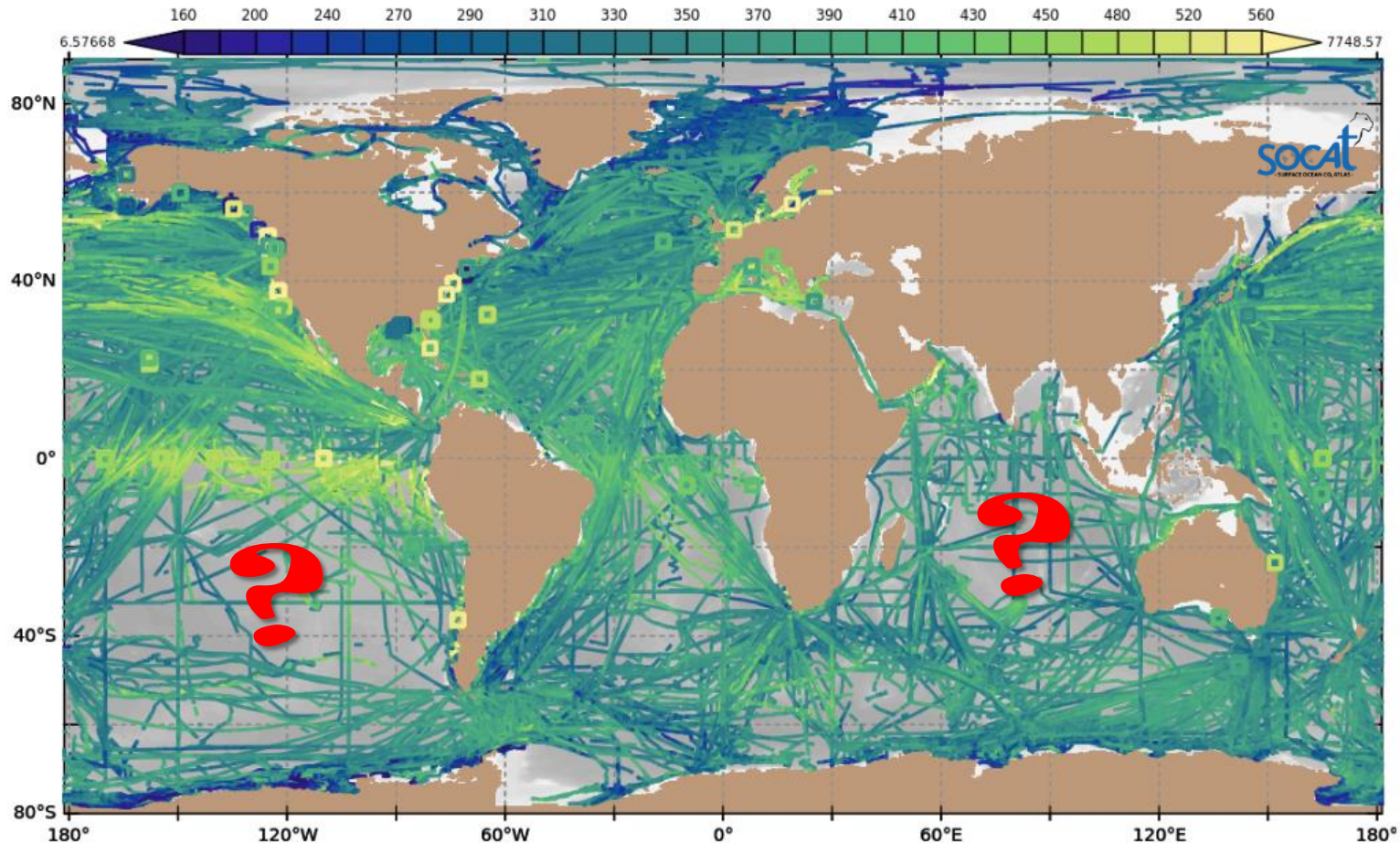


Zhong Shan Da Xue © Xinhua, Sun Yat-sen University



# What is Missing

All  $f\text{CO}_2$  Data available on SOCAT database, used for global climate models



You know at least a part of the surface....

Hardly anyone can get anywhere. Large areas are still unknown.

What effects on climate, energy transport models, etc.

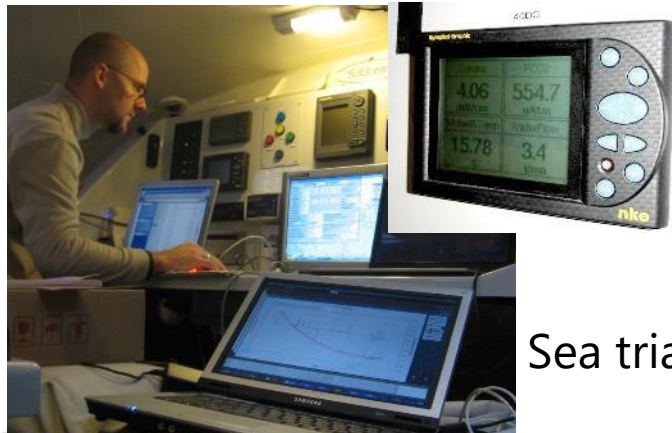


# How it all started



1<sup>st</sup> Lab testing 2009

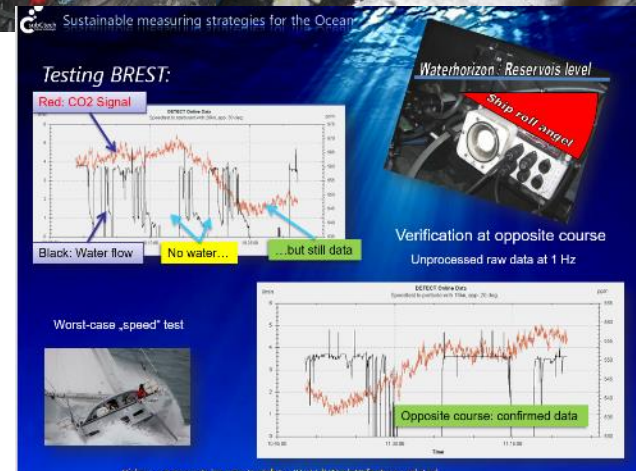
Installation 2009-2010



Sea trials



Compare with Ifremer MAREL CO2 Buoy



FB Workshop 2013 Helsinki



- **Ship time** is already paid
- **Autonomous** Mobile Monitoring
- **Plug and play**. Our systems will be operated during different racing events
- **Modular** sensor configuration
- **Calibration** before, during and after the race for high quality data
- **Remote** System monitoring during limited onboard maintenance
- **Observation** off the beaten tracks e.g. **Southern Ocean**
- **Relevant** data acquisition, **Citizen Science**
- Fleet **observation**: higher data precision, higher temporal and special cover
- Yacht racing = **high-profile events** = sponsoring

*“In the Southern Ocean and especially in the Pacific Sector of the Southern Ocean, there are generally very few CO2 measurements of the sea available, so it is a really new kind of data set.”*

Peter Landschützer, Feb. 2021, Max-Planck MPIM



## What makes the differences?

- Field tested
- Optimized for harsh environment
- State-of-the-art sensor technology
- Cooperation with leading institutes
- User-friendly, low-service, "ready to run"
- Low-energy, low-weight, low-size
- Modular, flexible sensor equipment
- Extreme robust
- Using proved SubCtech technology



## What makes "Sailing meets Science" possible?

- Arouse the enthusiasm of new markets, investors and foundations
- A comprehensible added value of extreme sports
- A new opportunity for science with excellent and approved data quality
- Public enthusiasm for understanding science, sport, business, our world
- Ideal for Citizen Science projects to support the UN Decade of the Oceans.





## Atmosphere

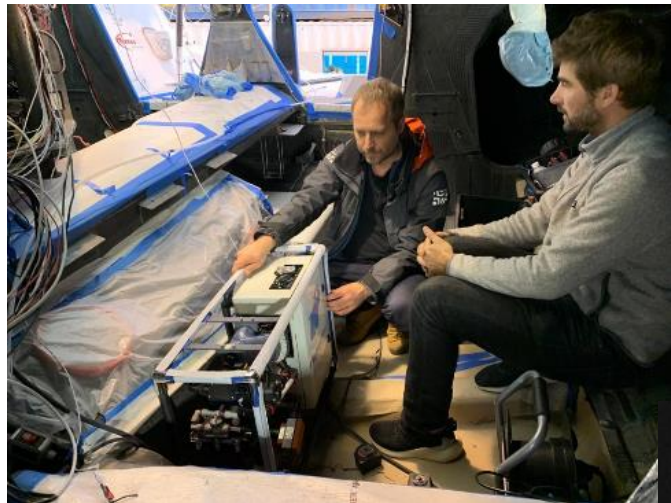
- Air Temperature
- Air Pressure, sea level pressure (SLP)
- Wind speed and direction
- Humidity
- Photosynthetic active radiation (PAR)
- Precipitation
- ...

## Ocean Surface

- Sea surface temperature (SST)
- Sea surface salinity (SSS)
- $p\text{CO}_2$
- $\text{O}_2$
- Algae classes, Fluorescence (Chl a), CDOM
- Alkalinity (pH)
- ...

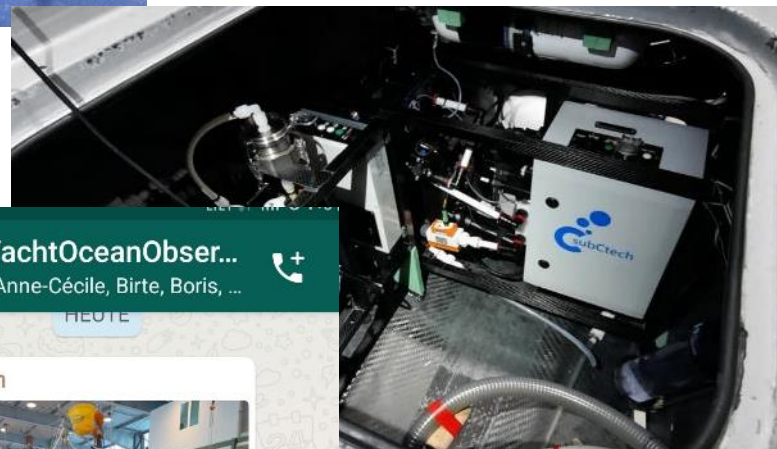
➤ Sensor configuration can be adjusted depending on the scientific project





© BorisHerrmannRacing

Reducing the weight, size and power consumption significantly improves the acceptance by sailors

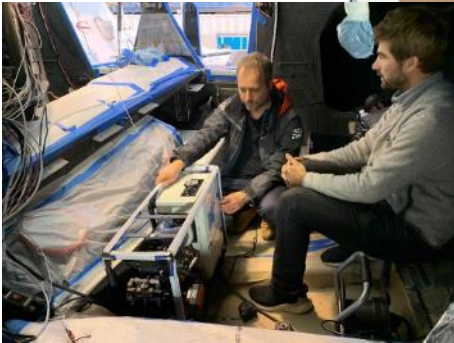


The new much lighter ocean lab.  
Amazing work by SubCtech 19:53

Development together with institutes in SOOP ongoing to improve accuracy

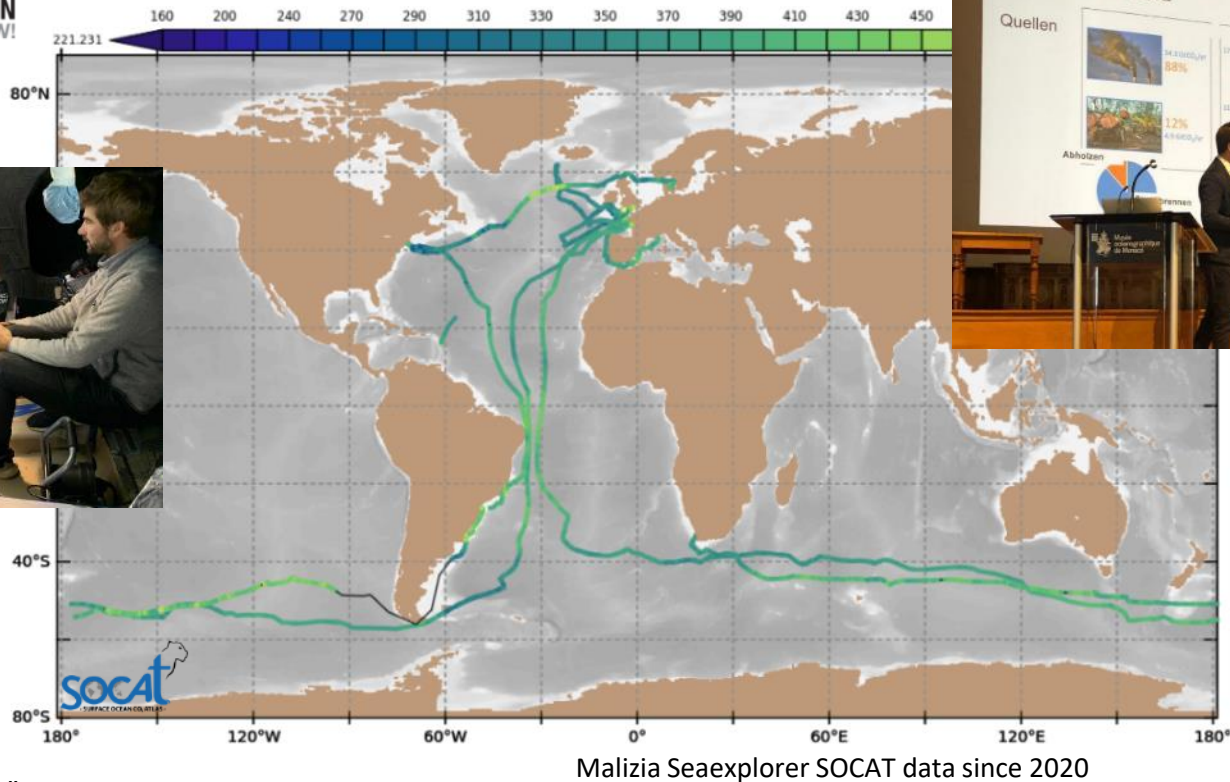


# We have new approaches: Sailing meets Science



© BorisHerrmannRacing

"We cannot stress enough the importance of the oceans, without them there would be no life on earth"



Pierre Casiraghi,  
Boris Herrmann and  
Stefan Raimund  
from SubCtech  
presenting at the  
Oceanographic  
Museum of Monaco  
May 2019.

Photo credit: Cedou.

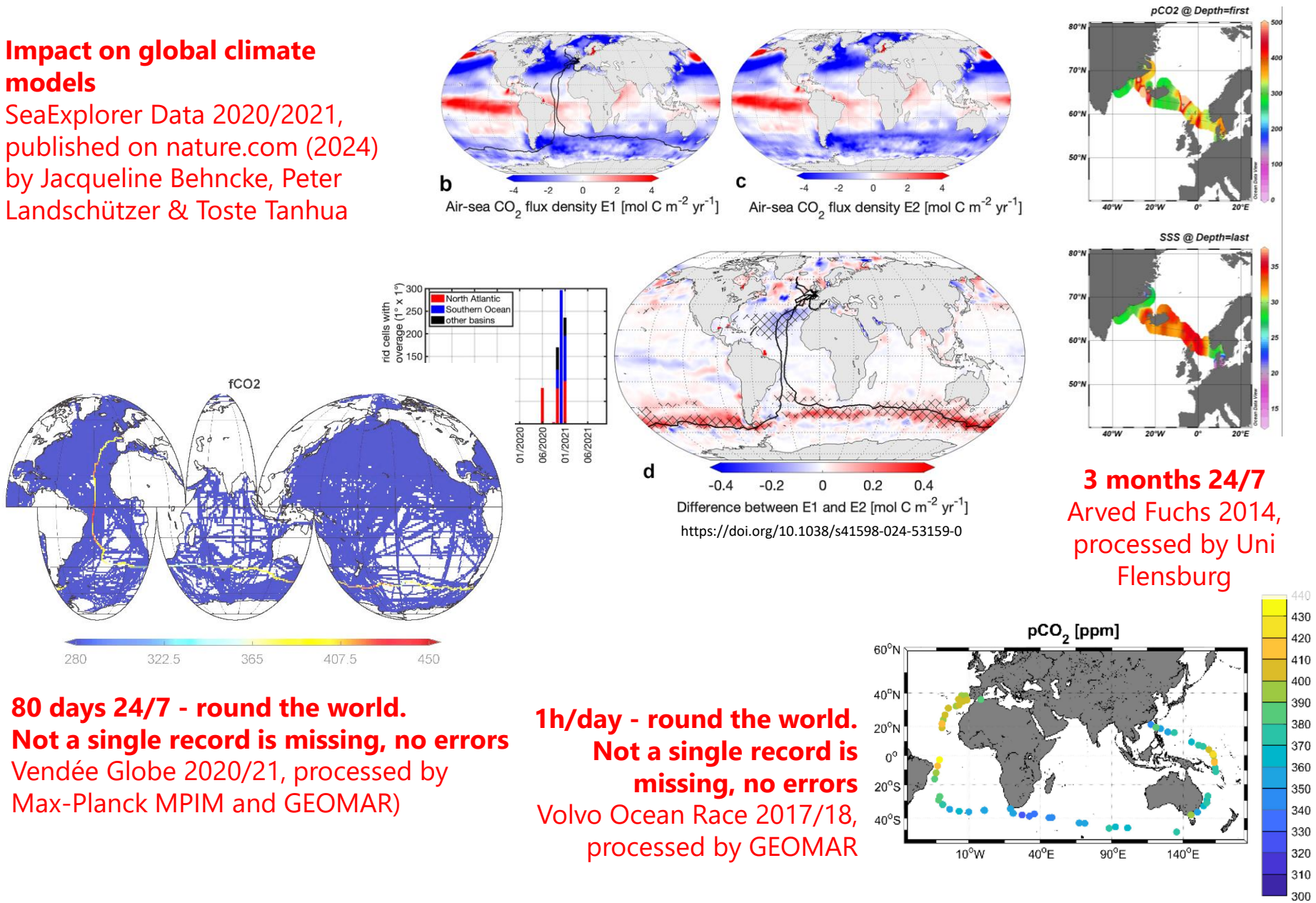


Vendée Globe closed  
data gaps by up to  
25kn with SubCtech's  
OceanPack RACE®.

© BorisHerrmannRacing

## Impact on global climate models

SeaExplorer Data 2020/2021, published on nature.com (2024) by Jacqueline Behncke, Peter Landschützer & Toste Tanhua



**80 days 24/7 - round the world.**  
**Not a single record is missing, no errors**  
 Vendée Globe 2020/21, processed by  
 Max-Planck MPIM and GEOMAR)

**1h/day - round the world.**  
**Not a single record is missing, no errors**  
 Volvo Ocean Race 2017/18,  
 processed by GEOMAR



# OceanPack RACE® - Track Record since 2009



© La Louise, Thierry Dubois



© Arved Fuchs Expedition



© Rederij Bark EUROPA



© Michael Amme, Max-Planck-Institute für Chemie



© JAMSTEC



© JAMSTEC



© Iodysséus



© ALDEBARAN Marine Research & Broadcast



© private



© Ainhoa Sanchez/Volvo Ocean Race



© Konrad Frost / Volvo Ocean Race



© Giovanni Soldini / Maserati



© Pierre Bouras #VG2020, Fabrice Amédéo, Newrest - Art & Fenêtres



© BorisHerrmannRacing



© Amory Ross / 11th Hour Racing



© Spindrift

# Requested by Scientists

## Developed by Scientists, Engineers and Sailors

### What should be considered:

- ✓ Additional ways of climate research are possible and have now been proven.
- ✓ Only interdisciplinary cooperation leads to sustainable results.
- ✓ Trust must be created in such processes and collaborations.
- ✓ SubCtech (and its partner) has the know-how for the technology and the will for improvement



# Thank you!



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