Argo New Zealand National Report, March 2022.

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1. The status of implementation of the new global, full-depth, multidisciplinary Argo array (major achievements and problems in 2021)

a. floats deployed and their performance:

2 Solo2 floats were purchased and deployed (WMO #s 5906702 and 5906703).

2 Apex floats with ice-avoiding software were purchased and deployed in the Ross Sea in January 2022 by F/V San Aotea II (WMOs 7900924 and 7900926). This work is being led by Craig Stewart (NIWA) with assistance from Esmee van Wijk (CSIRO).

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

i) R/V Kaharoa Voyage (Western Pacific):

R/V Kaharoa deployments September-December 2021.

- 9 Scripps Institution of Oceanography Deep Solo
- 16 University of Washington Apex
- 23 CSIRO
- 48 Scripps Institution of Oceanography Solo2
- 2 PMEL Deep Solo

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

R/V Tangaroa deployments January-February 2021

- 12 Scripps Institution of Oceanography Solo2
- 3 Scripps Institution of Oceanography Deep Solo

iii) R/V Tangaroa Voyage (Deep Argo Development Voyage: Western Pacific):

R/V Tangaroa deployments April 2021

- 6 Scripps Institution of Oceanography Deep Solo

iv) R/V Tangaroa Voyage (Western Pacific):

R/V Tangaroa deployments July 2021

- 12 Scripps Institution of Oceanography Solo2

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. This supports of the order of 2 months of personnel time.

A further voyage undertaking Deep Argo Development is planned for 2023. This voyage was intended for 2022, but deferred because of COVID-19. The timing and funding are to be confirmed.

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: planned purchase and deployment of 2 Solo2 floats in the South Pacific

Deployments for other countries:

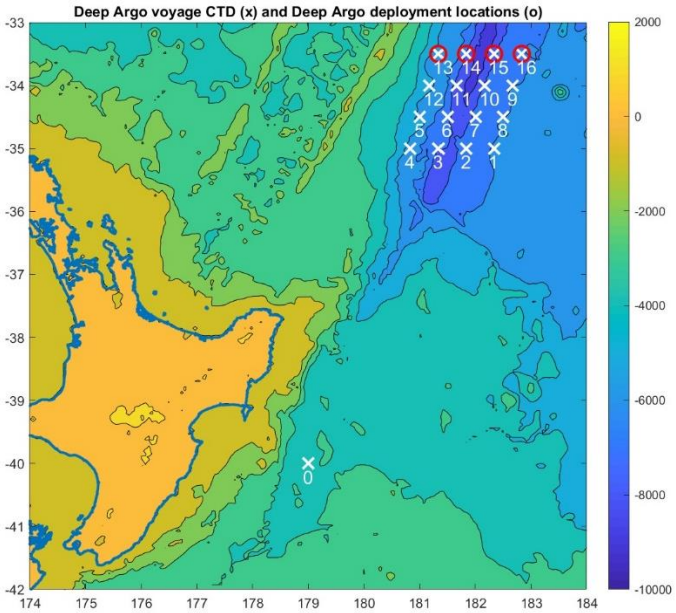
a) Planned 2022 Kaharoa Voyage (~ September 2022)
   110 Core floats split between Scripps Institution of Oceanography, University of Washington, CSIRO and New Zealand.
b) R/V Tangaroa Antarctic Voyage: January-February 2023.
   To be confirmed.
c) R/V Tangaroa Tsunami servicing voyages (southwest Pacific):
   To be confirmed.
d) R/V Tangaroa DWBC and Deep Argo Development Voyage: April 2023.
   Voyage and floats to be confirmed.

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.

Deep Argo Development Voyage

A R/V Tangaroa Deep Argo Development Voyage in collaboration with Scripps Institution of Oceanography (Nathalie Zilberman) and Sea Bird Scientific was performed between 27 March and 11 April 2020. The key aim of the voyage was to perform 6000m CTD casts with a number of experimental SBE sensors mounted on the CTD rosette to collect intercomparison data. COVID-19 border issues meant that intended US participants could not take part. Scripps Institution of Oceanography and SBE each funded one extra New Zealand participant, meaning that the voyage could proceed. Data were sent off the ship after each cast to Dave Murphy and Nathalie Zilberman so they could monitor progress.



Study site bathymetry and station locations.

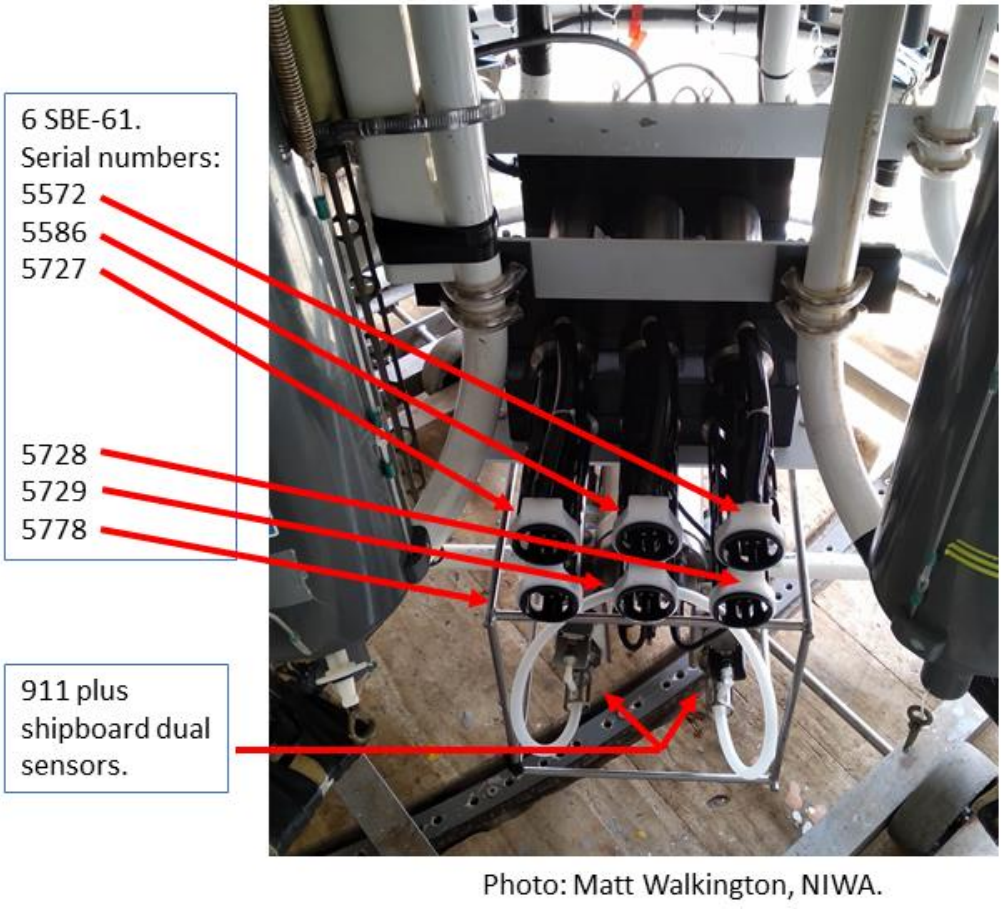


Photo: Matt Walkington, NIWA.

The experimental SBE 61s mounted on the CTD rosette.

27 6000m CTD casts were completed. The data appear to be of high quality. In addition, 6 Deep Solo floats with experimental sensor packages were deployed

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))**

Morrongiello, J.R., Horn, P.L., Ó Maolágain, C, Sutton, P.J.H. 2021. Synergistic effects of harvest and climate drive synchronous somatic growth within key New Zealand fisheries. Global Change Biology. DOI:10.1111/gcb.15490.

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 have been impacts on voyage mobilization:

- Border restrictions meant that the Deep Argo Development Voyage had to use local personnel without some of the desired expertise.
- Border restrictions making it impossible to get foreign technicians into New Zealand to start and load the floats.
- Shipping delays.

- A further Deep Argo Development voyage planned for 2022 has been postponed.
- 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. SIO, CSIRO).