



AST-23 meeting, 21-25 March 2022

Update on HM series

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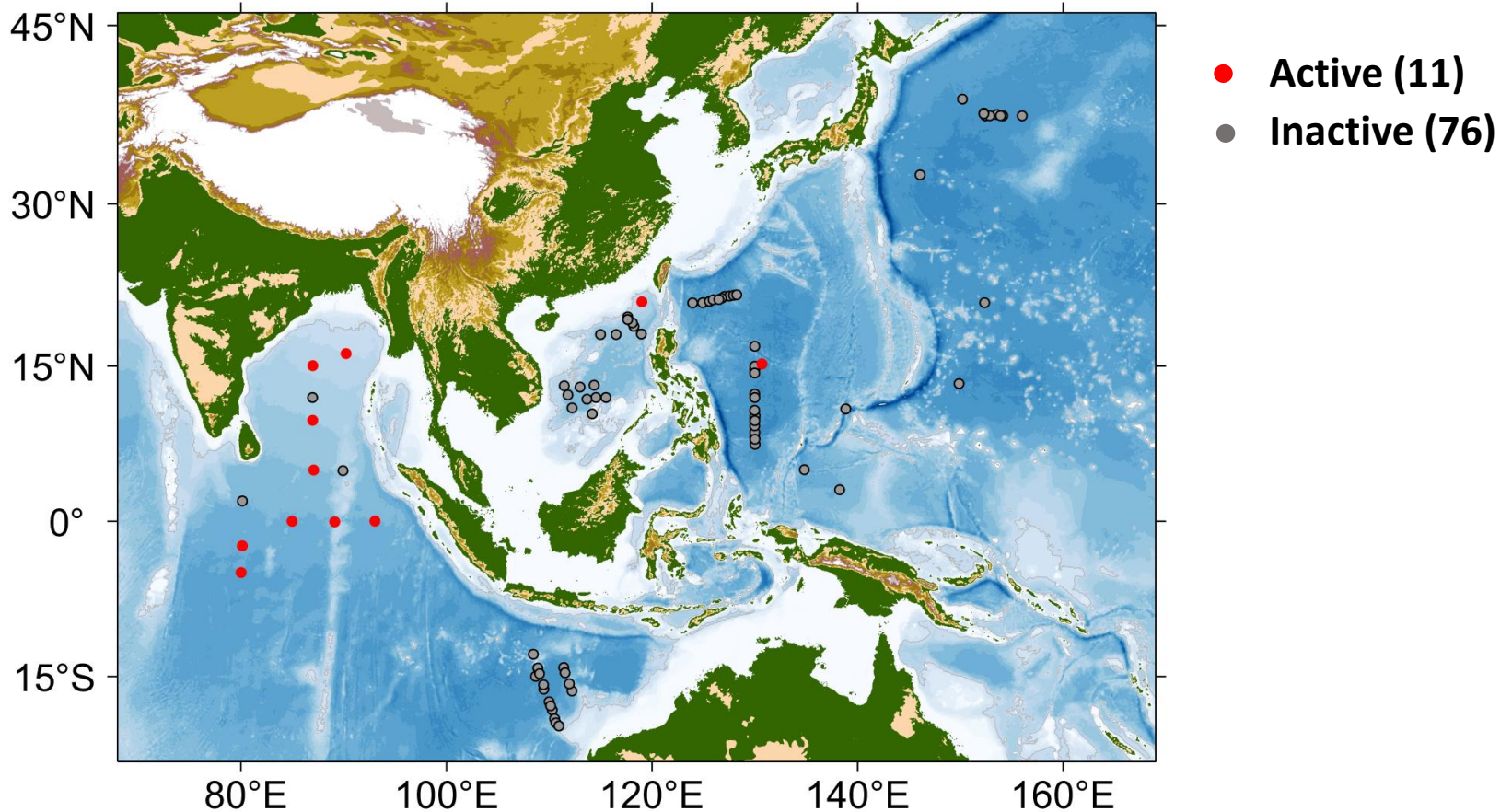


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SECOND INSTITUTE OF OCEANOGRAPHY, MNR



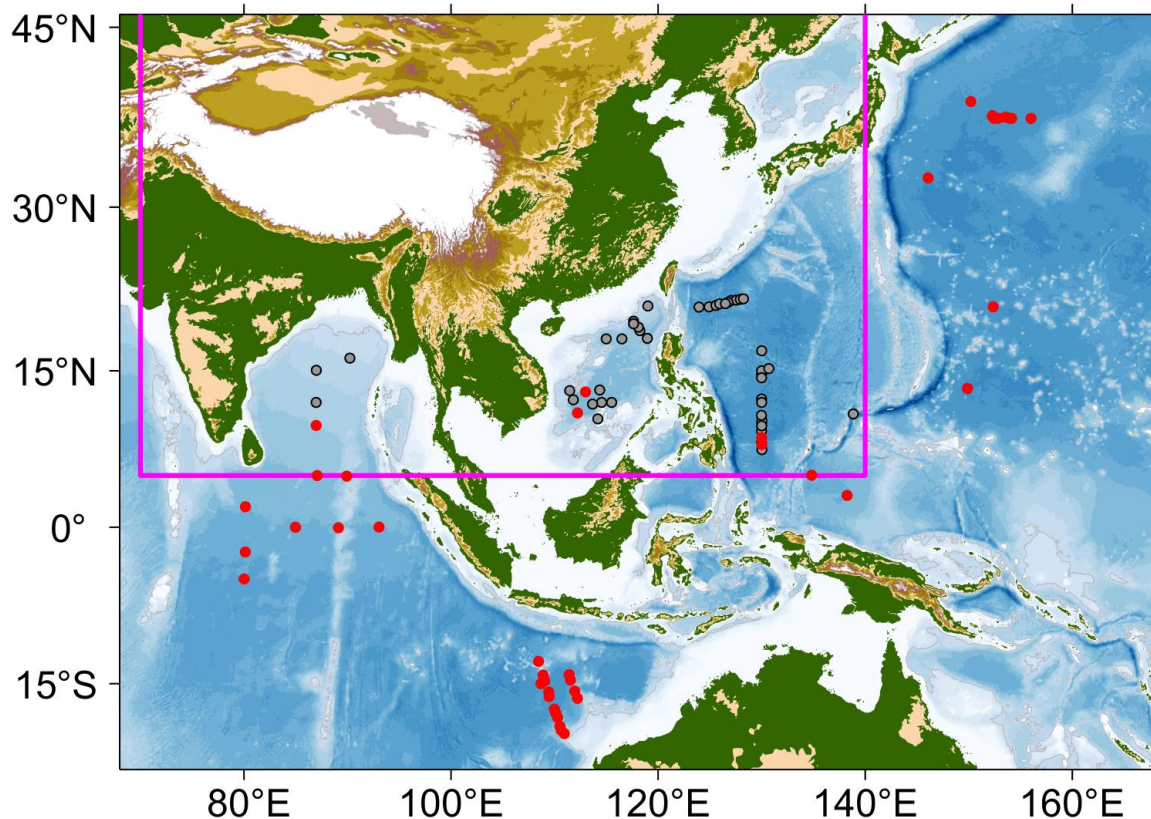
HM2000 Status

From 2016, 87 HM2000 floats had been deployed, and 11 floats are operational. These floats are sponsored by 5 organizations.



Communication system

- Both BEIDOU (BDS) and Iridium satellite systems have been applied in HM2000 floats.
- BDS-2's nominal communication coverage: 70° - 140° E and 5° - 55° N.
- BDS-3 enables global communication (enhanced in Asia-Pacific), will be available from July this year.

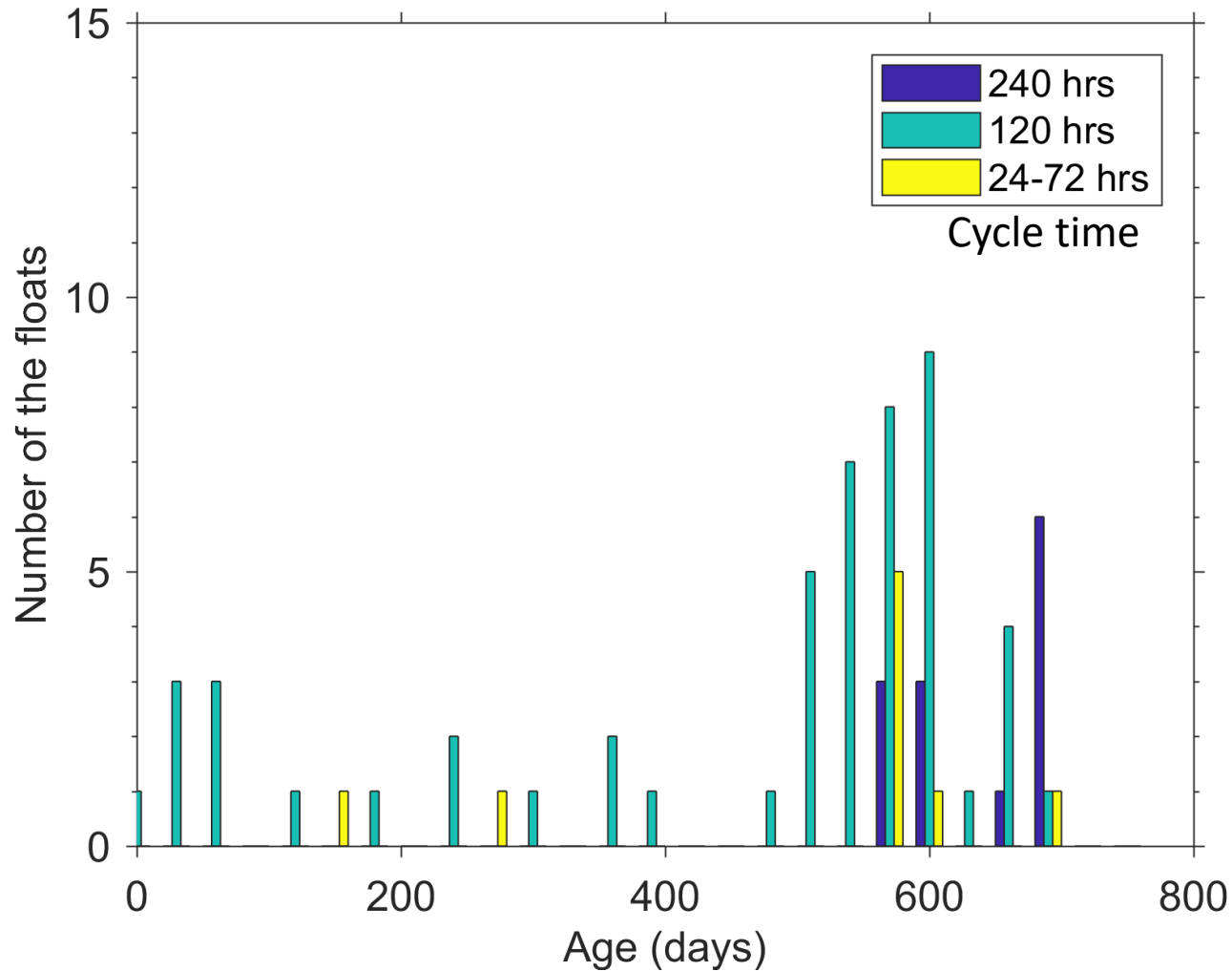


- **Iridium (44)**
- **BEIDOU (43)**



Lifetime

From the 76 inactive HM2000 floats, the estimated life time is ~600-700 days.



Lifetime

HSEO will try and test Tadiran Lithium battery in 2022.
10 HM2000 floats will install Tadiran battery requested by CSIO.

- 46 TLP-93111/A/SM batteries
- Energy increased by 30%
- Cost increased by 1,900 USD

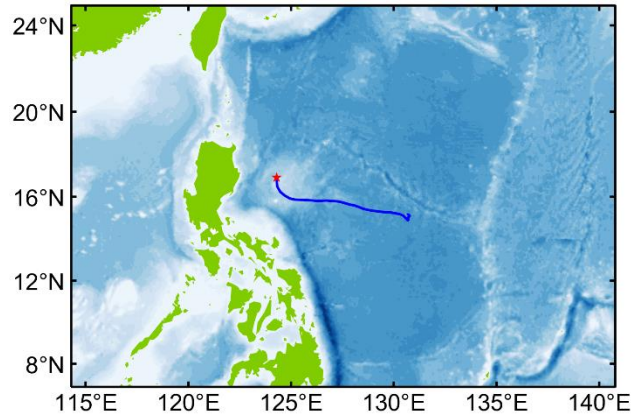


HM2000_DO

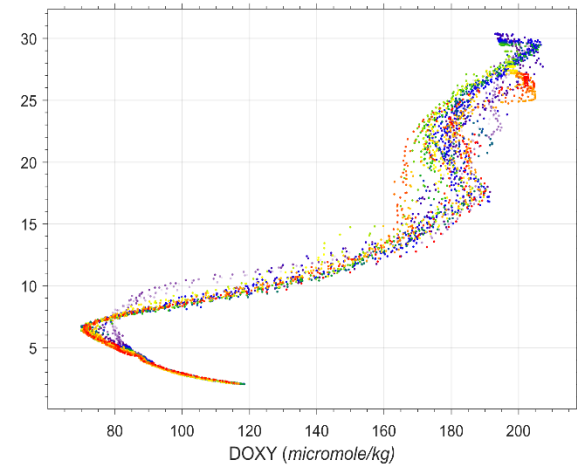
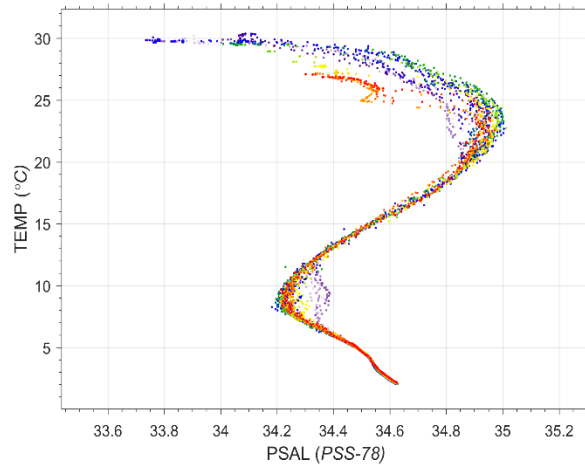
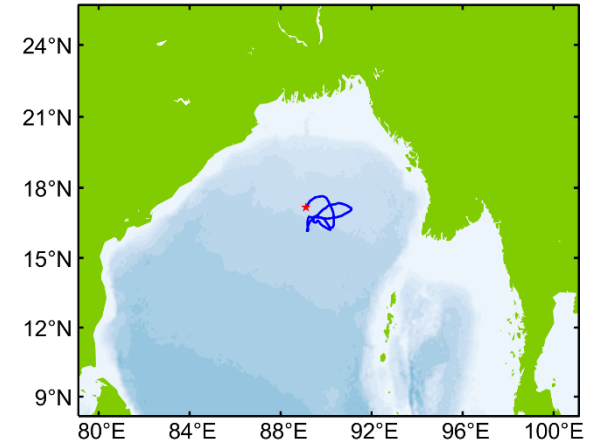
Aanderaa 4330



2902757 (Aug. 2021)



2902758 (Mar. 2021)



Technical issues

- 4 floats experienced early failure after deployment in 2021.
- The problem was attributed to the leakage in antenna caps (glass) found by a laboratory testing.
- HSOE replaced it with new antenna cap made of PEEK.

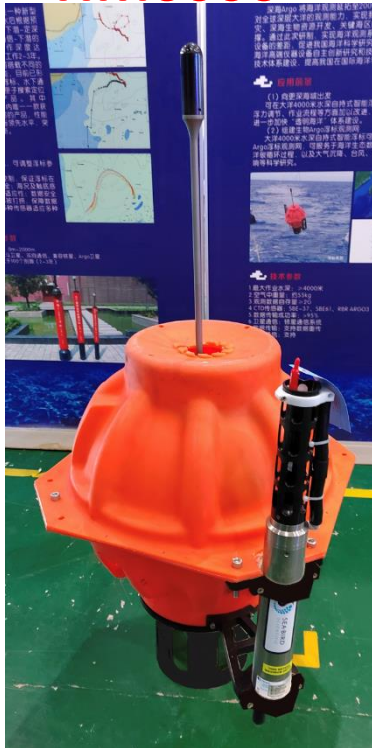
Laboratory testing for antenna caps



HM4000/6000 updates

- Compatible with SBE61/RBRargo CTD sensors
- Optimized low power management module
- HM6000 buoyancy drive system is developed, maximum buoyancy driving capacity over 60Mpa was verified.

HM6000



8 floats with RBRargo CTD
1 float with SBE61 CTD

HM4000

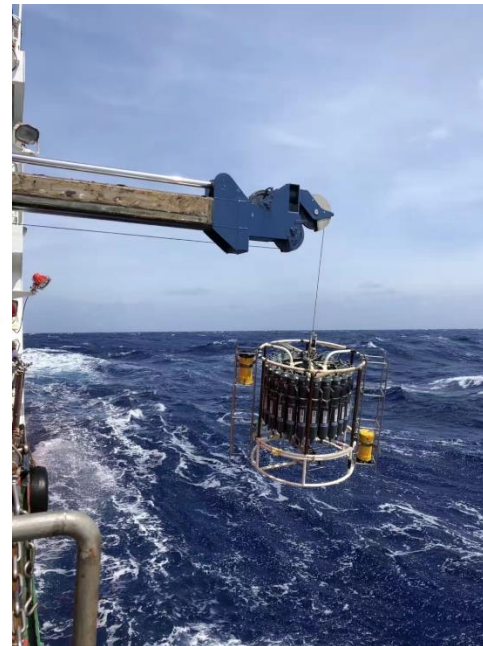
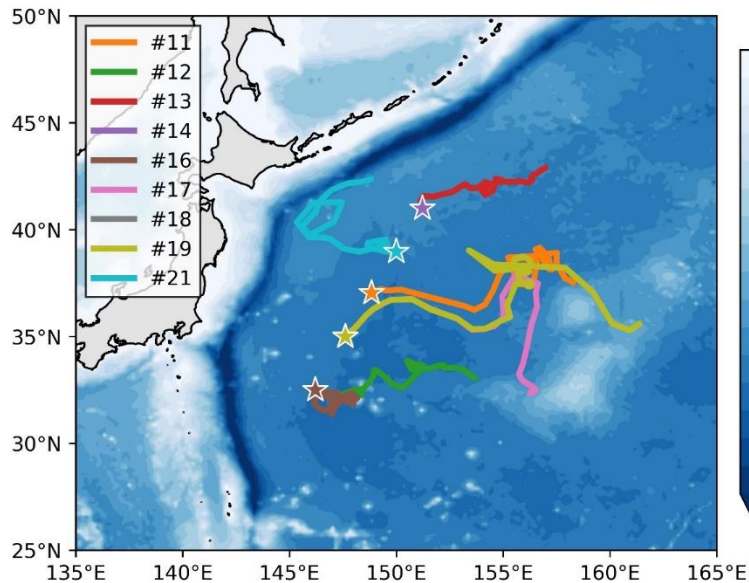


Pilot deployment in 2021

SBE61

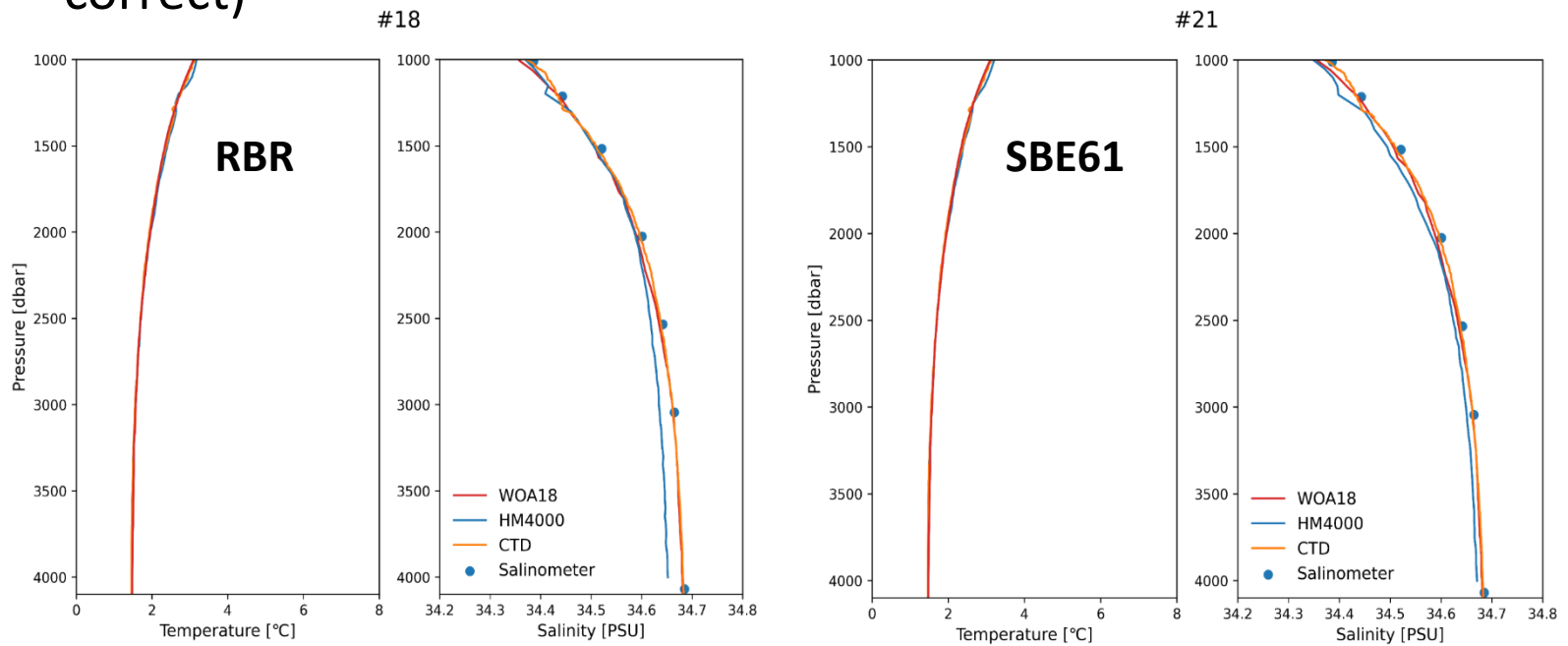
- 9 HM4000 were deployed in the Kuroshio/Oyashio Extension region in the northwestern Pacific.
- Concurrent CTD cast and on-board salinity measurement were conducted @float deployment.

Stations	D2	D3	D4	D5	D6
Floats No.	#12, #16	#17, #19	#11	#18, #21	#13, #14
Date of Deployment	2021-05-20	2021-05-24	2021-06-07	2021-06-01	2021-05-30
Location	146.19E, 32.49N	147.67E, 35.00N	148.82E, 37.02N	150.00E, 39.00N	151.20E, 41.00N



Results

- 4 out of 8 floats with RBRargo CTD show pressure-dependent salinity bias
- The float with SBE61 CTD shows systematic salinity bias (easy to correct)



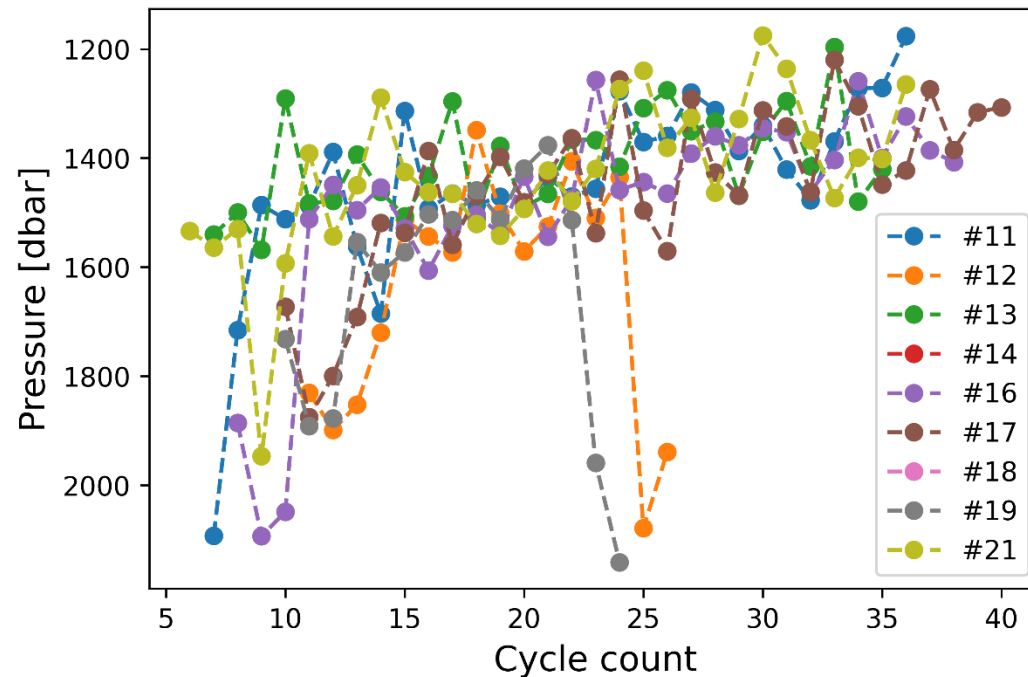
Technical issues

3 floats with RBR CTD experienced CTD failure problem, resulting in the failure of the floats' diving.

Float SN	No. of Observed profiles	Malfunction
#12	85 (alive)	RBR CTD failure
#14	3 (inactive)	Spherical glass pressure housing leakage
#18	6 (inactive)	RBR CTD failure
#19	65 (alive)	RBR CTD failure

Technical issues

- Parking depth changes greatly.
- A new control strategy for parking depth is being developed.



Float deployment in 2022

- Two 6000-m floats and one 4000-m float will be deployed in the Philippine basin and KE region by QNLM during June and July ;
- Over ten 6000-m floats will be assembled and tested in the second half of the year.

