A glider component for the GOOS

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EGO: a glider community (sci & tech)

Everyone’s Gliding Observatories
Australia, Canada, Chile, Egypt, EU, Israel, Mexico, Peru, South Africa, USA,… (academy+manufacturers)

• EGO meetings & Glider Schools since 2005; now 100-150 people

• Showcase EGO website http://www.ego-network.org (10,000 unique visitors and 100,000 pageviews per year)

• Coordination (best practise, data management, international experiments)

• OceanObs’09 White Paper Testor et al., 2010

→ need for a glider component in the GOOS, recommendations
  ✓ formation of the global glider system,
  ✓ adoption of best practice, standards and a “Argo” like data system
  ✓ setup of a network of shared resources and expertise,
  ✓ common and accessible portal for glider data.
A global glider network

Challenge: “gliderports” (infrastructures) distributed all around the world

Deployment, piloting, recovery, maintenance, data management and analysis

Coordination
Support from
EGO COST Action
EU FP7 GROOM
National projects

A decade of glider data (2004/09 – now) on the GTS 226243 profiles, 113 platforms
> 200 scientific articles

→ process studies & sustained observing programs (often in conjunction with other platforms)
International framework for sustained glider observations

→ Discussions at JCOMM Obs. Coordination Group meetings (OCG-5 & 6)
→ Formation of international (EGO) Glider Steering Team (GST) and Data Management Team (GDMT). To be approved by JCOMM at next MC.

• ToRs
• Membership and governance
• Monitoring of the network
• Scientific international program
  ➢ Provide unaliased physical and biogeochemical time series in key areas (water formation areas, upwellings, boundary currents, straits, shelves, biogeochemical provinces) and information about the processes
  ➢ Study the links between the regional and global systems, and interconnections

**GST**
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Evolution of the GOOS

- Essential Ocean Variables: physical, biogeochemical
- Extension to regional seas and coastal ocean

The present GOOS can be considered to have a resolution of 300km and 10 days (Altimetry/Argo; climate-oriented)

Regional/coastal zones
➔ more societal applications (green, blue growth, …)
Physical and biogeochemical variability at regional scale

Satellite image sea color - surface Chl-a

Need for better characterization of the vertical structure of the ocean (satellites only describe the surface)

- for physical and biogeochemical variables
- and at (sub)mesoscale to avoid erroneous conclusions on regional and coastal areas due to aliasing effects

in situ observations: generally too coarse (time or space) or with poor coverage (duration)

→ gliders cover a wide range of scales and provide a cost-effective solution to fill this gap
Fine description of an upwelling system

100km ~ 5 days

depth-average currents

2008, PE-FR collaboration (IMARPE, CNRS/IRD)
Premise of a long term obs program

Pietri et al (2013)
Sustained observations at the regional scale

→ Synoptic description of provinces
→ Variability indices
The preponderant role of Submesoscale Coherent Vortices

- Numerous SCVs in glider data (good resolution, link space-time-intensity)
- Revisited historical data. Isolated profiles (ships, floats) have been carried out in SCVs...
- Formation process and impacts

→ Major impact on intermediate and deep circulations!
The preponderant role of Submesoscale Coherent Vortices

Glider-enabled science, resolving power
Adaptive sampling and asynchronous fleet coordination

3D view, salinity along the gliders (scouts) trajectories
« Picture » of the Warm Core Cyprus Eddy and its dynamics
Context for biological measurements (Tara-Océans - genomics)
Conclusions

Gliders can

• be operated in strong conditions (weather, currents, ice) and maintained in regions of interest
• make high resolution physical and biogeochemical measurements over long periods of time/distances
• make us enter a new era in oceanography (like “scalpels” or “Galileo’s telescopes”)

→ Gliders are great tools for long term observations and process studies of physical and biogeochemical variability/coupling at large, meso, and submesoscale, able to fill gaps left by the other observing components

→ The glider community is well organized but needs high-level support for
  • carrying out sustained observations
  • further developing observational capacities (>100 gliders on a process study!!)
  • enabling more societal applications (directly from glider data and/or through ocean analyses/forecasts with data assimilation)
Thank you for your attention

Спасибо за внимание

Muchas gracias por su atención

Danke für Ihre Aufmerksamkeit

Merci de votre attention