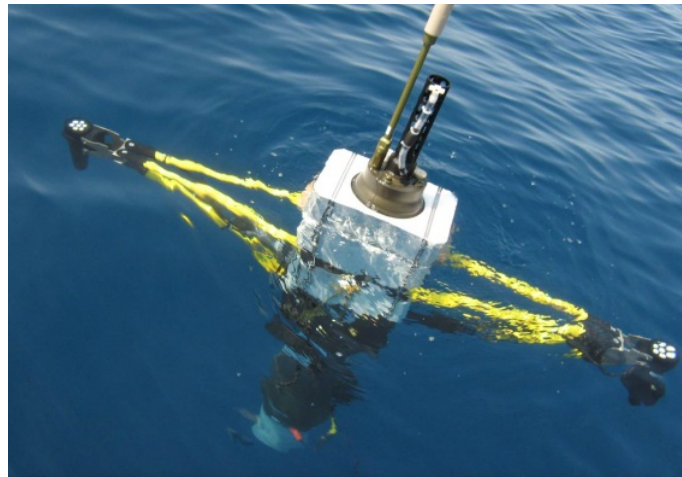# ProVal

A profiling float dedicated to *in-situ* radiometric measurements

E. Leymarie, C. Penkerc'h, V. Vellucci, C. Lerebourg, D. Antoine, E. Boss, M. R. Lewis, F. D'Ortenzio and Hervé Claustre

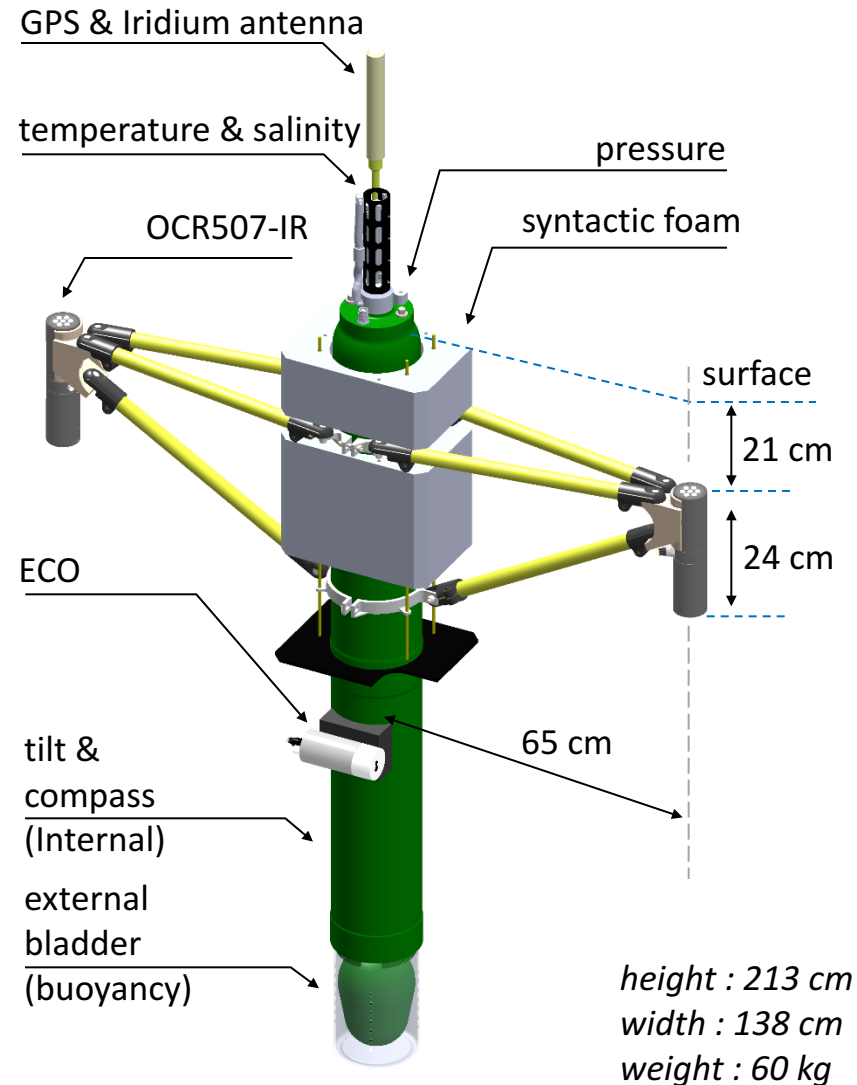Griet Neukermans (LOV)

ProVal – technical features

- New Provor CTS5 (NKE)
- High speed, bidirectional Iridium

Sensors:

- 2 identical sensors E_d-L_u

E_d : 380, 412, 443, 490, 510, 560, 665 nm + PAR

L_u : 380, 412, 443, 490, 510, 560, 665 nm

- Tilt and compass sensors
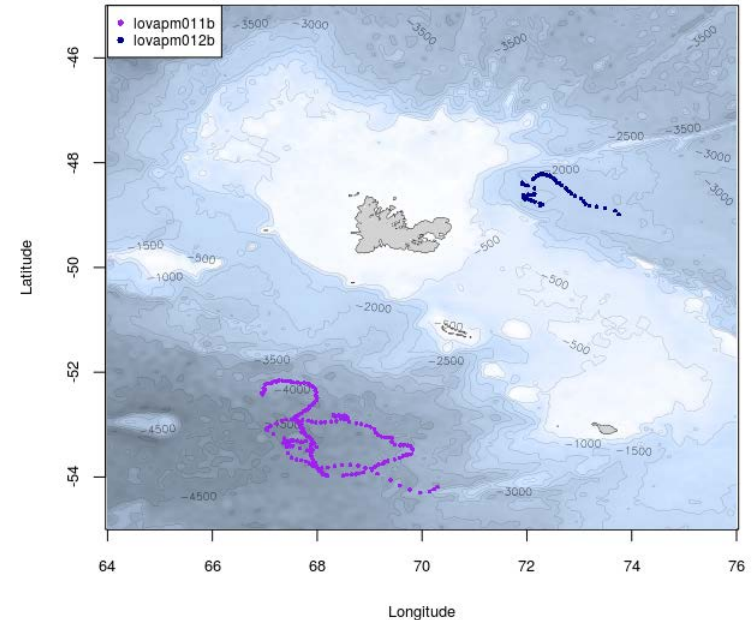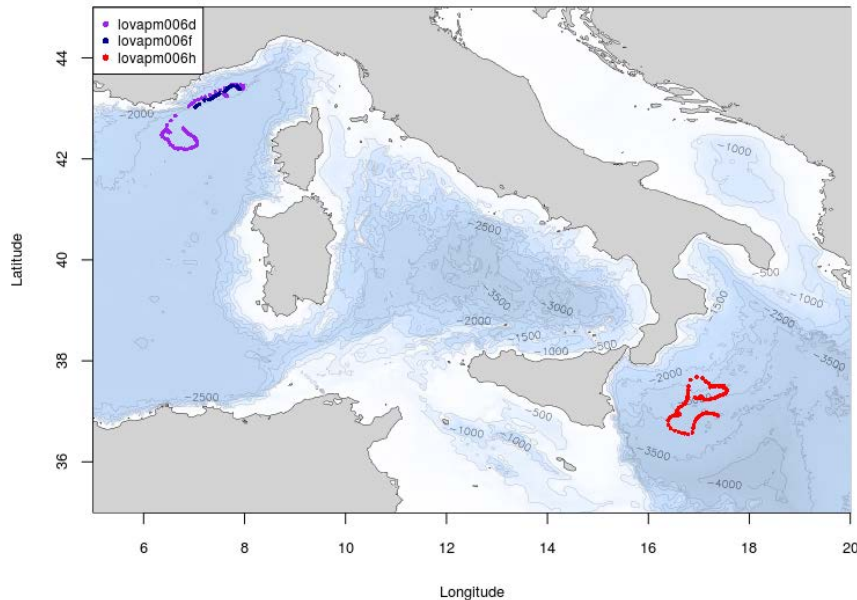- Chla, backscattering, CDOM

ProVal's original features:

- Sensors redundancy
- designed to minimize self-shading

GPS & Iridium antenna

temperature & salinity

pressure

OCR507-IR

syntactic foam

surface

21 cm

24 cm

ECO

tilt & compass (Internal)

external bladder (buoyancy)

65 cm

height : 213 cm
width : 138 cm
weight : 60 kg

5 Deployments

Same float used 3 times in Med sea

|	float name	Area	Year	Status	N. Profiles
1	lovapm006d	NW Med	2015	**recovered**	53
2	lovapm012b	E Kerguelen	2016	mission completed	68
3	lovapm011b	SW Kerguelen	2016	mission completed	247
4	lovapm006f	NW Med	2017	**recovered**	81
5	lovapm006h	Ionian Sea	2018	**recovered**	117

Data Acquisition

Time accuracy at surface ≈ 15 min

1 min @ 1 Hz
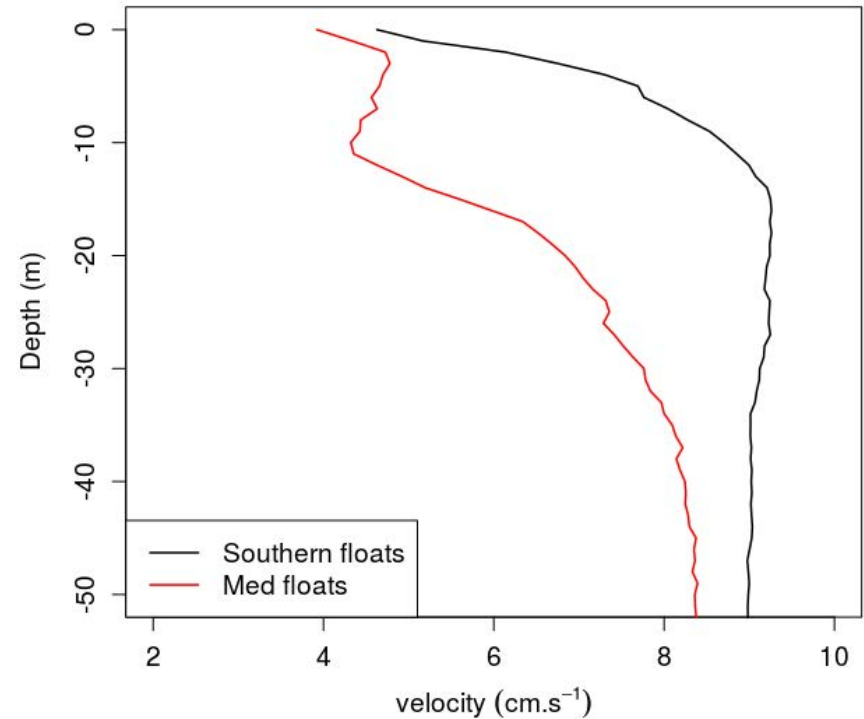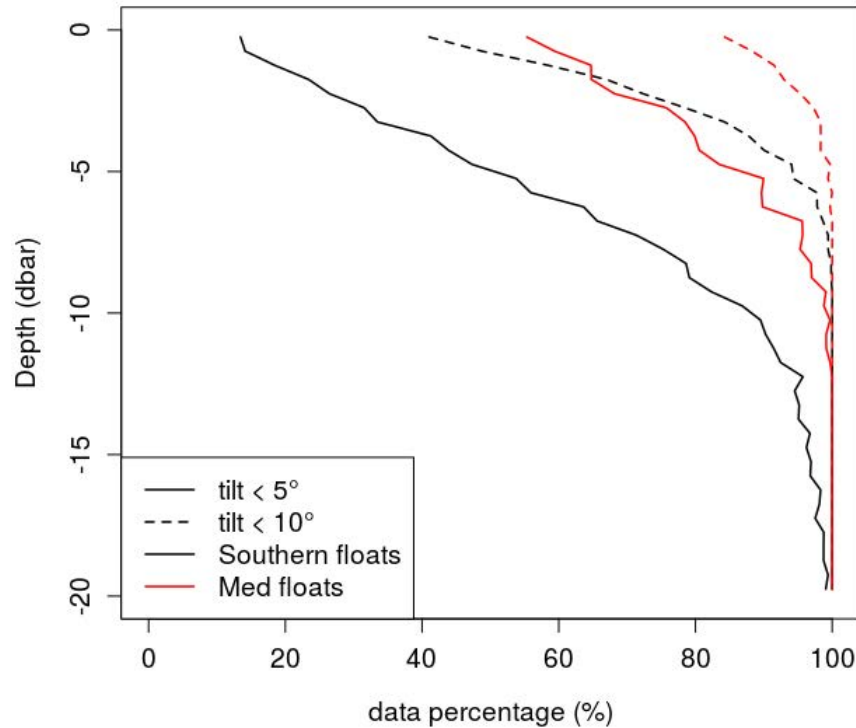
- 0 – 60 dbar : resolution 10 cm
- 60 – 300 dbar : resolution 1m
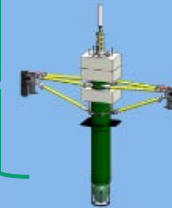
➢ Parking 500m / 800m : black measurement 1 per dive

➢ Deep Parking depth is used to mitigate Biofouling

➢ Cycling: every day to every 5 days.
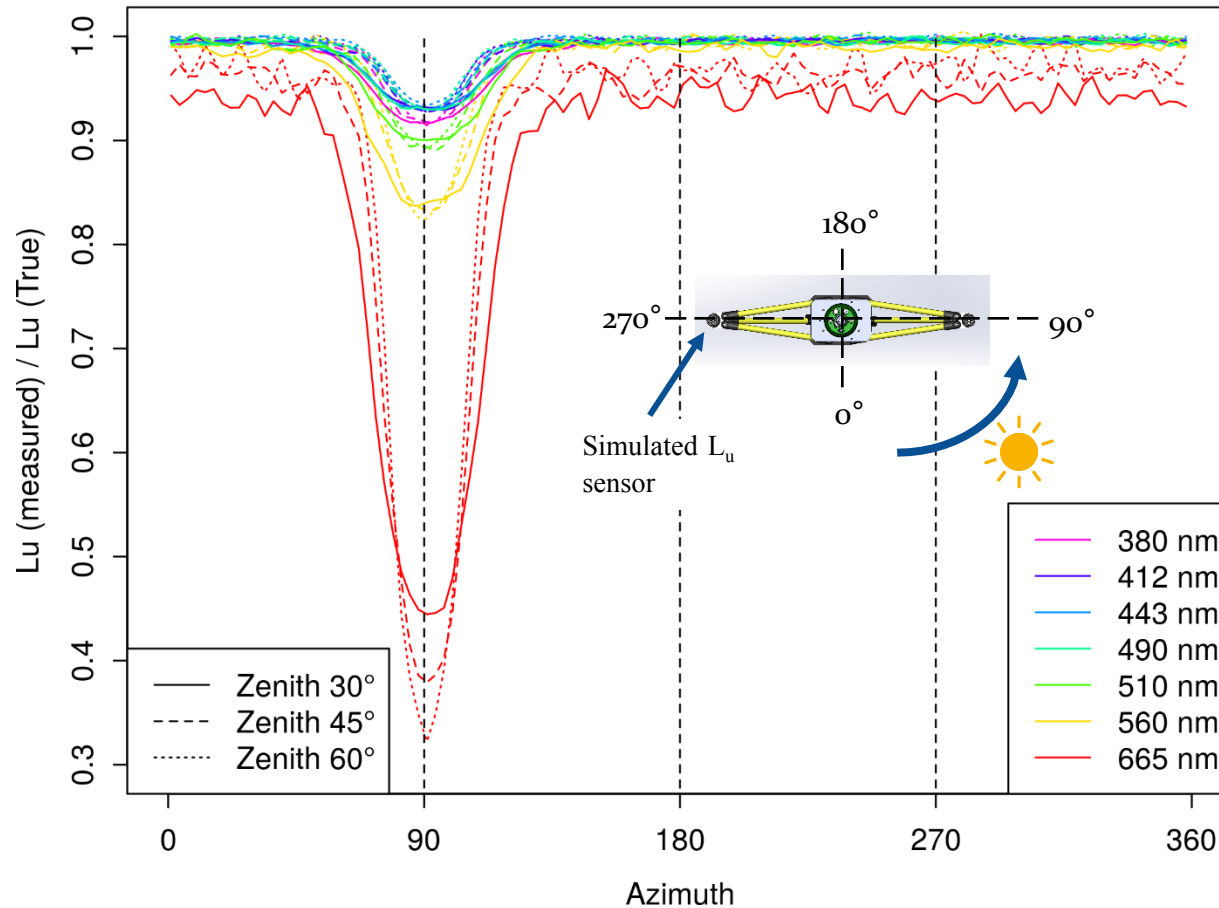
Float Tilt & Speed

Average on all profiles in Med Sea and Southern Ocean

➢ Tilt < 10° (< 5° if possible) is requested for data quality

➢ Low and stable ascent speed increase depth resolution

Shading

estimated by Monte Carlo simulations

Simulation realized at 2m depth with sun zenith angles of 30°, 45°, and 60° in a black sky.
IOPs derived from [Chla] = 0.1 µg/L.
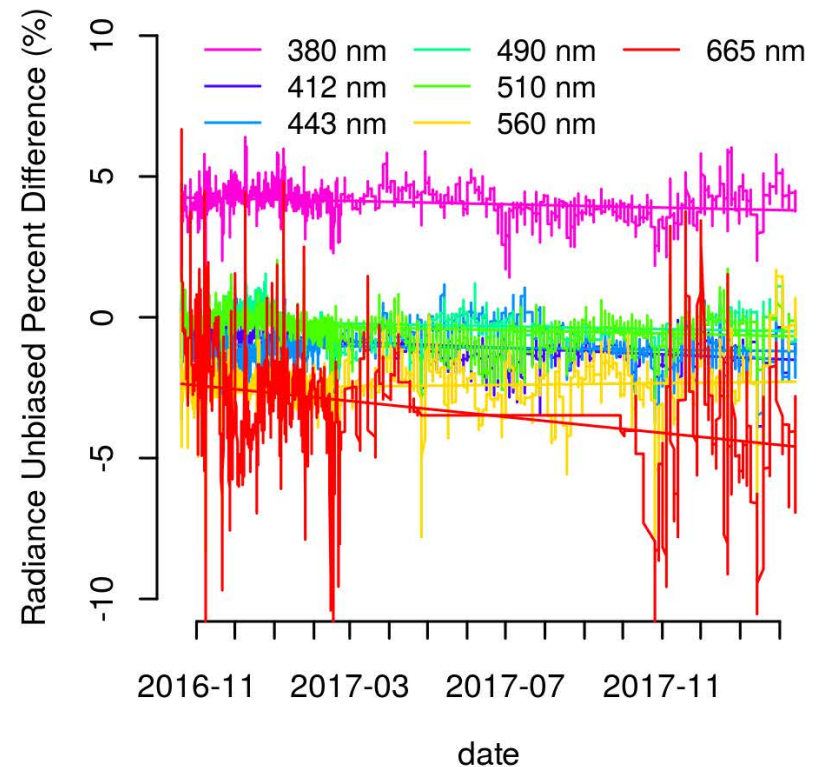
Sensor Aging

Sensor *in-situ* inter-comparison

« Double Arms » allows for *in-situ* Comparaison

$$100 * \frac{2 * [L_1(\lambda, z) - L_2(\lambda, z)]}{[L_1(\lambda, z) + L_2(\lambda, z)]}$$

L1, L2: upwelling radiance from left and right arms

➢ Comparison over 14 months in Austral (*lovapm011b*)

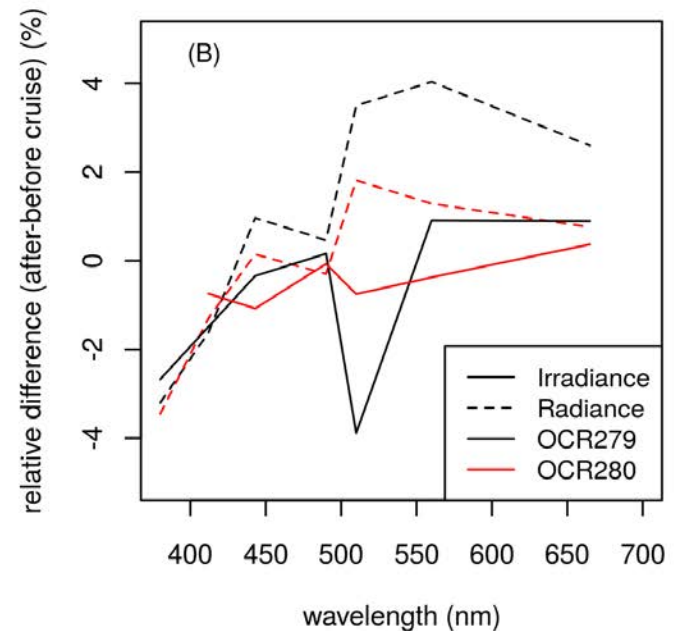➢ Difference dominated by calibration issues

Sensor Aging

Estimated After recovery (2 months in Med Sea summer time)
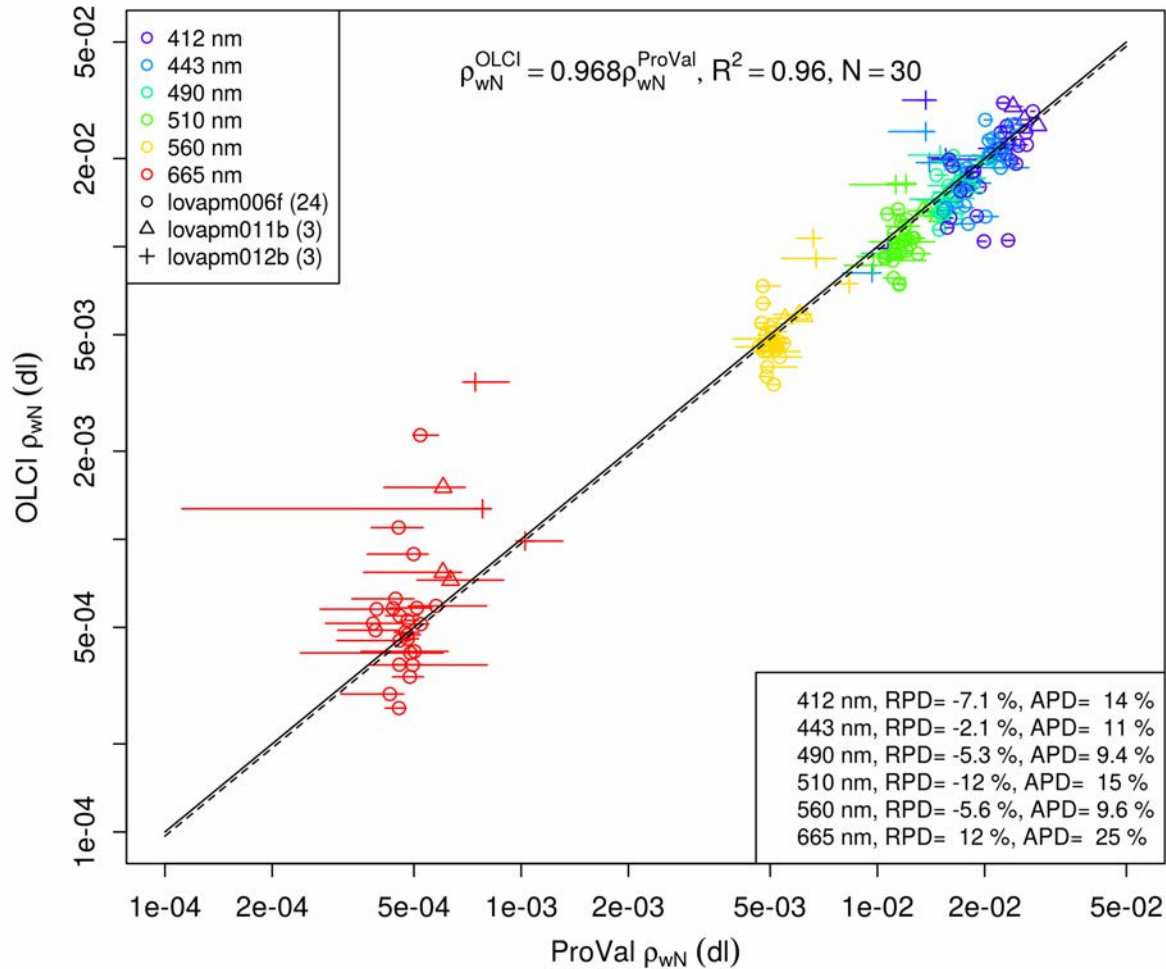

sensor after recovery and without any cleaning

Relative difference of calibration coefficients determined at the LOV calibration laboratory before and after deployment

➔ Deep Parking depth minimizes aging and biofouling

OLCI Rrs Matchups

- Are floats suitable to be part of an upcoming global System Vicarious Calibration ?
- 6 matchups in Southern Ocean (8 available for 10 years of MERIS for Lat > 40°S)

take home messages

➢ Profiling floats are adapted to be deployed world wide

➢ ProVal float is a stable platform adapted to carry radiometers

➢ Deep parking depth minimizes biofouling

➢ Float recovery and post calibration are manageable if needed

➢ First results are promising, showing the potential of such floats as part of an global SVC

➢ Next step : Adaptation to hyperspectral radiometers

Thank you