Argo float technology

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UK-IMON International Workshop on New Monitoring Technologies

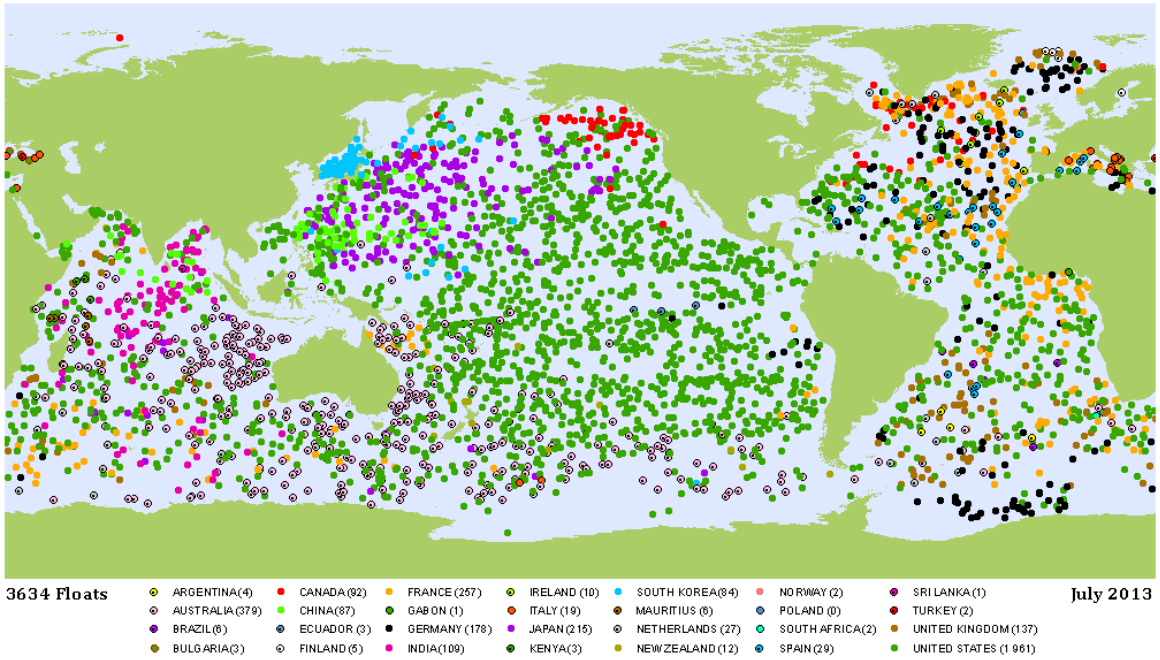
Tuesday 10 - Thursday 12 September 2013 Southampton, UK

Argo

- In the last decade Argo has revolutionized our ability to observe the global oceans - by November 2012, Argo had collected its millionth profile, twice the number obtained by research vessels during all of the 20th century

Apex, Arvor, Navis, Nova & S2A

Over 3,600 floats presently operating (~135 UK)

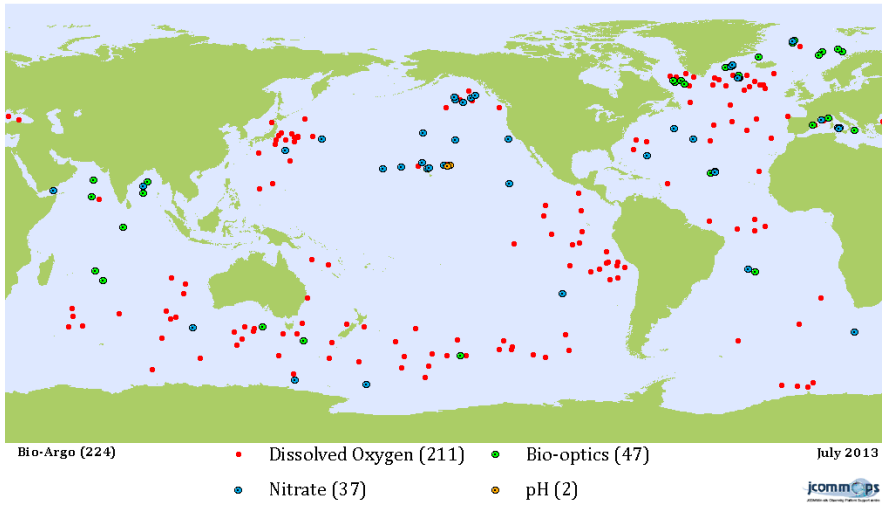


Argo floats

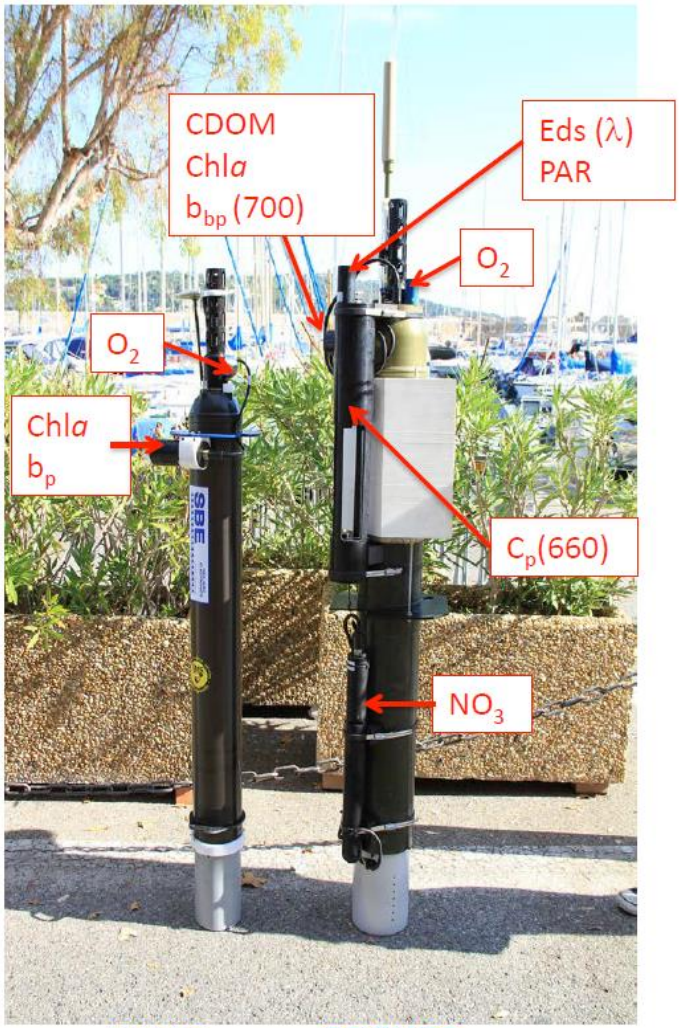
- Standard floats provide CTD to 2,000m depth
  - ~100 vertical levels with Argos, ~1000 levels with Iridium
  - lifetime ~150 profiles (or as many as 300 profiles with lithium batteries)
  - cost ~ £10k to £12k each
- New float designs capable of going down to 6,500m
  - Apex deep: in February 27, 2013 set a record diving to a depth in excess of 6,000 meters in the Puerto Rico trench
  - goal of at least 150 profiles using lithium batteries

Bio-Argo

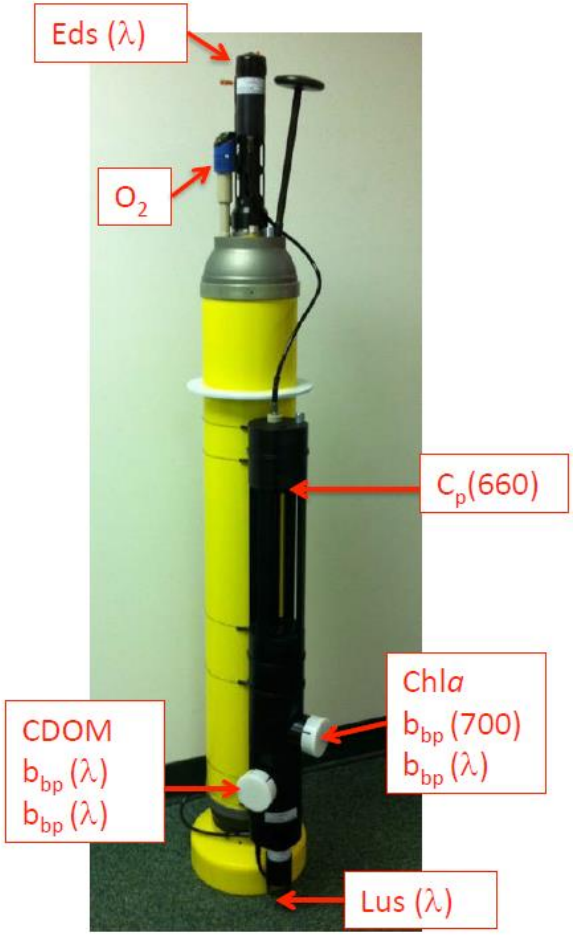
- Brings together advances in miniature, low power biogeochemical sensors and autonomous float platforms for observing the “biological” ocean
- In recent years, new generations of profiling floats have been developed and deployed with sensors for:
  - dissolved oxygen, chlorophyll fluoresence, nitrate and particulate backscattering; these are ready to transition to wider use
  - pH, radiometry (PAR, downwelling irradiance), transmissometry and CDOM are on their way



Bio-geochemical floats



NAVIS PROVOR



APEX

Argo extensions

- Abyssal oceans (deep Argo)
- Bio-geochemical measurements (Bio-Argo)

- Marginal seas (use Iridium to minimize time at surface)
- Shallow seas (modified Apex used in the Baltic)
- Operation in high latitudes (ice-avoidance, store profiles while under ice)
- High resolution temperature profiles through the surface layer

- Iridium downlink allows the mission profile to be modified while the float is at sea (vertical sampling, cycle time)

Summary

- Argo has revolutionized our ability to collect CTD data from the open oceans – it is the only technology able to provide global coverage
- Over the next 10 years it is likely to revolutionize our ability to collect bio-geochemical data from the oceans (focusing on regions that are hotspots for climate change)