Ifremer updates

IRSO 2016

Evolution of the French oceanographic fleet since 2015

- Considering that :
  - *Marion Dufresne* (IPEV, 1994) has had a mid-life refit, enabling the vessel to be operated till 2030,
  - *Pourquoi pas ?* (2005) is only 10 years old,
  - L'Atalante (1989), has been modernize in 2009 in order to be operated up to 2025,
  - *Le Suroit* (40 years old) had for several years a significant under-activity. But the lost of that vessel should constraint the scheduling of campaigns due to the lost of the flexibility *Le Suroit* was still offering

Decision has been taken in 2015 to reduce the number of French Global or Ocean vessels to four vessels and finance modernization of *Thalassa* (1995) with implementation of Geosciences capacity previously supported by *Le Suroit*.

R/V *Thalassa* is an oceanographic ship mainly dedicated to public service missions in the field of fish stock assessment and physical oceanography. The aim of this modernization is to enlarge the capacity to the vessel in the fields of marine geosciences and deep sea environment.

One new crane able to deploy Victor 6000, Ariane and futur AUV6000 m « Coral »

A new propulsion drive enabling the vessel to be under ICES Noise curve

New scientific spaces and laboratories

4 new Gensets

A new fairing with EM302 and EM2040

- Propulsion drive and Genset contracts have been signed,
- Crane contract to be signed next month,
- *Le Suroit* EM 302 has been dismantled in September 2016, and sent to Kongsberg for update, before integration on Thalassa summer 2017.

- Call for tender for the shipyard is under process. Shipyard to be chosen next month. Modernization contract to be signed in January 2017.

- Due to Stock assessment activities of the vessel the modernization to be conducted from 5th June 2017 (end of Pelgas CIEM campaign) to 30 September 2017 (beginning of Evohe CIEM campaign).

- **Le Suroit is for sale with 6 months full certificates !**

Ariane Hybrid ROV – Back to trials

Operated from non DP capable light vessel :

➔ Reduced operational cost

➔ Easy and cost-effective access to ship time.

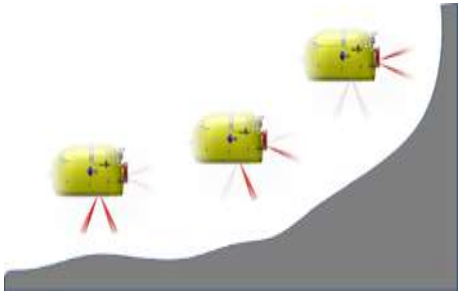
Hybrid-ROV :

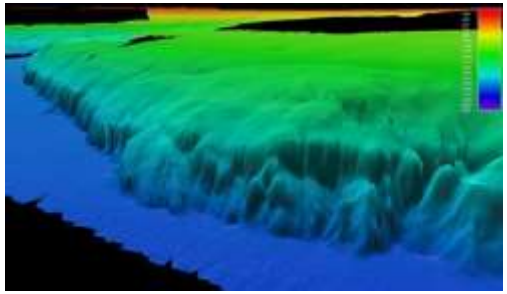
Self powered underwater vehicle

- fiber optic tether → ROV mode
- untethered → AUV mode

Ariane missions :

- Daily work cycle, mostly coastal, up to 2500m depth
- Close-up inspection, sampling and light tools manipulating, optical imaging, acoustic mapping
- Perform tasks on all sorts of seabed morphology, emphasis on canyons, cliffs and steep inclines

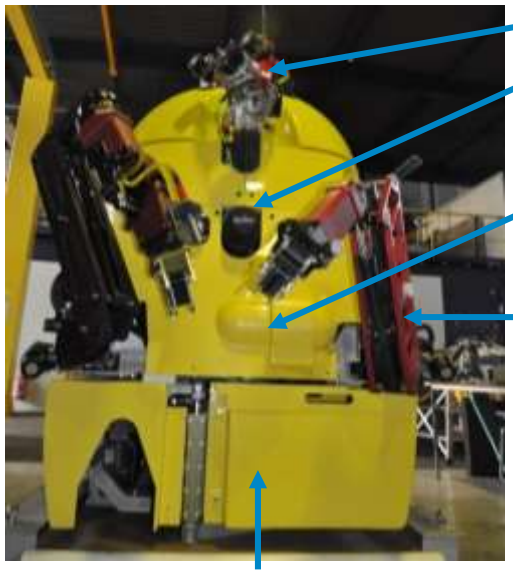




Hybrid ROV Ariane : vehicle

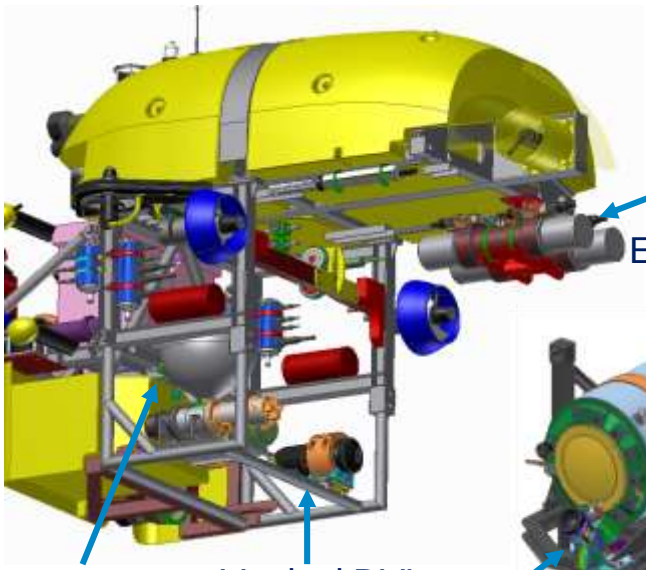
USBL beacon
Wifi, DGPS Gonio-beacon
Flasher
Acoustic modem

1.8 tons
2500 m max depth
4 to 10 hours endurance
Payload : up to 250 kg

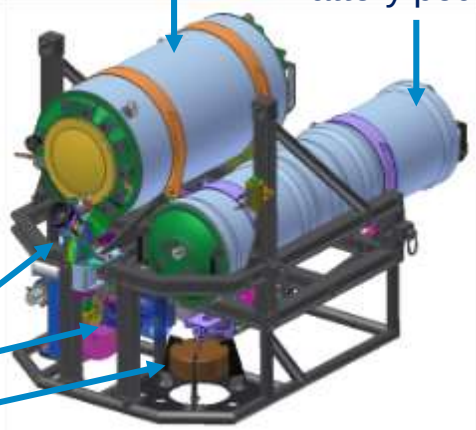


Main P&T HD cam
FWD looking sonar
Frontal DVL
5 and 7 function arms

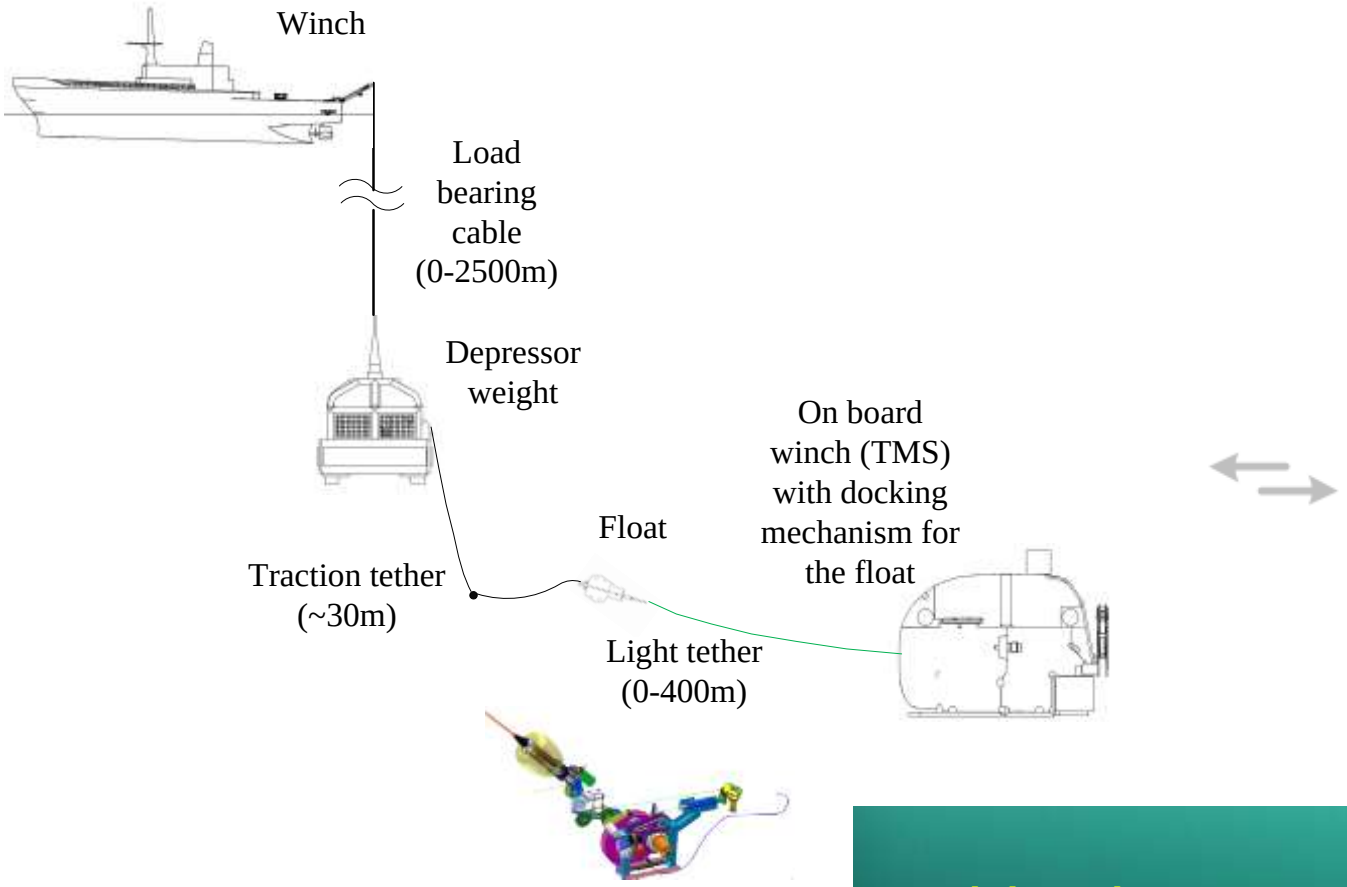
Motorised payload tray
Tilting digital camera
Biological sampling tools

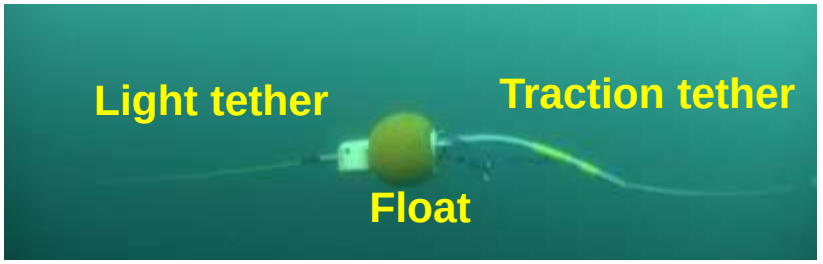


Thruster pods
Electronics pod
Battery pod
Vertical DVL
Swivel joint
TMS
Drop weight
Ballast



Ariane's innovative deployment





But … in September 2015

- Thermal runaway occured on battery integrated in the electronic pod, during charge
- Expert assessment in progress to define causes
- mechanical fuse on pod limits damages and prevents explosion
- Damages limited to the electronic vessel.

End of operational trials are in progress since august 2016, with a new battery.

Ariane to de operational for scientific campaigns begining 2017

IFREMER contribution to POLAR POD project

Marc Nokin – Olivier Lefort IRSO 2016
Images provided by Jean-Louis Etienne

POLAR POD – A project leaded by Dr Jean-Louis Etienne

Some expeditions carried out until now

- ✓ 1986 : First-ever solo dogsled reach of North Pole - 63 days

- ✓ 1989-90 : First-ever international dogsled crossing (6300 km) of Antarctica

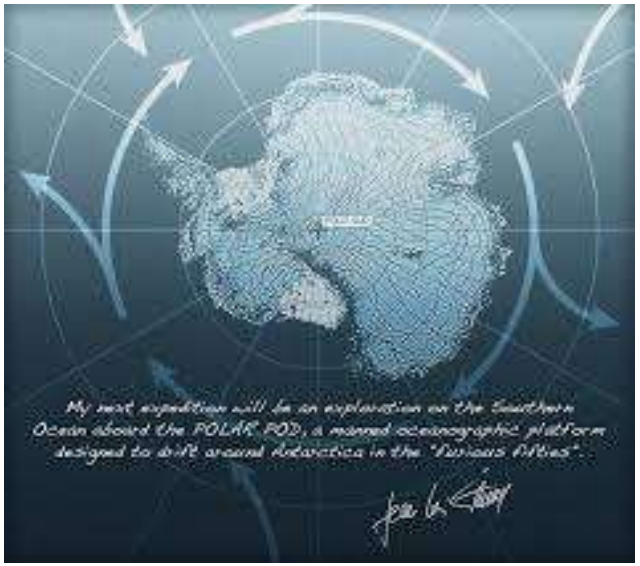
- ✓ 2002 : 4 monthes drift on-board Polar Observer in Arctica

- ✓ 2010 : First crossing over Arctic ocean on-board Generali Arctic Observer

POLAR POD Concept

- POLAR POD : Platform based on the US FLIP (SCRIPPS) – Floating Instrument Platform

- Concept : « Vertical ship » between a buoy and a ship

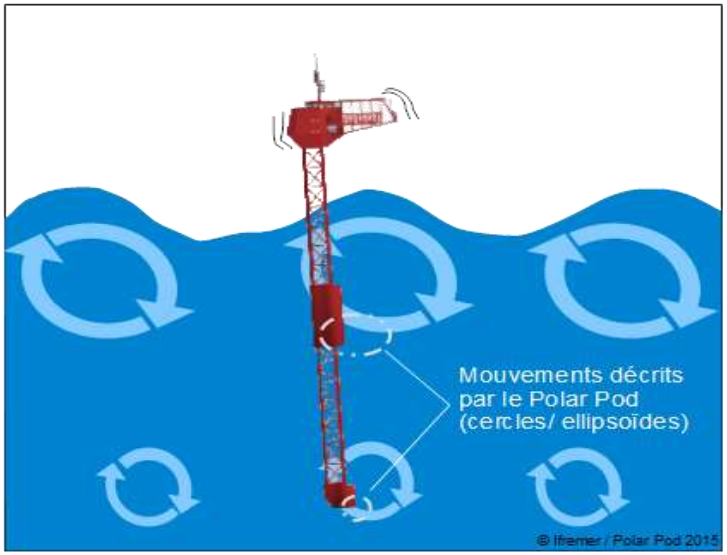


- Expedition : 2 years circum-navigation around Southern Ocean

POLAR POD concept

Requirements

- ✓ Reduced motions in heavy seas
- ✓ Silent (engineless)
- ✓ Weak perturbations of the environment

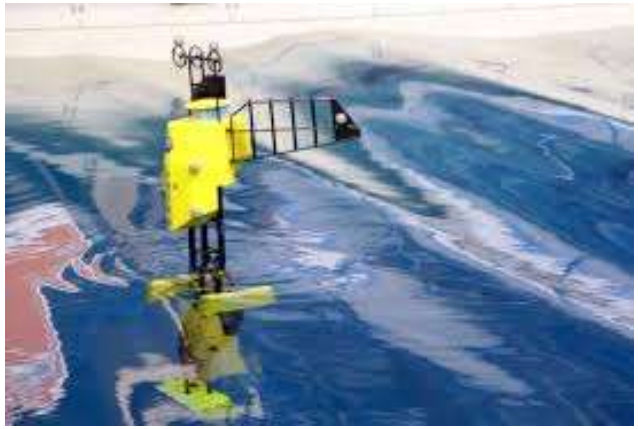


Design

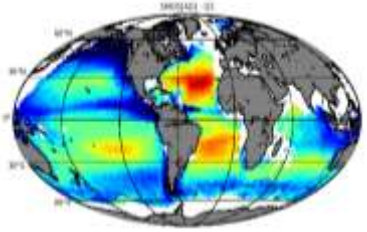
- ✓ 20.6m H1/3, 76 knts wind speed
- ✓ Absorption of 90% heave motions
- ✓ Less than 5° pitch
- ✓ Surge acc. < 0,03g/wave height
- ✓ Vertical acc. <0,007g/wave height

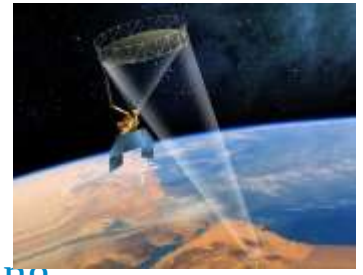
Technical and operational constraints

- ✓ Low energy available (< 3 kW)
- ✓ Limited spaces (< 40 m²)
- ✓ Reduced technical crew (4 persons)



Scientific project





- ✓ Air-Sea exchanges in the Southern Ocean
- ✓ Long term monitoring of the Southern Ocean from remote sensing
- ✓ The biodiversity of the Southern Ocean
- ✓ Anthropic impacts

- ✓ **> 100 researchers involved from 40 institutions and 10 countries**

POLAR POD characteristics

- ✓ 22m length
- ✓ 80m draft
- ✓ 60m air draft
- ✓ 800 t
- ✓ 7 persons
- ✓ <1,5 knts drift speed
- ✓ 3 or 4 windfarms (2,5 kW)
- ✓ Emergency DA
- ✓ Emergency propeller

Expedition

- ✓ Towed to the gyre horizontally, then flip to vertical position
- ✓ 2-3 month legs (2 years cruise)

POLAR POD project organisation

Ifremer shall be the owner of Polar pod :

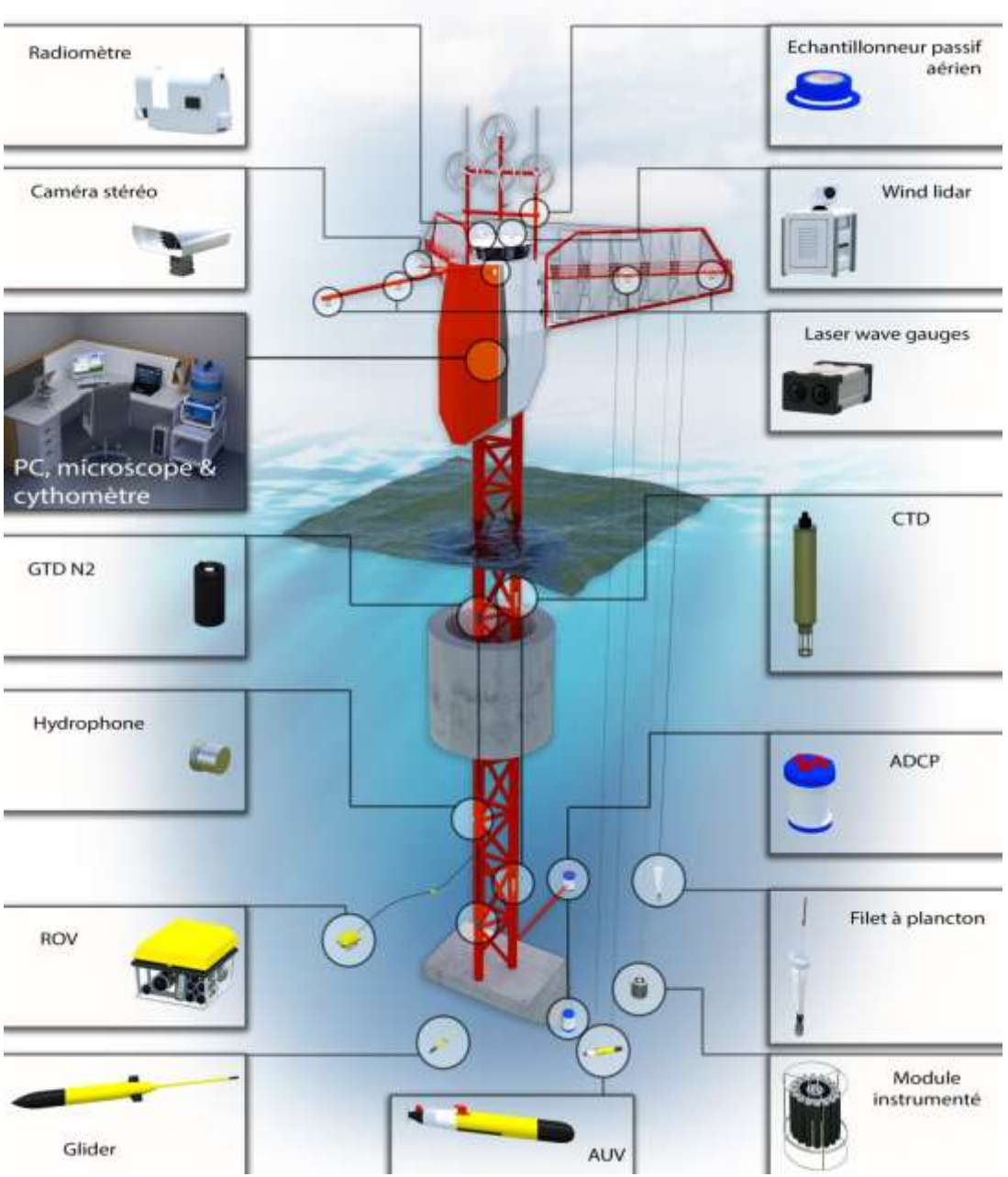
- ✓ Call for tender for the construction
- ✓ Construction
- ✓ Integration of scientific equipment and IT equipment
- ✓ Data management

But first circum-navigation shall be managed by Jean-Louis Etienne fondation « Océan Polaire » in close cooperation with more than 40 international institutions

Calendar (tentative)

- ✓ Construction : 2017-2018
- ✓ Extensive sea trials : until mid-2019
- ✓ Towing to the area : summer 2019
- ✓ Cruise departure : Automn 2019
- ✓ End of the cruise : 2021

POLAR POD – scientific and mobile equipment

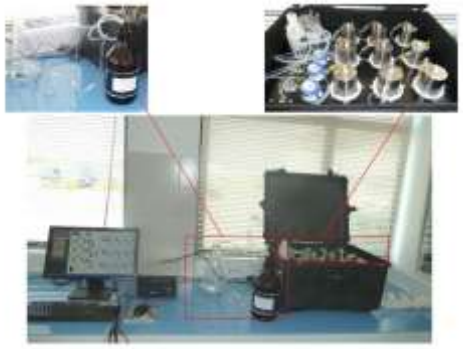


Chemical contaminants

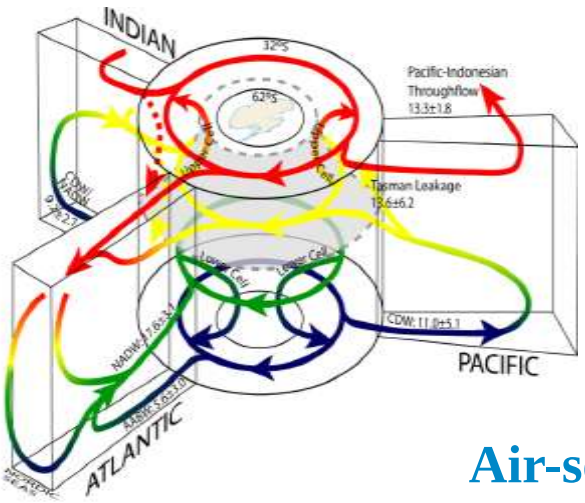
General objectives : Assessment of the organic and metallic contamination

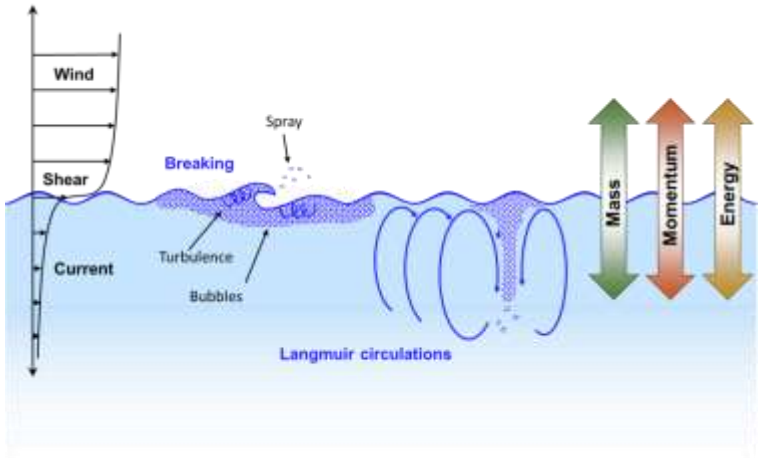
- ✓ Levels, exposure of first trophics levels, seasonal and regional variations, transport on long distance
- ✓ Developments of equipment compatible with Polar Pod constraints
- ✓ Validation and tests of systems before circum-navigation

Problems : not to be contaminated by the Polar Pod itself



Ocean-Atmosphere fluxes

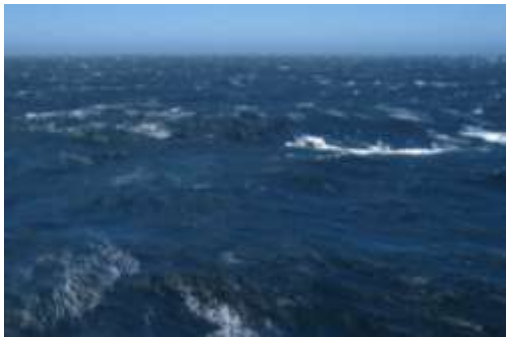




Air-sea exchanges are driven by waves (energy, momentum, mass)

General objectives :

- ✓ Up-grading of climate numerical models
- ✓ Better calibration of models by strong winds access giving new data
- ✓ Comparaison with satellite data



Normal conditions

Extreme conditions