# Argo New Zealand National Report, March 2021.

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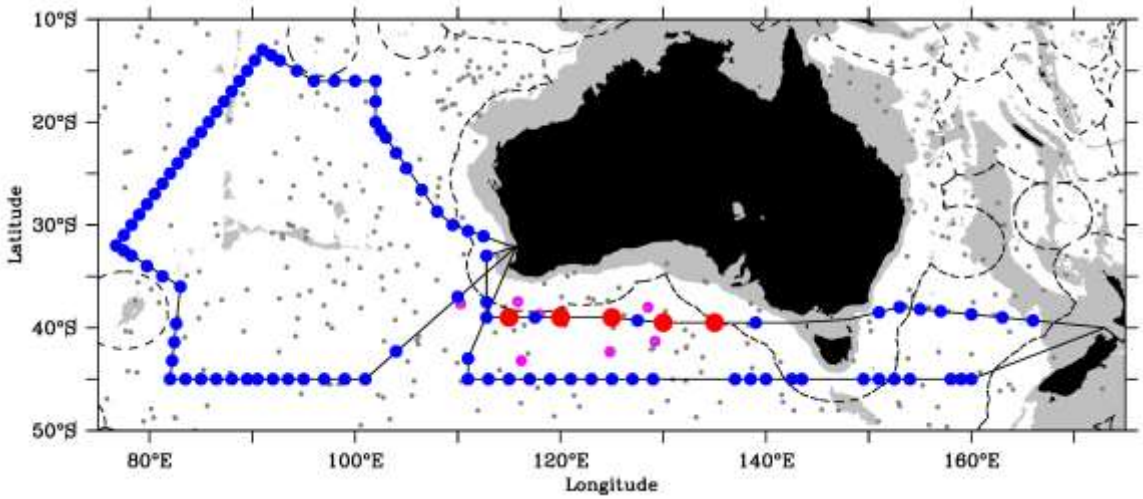
## 1. The status of implementation of the new global, full-depth, multidisciplinary Argo array (major achievements and problems in 2020)

### a. floats deployed and their performance:

2 Solo2 floats were purchased and deployed (WMO #s 5906408 and 5906409).

New Zealand also deployed floats for other organisations on two voyages:

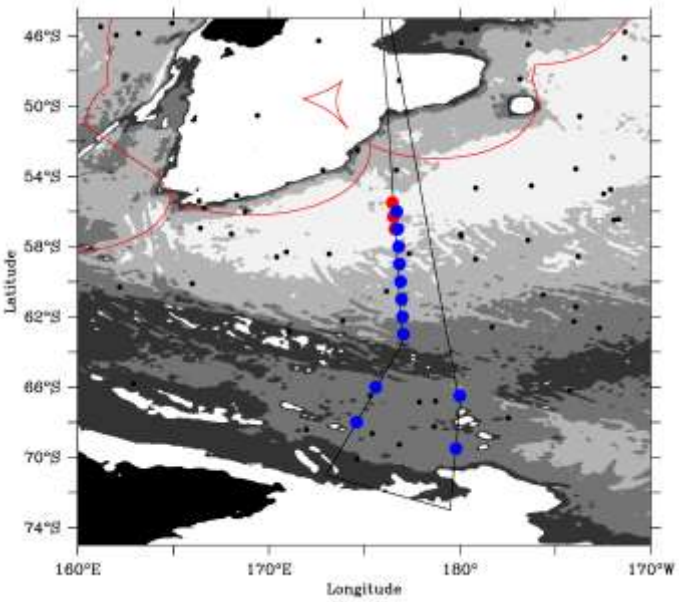
i) R/V Kaharoa Voyage (Indian Ocean):




*R/V Kaharoa deployments August-September 2020. Blue = Core, Red = Deep.*

- 5 Scripps Institution of Oceanography Deep Solo
- 42 Scripps Institution of Oceanography Solo2
- 42 University of Washington Apex
- 10 CSIRO Navis
- 9 CSIRO MRV

ii) R/V Tangaroa Voyage (Southern Ocean):




*R/V Tangaroa deployments January-February 2021. Blue = Core, Red = Deep.*

- 2 NZ Solo2
- 10 Scripps Institution of Oceanography Solo2
- 3 Scripps Institution of Oceanography Deep Solo

**b. technical problems encountered and solved:**

The NZ floats are functioning well. Other partners will report on their floats.

**c. status of contributions to Argo data management (including status of high salinity drift floats, decoding difficulties, ramping up to include BGC or Deep floats, etc):**

none

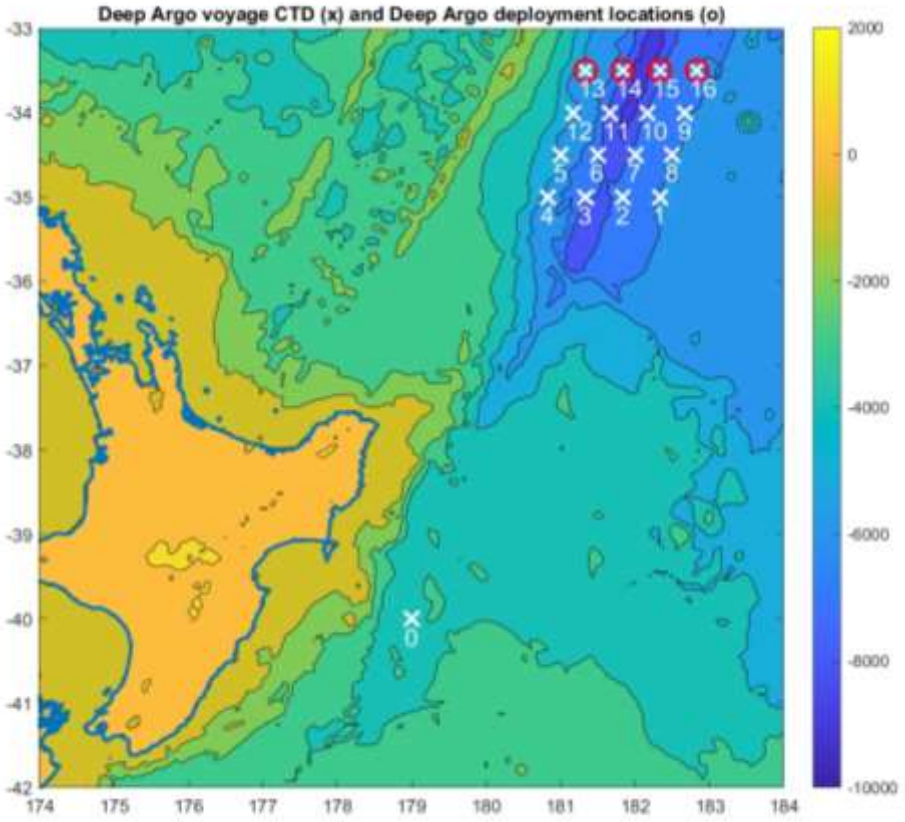
**d. status of delayed mode quality control process:**

DMQC on NZ floats is performed by Scripps Institution of Oceanography (John Gilson).

**2. Present level of and future prospects for national funding for Argo including a summary of the level of human resources devoted to Argo, and funding for sustaining the core mission and the enhancements: BGC, Deep, Spatial (Polar, equator, WBCs)**

New Zealand Argo float funding continues on a year-to-year basis at the level of two floats per year. Funding for personnel is via a research programme also funded year-to-year and a contract with Scripps Institution of Oceanography associated with the R/V Kaharoa charter.

NZ is contributing to Deep Argo via a Deep Argo Development Voyage on R/V Tangaroa in March/April 2021 aiming at improving Deep Argo (SBE-61) sensor performance. 6 Scripps Deep Solo floats will be deployed. This work is in partnership with Nathalie Zilberman (SIO) and Dave Murphy (SBE).




*Deep Argo Development Voyage plans: x=CTD, o=Deep Solo deployment*

NZ (NIWA) is also purchasing 2 Apex floats with ice-avoiding software for deployment in the Ross Sea sometime after December 2021. This work is being led by Craig Stewart (NIWA) with assistance from Esmee van Wijk (CSIRO). It is currently uncertain whether there will be more purchases and deployments in the future.

There is enthusiasm in New Zealand for BGC floats, but they have not as yet been funded.

3. **Summary of deployment plans (level of commitment, areas of float deployment, Argo missions and extensions) and other commitments to Argo (data management) for the upcoming year and beyond where possible.**

New Zealand floats:

a. planned purchase and deployment of 2 Solo2 floats in the South Pacific
b. 2 Apex floats to be deployed in the Ross Sea after December 2021.

Deployments for other countries:

a) Deep Argo Development Voyage: R/V Tangaroa March/April 2021:
   6 Scripps Institution of Oceanography Deep Solo
b) R/V Tangaroa Dart Voyage May/June 2021:
   12 Scripps Institution of Oceanography Solo2
   5 CSIRO
c) Planned 2021 Kaharoa Voyage (~ September 2021)
   121 Core floats split between Scripps Institution of Oceanography, University of Washington, CSIRO and New Zealand.

4. **Summary of national research and operational uses of Argo data as well as contributions to Argo Regional Centers. Please also include any links to national program Argo web pages to update links on the AST and AIC websites.**

Argo data and products are routinely used in research, including physical oceanography, marine ecosystems, climate and fisheries.

5. **Issues that your country wishes to be considered and resolved by the Argo Steering Team regarding the international operation of Argo. These might include tasks performed by the AIC, the coordination of activities at an international level and the performance of the Argo data system. If you have specific comments, please include them in your national report.**

No issues beyond those faced universally, i.e. funding and Covid-19 disruptions.

6. **To continue improving the quality and quantity of CTD cruise data being added to the reference database by Argo PIs, it is requested that you include any CTD station data that was taken at the**

**time of float deployments this year. Additionally, please list CTD data (calibrated with bottle data) taken by your country in the past year that may be added to the reference database. These cruises could be ones designated for Argo calibration purposes only or could be cruises that are open to the public. To help CCHDO track down this data, please list the dates of the cruise and the PI to contact about the data.**

CTD data from the Deep Argo Development Voyage will be provided for the reference database.

**7. Argo bibliography ( Bibliography | Argo (ucsd.edu))**


Behrens, E., Williams, J., Morgenstern, O., Sutton, P., Rickard, G., Williams, M. 2020. Local Grid Refinement in New Zealand's Earth System Model: Tasman Sea Ocean Circulation Improvements and Super-Gyre Circulation Implications. *Journal of Advances in Modelling Earth Systems, 12, e2019MS001996.* https://doi.org/10.1029/2019MS001996.

Chiswell, S., Sutton, P., 2020. Relationships between ocean warming and primary production in the New Zealand region. *New Zealand Journal of Marine and Freshwater Research*. DOI: 10.1080/00288330.2020.1713181

Holland, L., A. Rowden, J. Hamilton, M. Clark, S.M. Chiswell, and J.P.A. Gardner, *Genetic connectivity of deep-sea corals in the New Zealand region*, in *New Zealand Aquatic Environment and Biodiversity*. 2020

Morrongiello, J.R., Horn, P.L., Ó Maolágain, C, Sutton, P.J.H. 2020. Synergistic effects of harvest and climate drive synchronous somatic growth within key New Zealand fisheries. Global Change Biology. DOI:10.1111/gcb.15490

Salinger, M.J., Renwick, J., Diamond, H.J., Behrens, E. Fernandez, D., Mullan, A.B., Smith, R.O., Parker, A.K., Johnstone, P., Teixeira, E., Woodward, A., Sirguey, P., Cullen, N.J., Fitzharris, B.B., Herold, N., Hales, S., Hepburn, C.D., Trought, M.C.T. and Sutton P.J. 2020. Unparalleled coupled ocean-atmosphere summer heatwaves in the New Zealand region: drivers, mechanisms and impacts. Climatic Change. https://doi.org/10.1007/s10584-020-02730-5.


**8. How has COVID-19 impacted your National Program's ability to implement Argo in the past year? This can include impacts on deployments, procurements, data processing, budgets, etc.**

There has been minimal impact in the past year except for having to mobilise deployment voyages and the Deep Argo Development Voyage without foreign support. This has been possible with some extra resources.

There could be budget impacts in the future resulting from COVID-19

9. **Argo is still interested in piloting the RBR CTD. Does your National Program have any deployment plans for RBR floats in the next couple years? If so, please indicate how many floats will you be buying in 2021 and 2022 (if known) and where they might be deployed.**

New Zealand currently has no intention to purchase RBR CTD floats. We will deploy other nations' RBR-equipped floats (e.g. CSIRO).