

# Argo Profiling CTD Floats



## Argo Floats

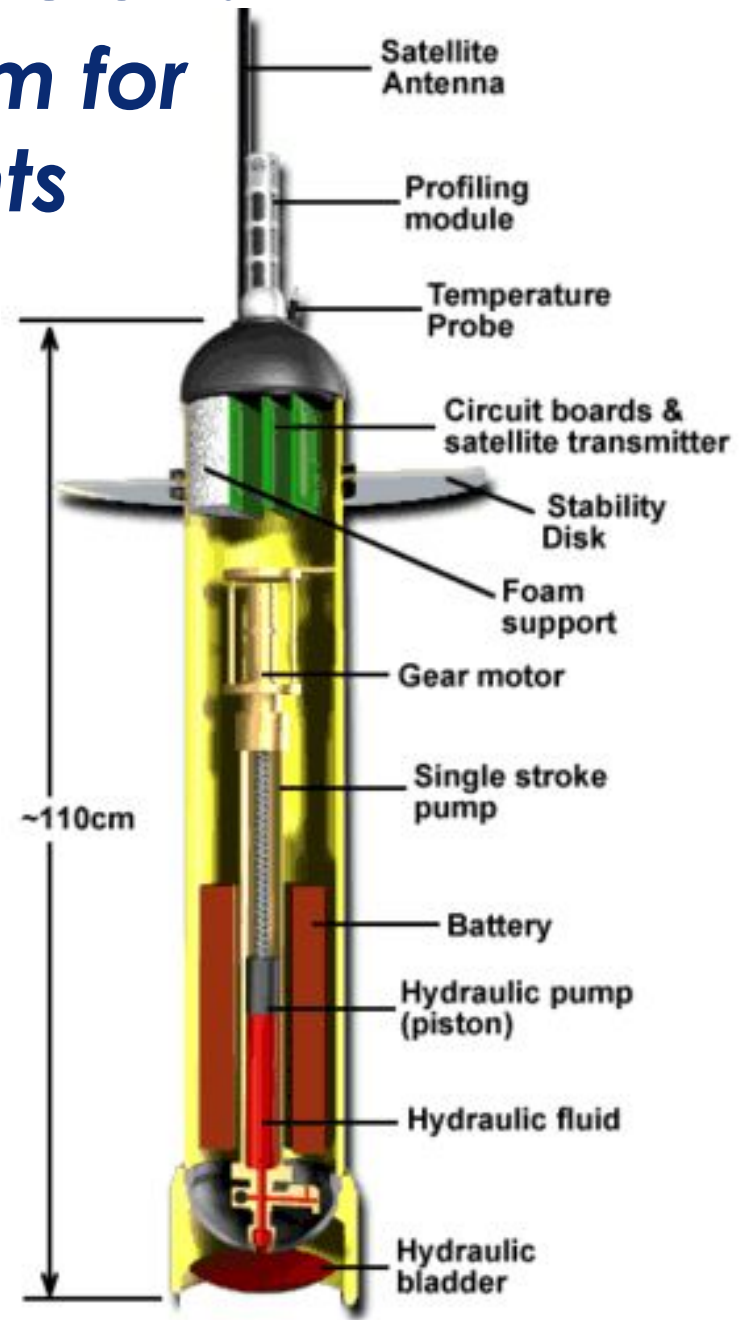
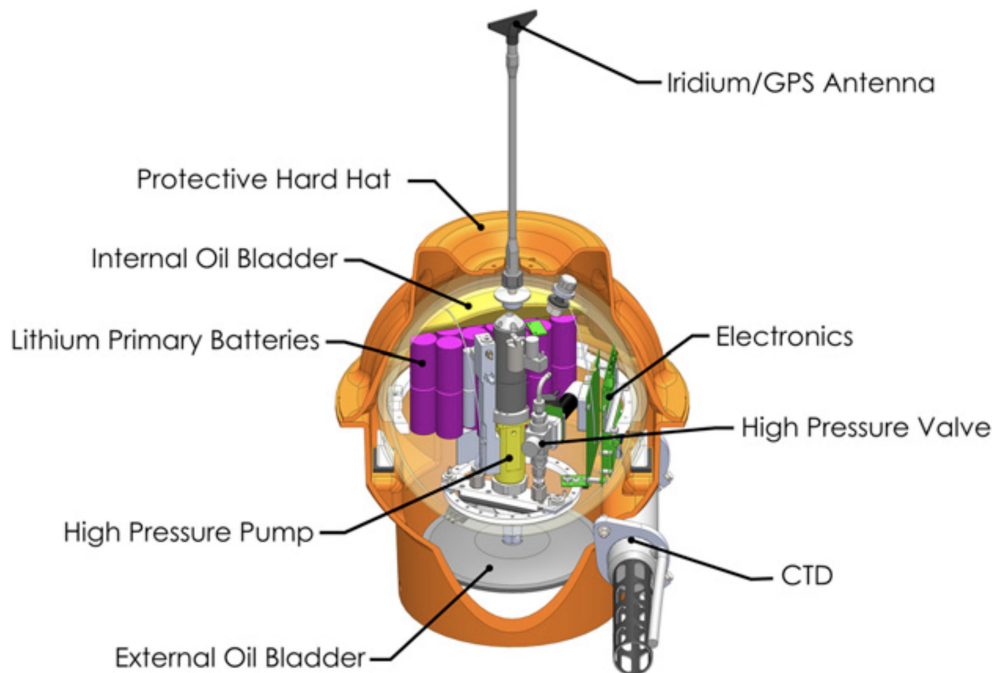
Elizabeth Steffen



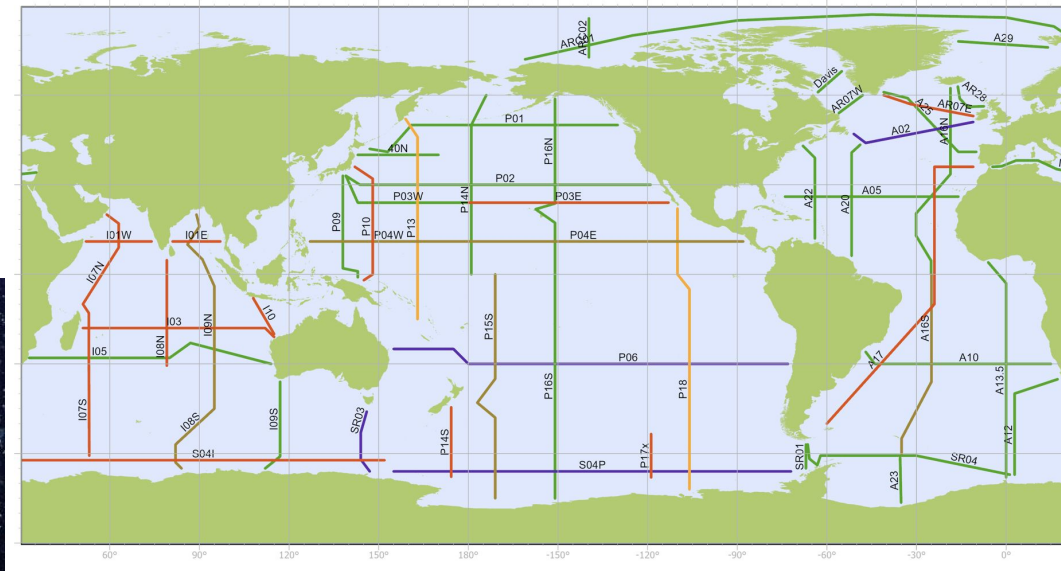
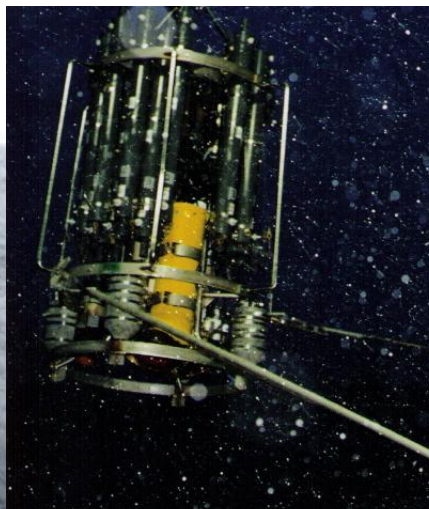
# What's a profiling float?

## An autonomous platform for taking measurements

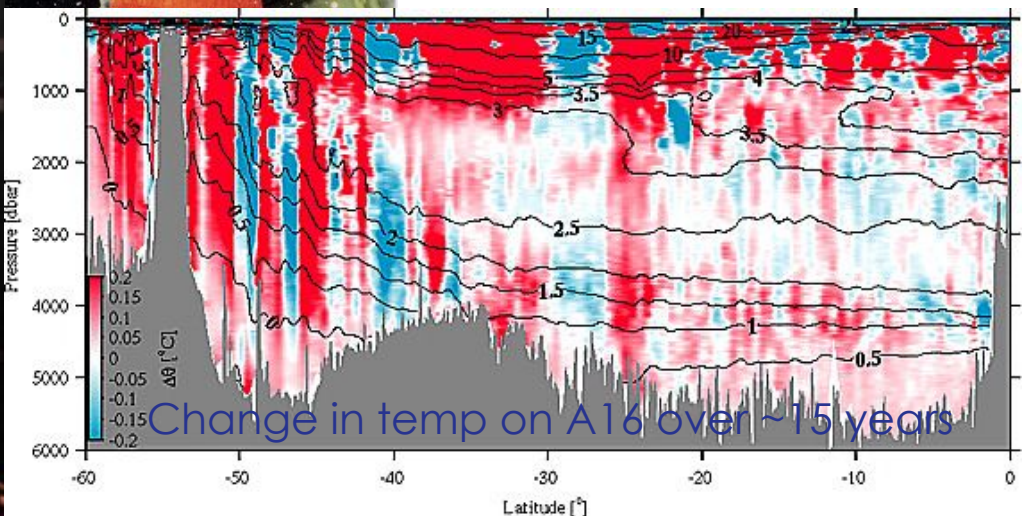
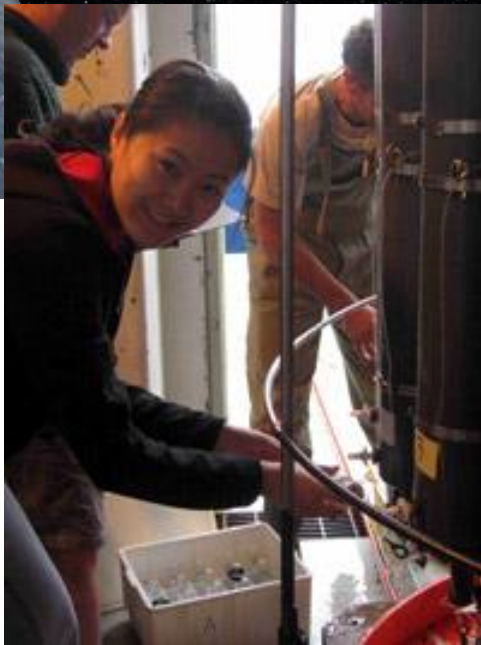
- Changes density by changing volume - "exterior" oil reservoir
- Can profile for years
- Satellite data return



# Traditional data collection- Hydrographic Survey Lines



It takes about 2 months to cross one ocean basin, so can only repeat approximately decadal



Geophysical Research Letters, Volume: 33, Issue: 14, First published: 28 July 2006, DOI: (10.1029/2006GL026769)

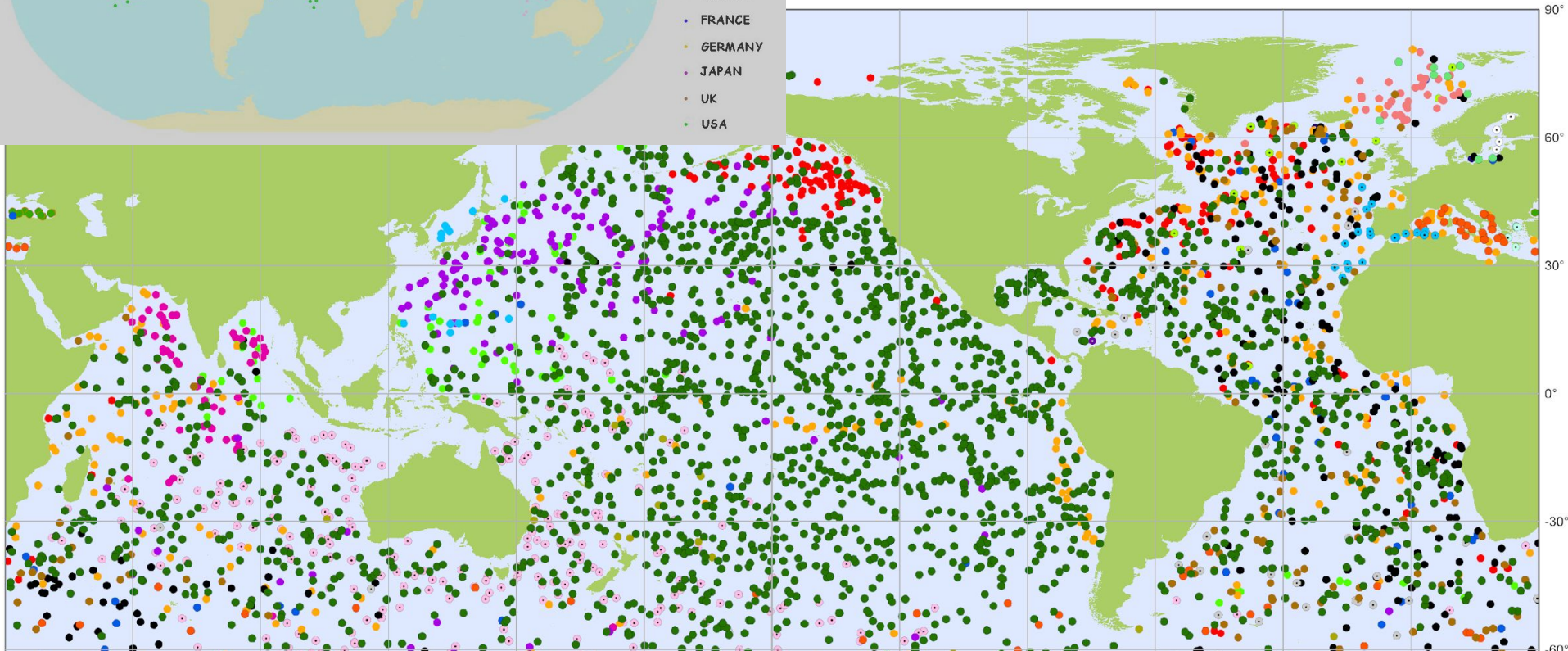
Can collect extremely high quality data including trace but things change

# What's Argo?

## An international effort



- AUSTRALIA
- CANADA
- FRANCE
- GERMANY
- JAPAN
- UK
- USA



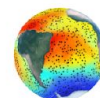
Argo

National contributions - 3866 operational floats

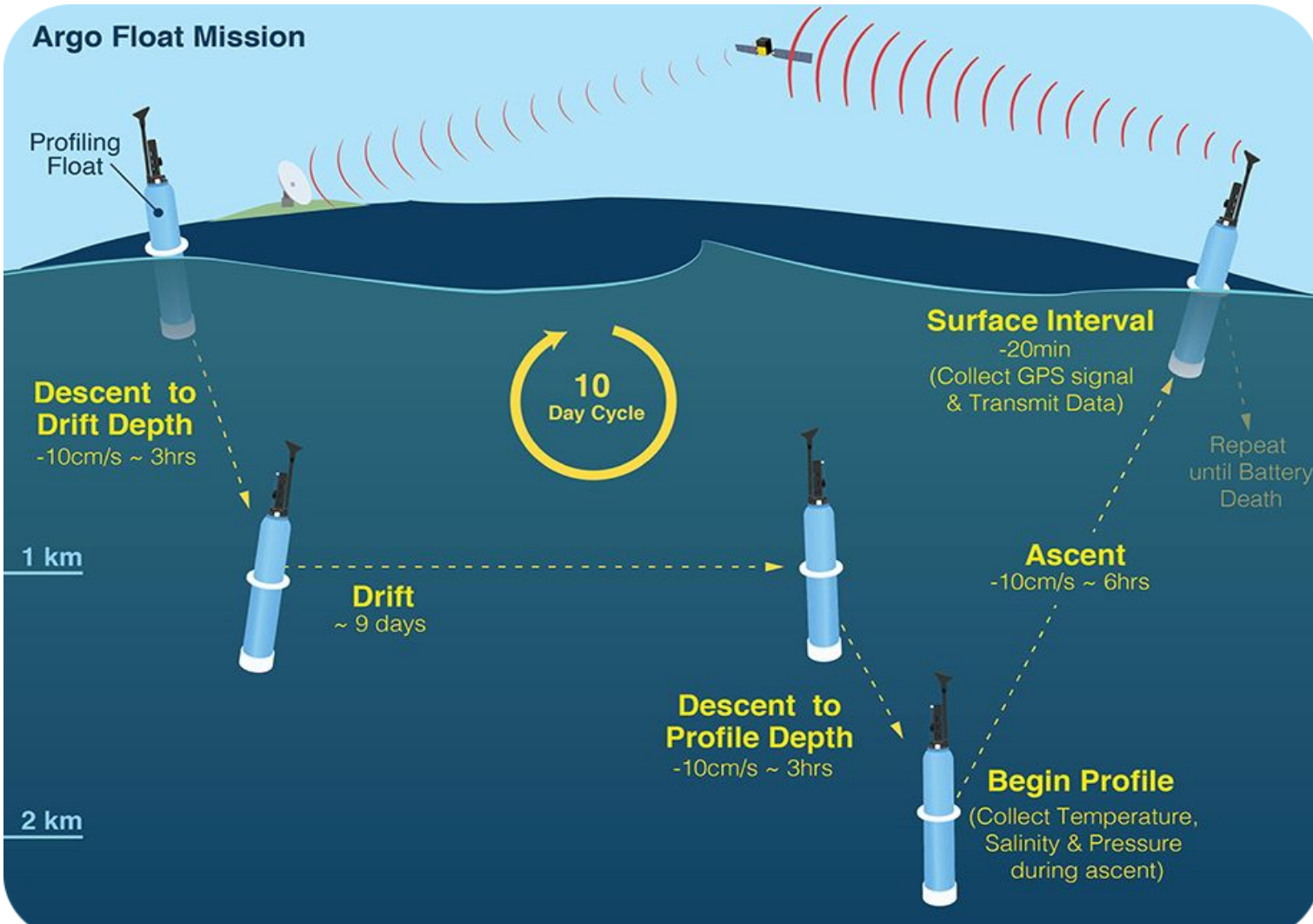
September 2024

Latest location of operational floats (data distributed within the last 30 days)

- |                   |                 |                |                           |              |
|-------------------|-----------------|----------------|---------------------------|--------------|
| • AUSTRALIA (292) | • DENMARK (2)   | • GREECE (6)   | • NETHERLANDS (32)        | • SPAIN (20) |
| • BULGARIA (12)   | • EUROPE (56)   | • INDIA (59)   | • NEW ZEALAND (16)        | • UK (128)   |
| • CANADA (200)    | • FINLAND (5)   | • IRELAND (14) | • NORWAY (40)             | • USA (2171) |
| • CHINA (70)      | • FRANCE (291)  | • ITALY (86)   | • POLAND (11)             |              |
| • COLOMBIA (1)    | • GERMANY (242) | • JAPAN (165)  | • KOREA, REPUBLIC OF (14) |              |



## Argo Float Mission



### Enhanced, One Argo mission:

- Profile every 10 days to profile depth (2km), for some floats this is 6km
- Floats every 3 degrees of latitude and longitude including under ice  
some enhanced sampling regions like the equator
- In addition to T and S, BGC parameters sampled from some floats.
- Float lifetime of 5-7 years targeted

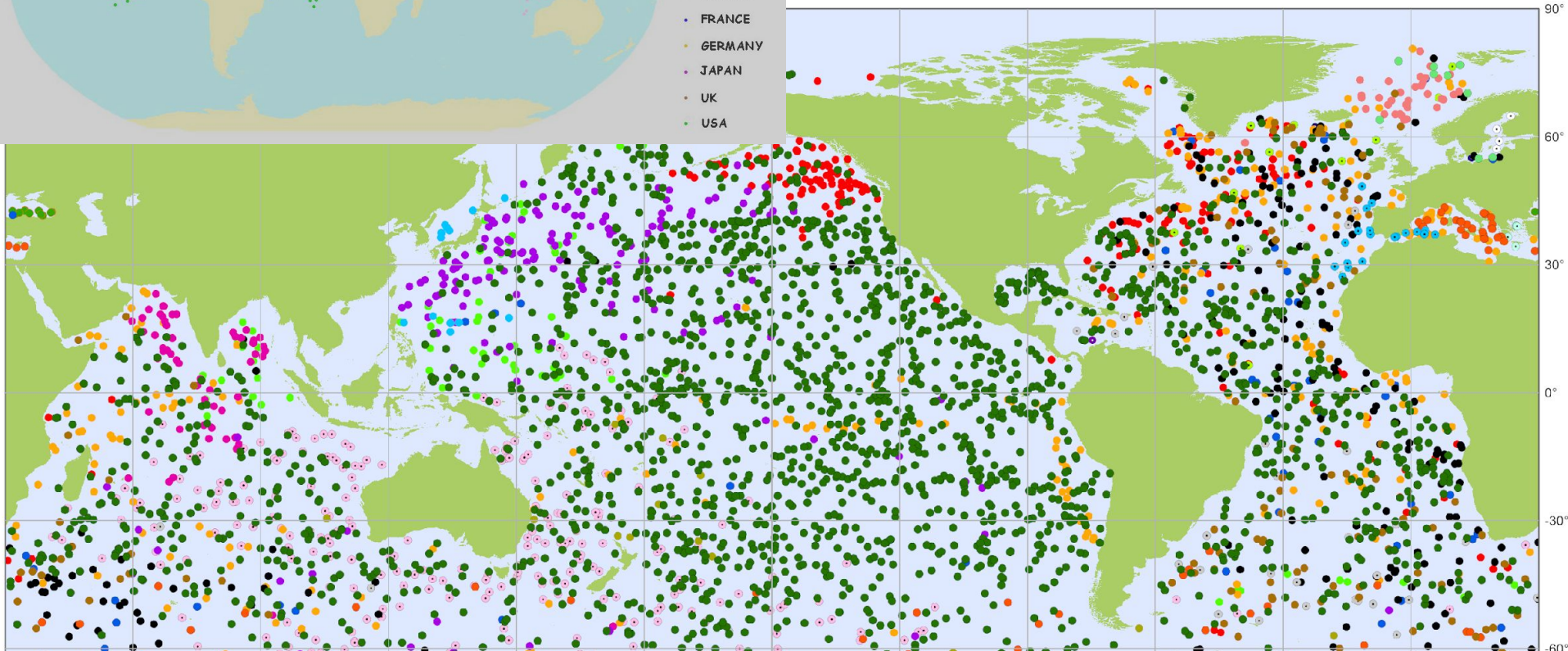
Argo Status as of June 2001  
135 Floats



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# What's Argo?

## An international effort



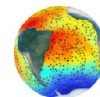
Argo

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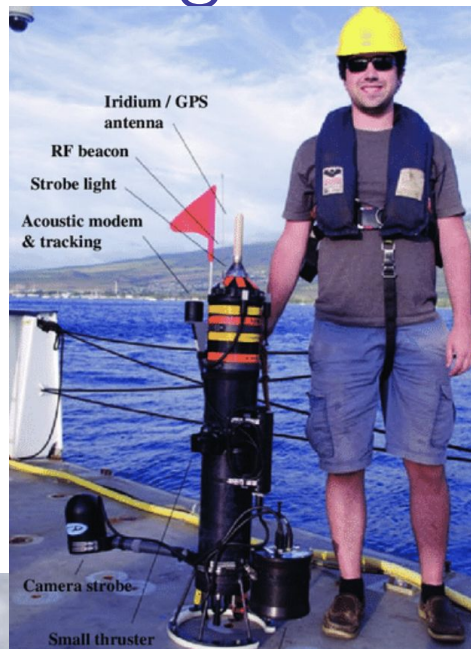
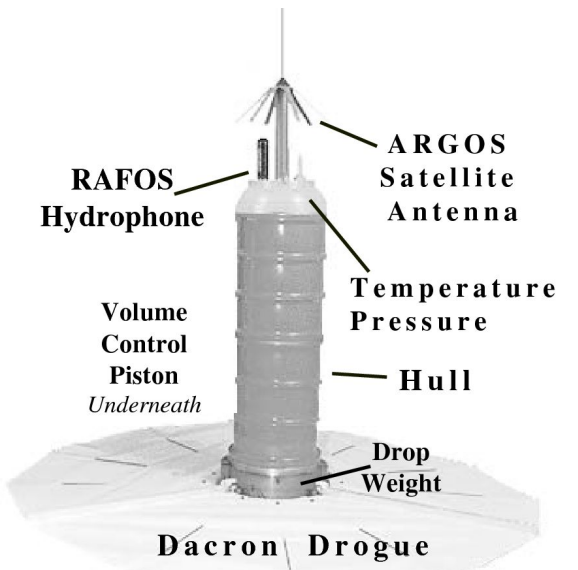


# Argo floats aren't all the same



If you've seen one Argo float, you definitely haven't seen them all

# Not all floats are Argo floats



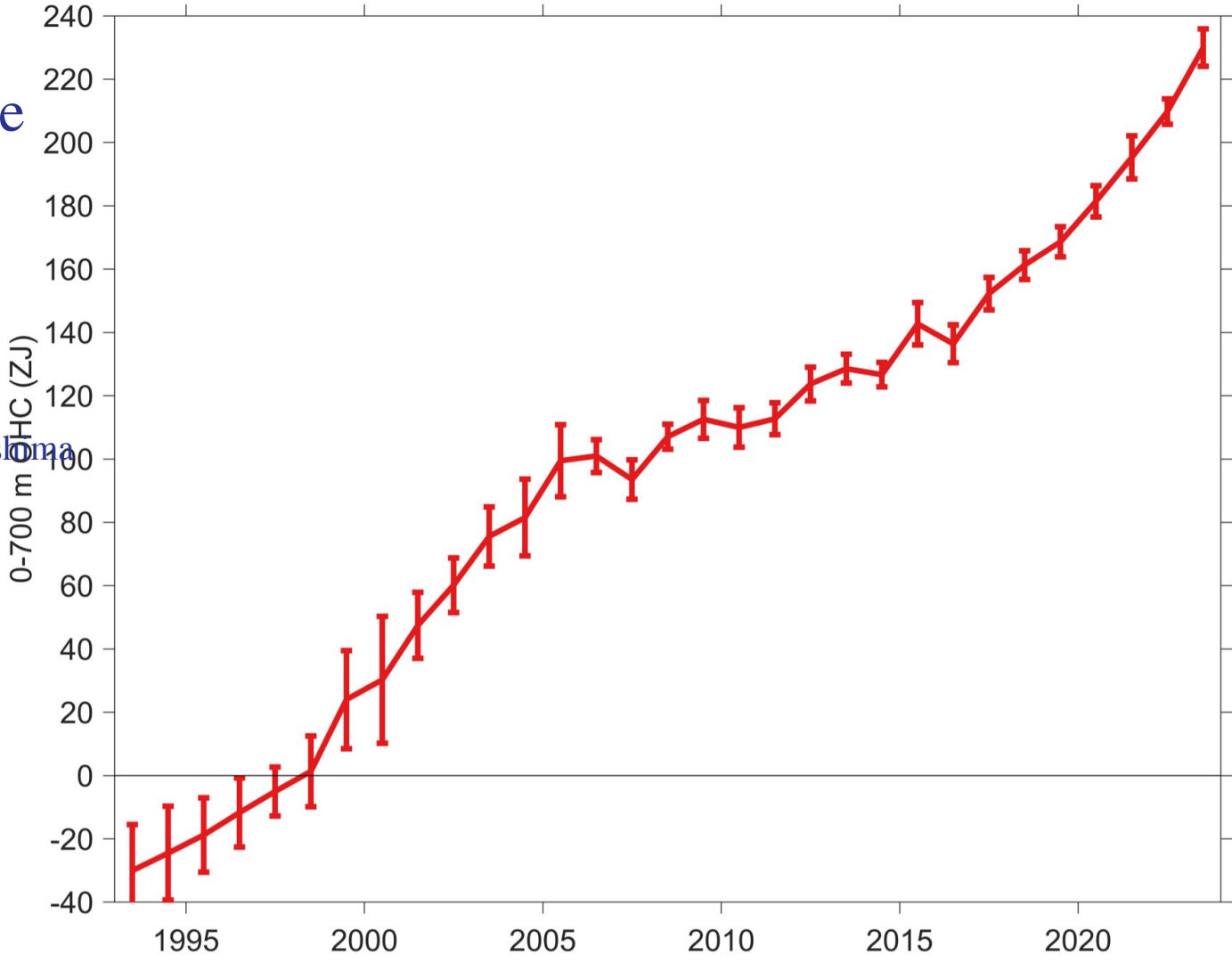


# Deployments— get float into the water as gently as possible



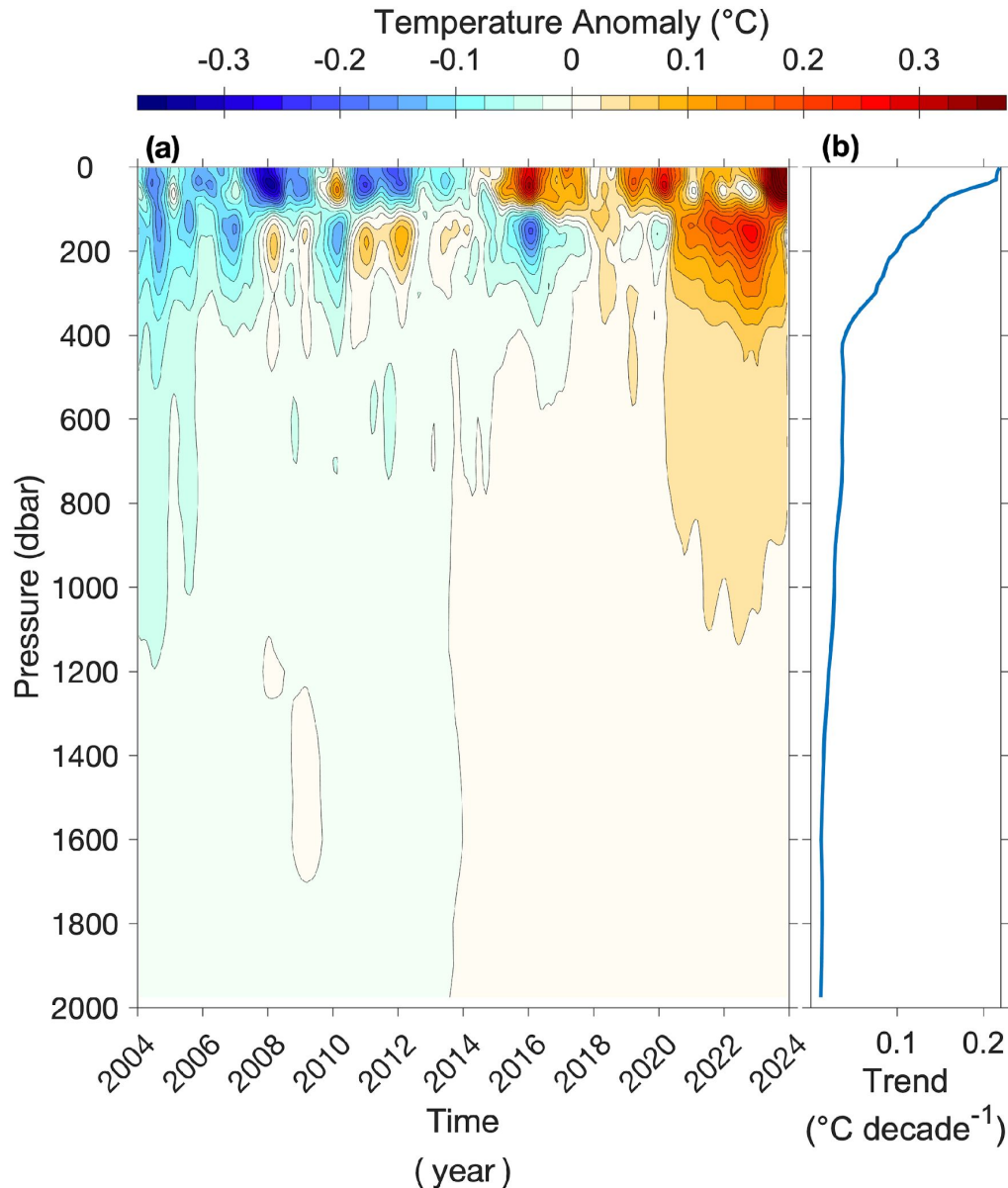
# Global Oceanic Heat Content increase

- error bars decreasing due to Argo
- ZJ is  $10^{21}$  Joules
- trend  $\sim 0.5\text{W/m}^2$
- 1 ZJ  $\approx$  55 million Hiroshima bombs



courtesy John Lyman, State of the Climate Report 2024

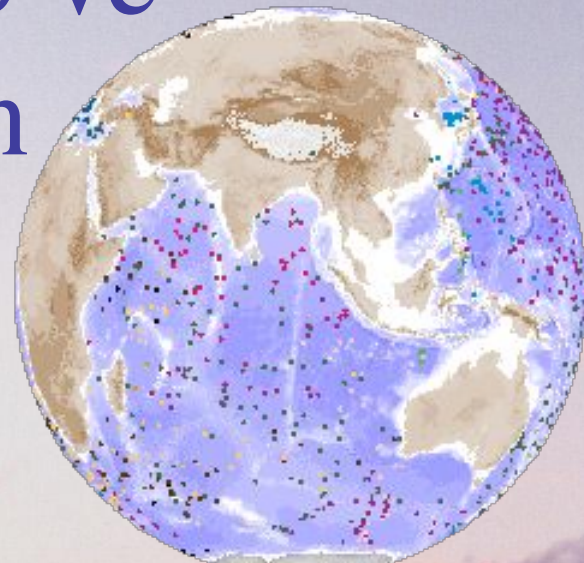
# Global Oceanic Heat Content increase



- With Argo we can resolve the vertical structure of the warming
- This was not possible to resolve prior to Argo's implementation

from Johnson et al in the State of the Climate Report 2023

A huge thank you to all who've  
helped build and maintain  
the Argo Array!



*Argo Globe,  
Courtesy H. Freeland, IOS Canada*

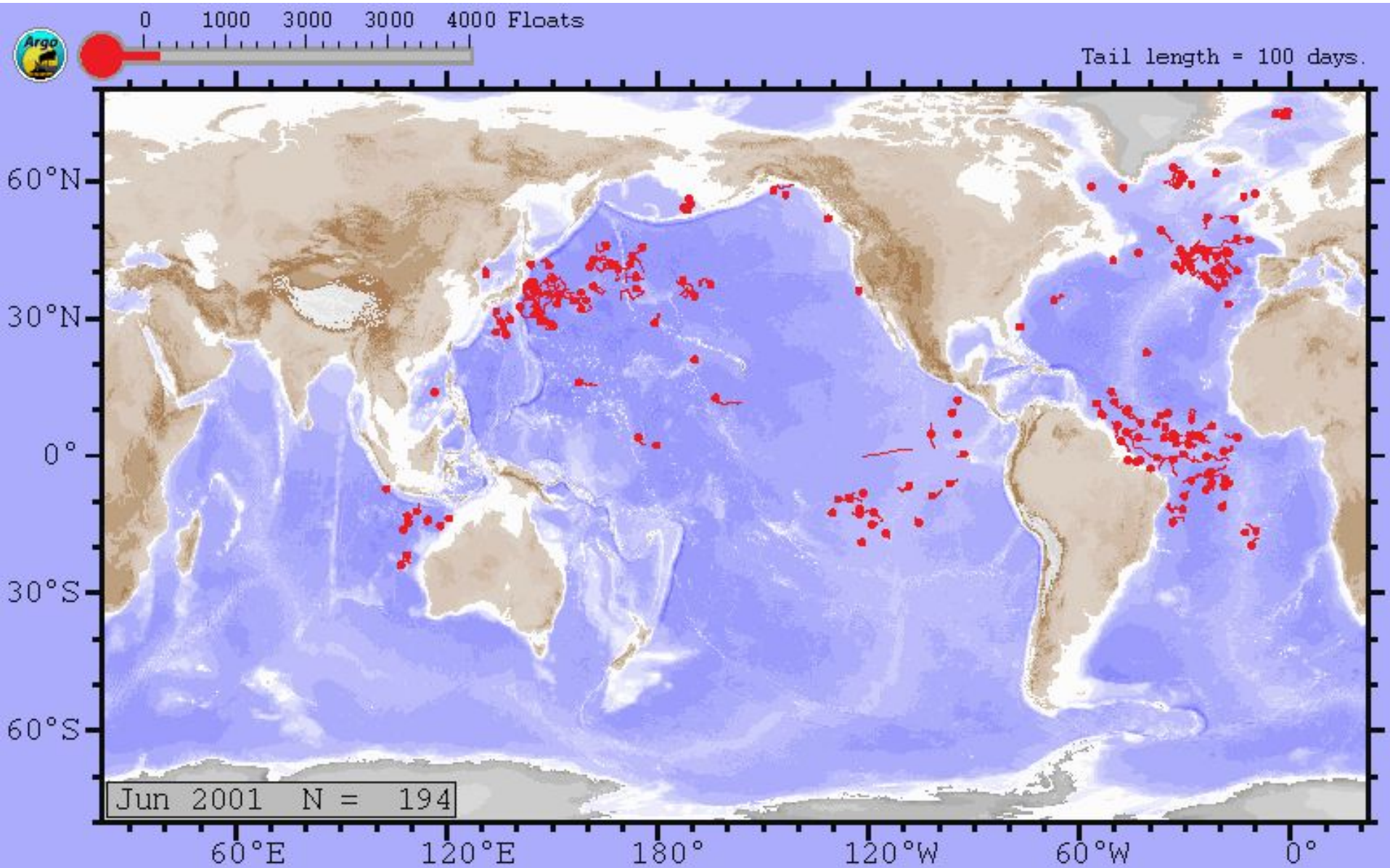
Photos pulled from publicly available web pages, mostly from the Argo community

Ocean ops-- <https://www.ocean-ops.org>


Argo program-- <https://argo.ucsd.edu>

WHOI Argo-- <https://www2.whoi.edu/site/argo>

UW Argo-- [https://www.ocean.washington.edu/story/Argo\\_Float\\_Lab](https://www.ocean.washington.edu/story/Argo_Float_Lab)



*Courtesy H. Freeland, IOS Canada*



# Argo Floats

understanding our oceans



An aerial photograph of the ocean surface, showing a complex pattern of waves and white foam. The water is a deep blue color, and the foam is white. The waves are moving in various directions, creating a textured appearance. The text is overlaid in the top right corner.

**Thank you for helping to  
build The Global Ocean  
Observing System.**