Sustained Glider Lines in Cyprus

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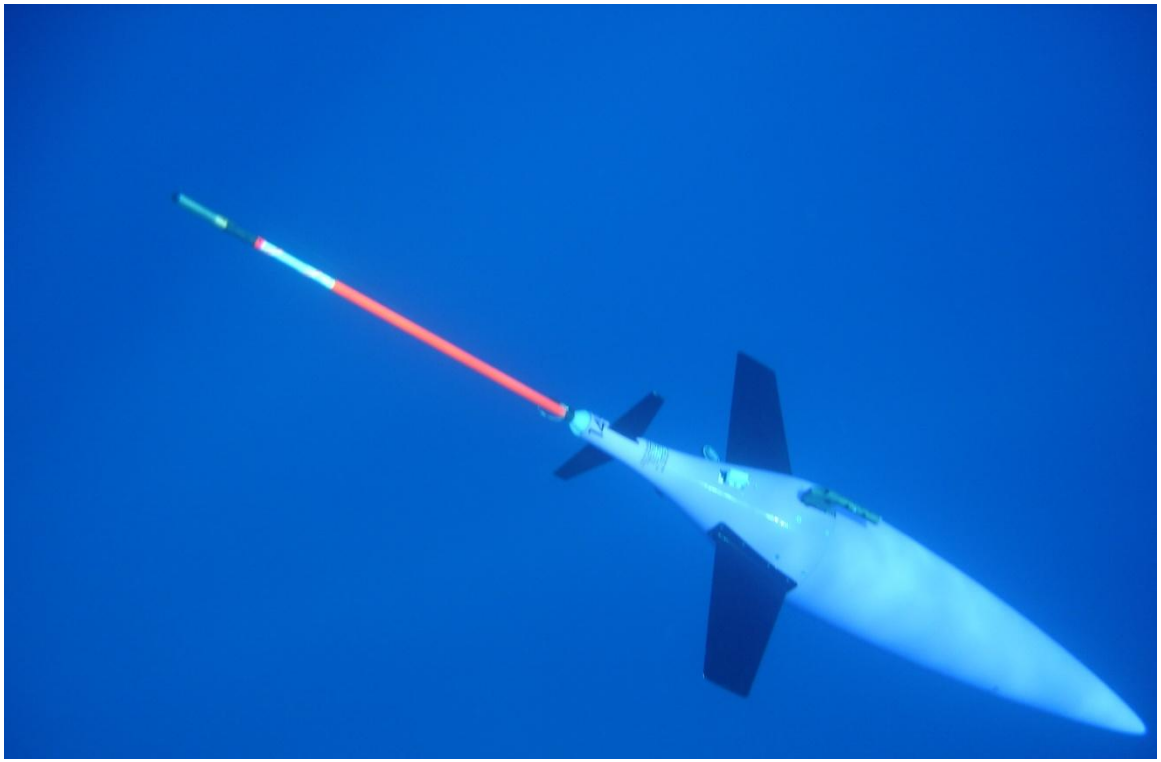


Outline

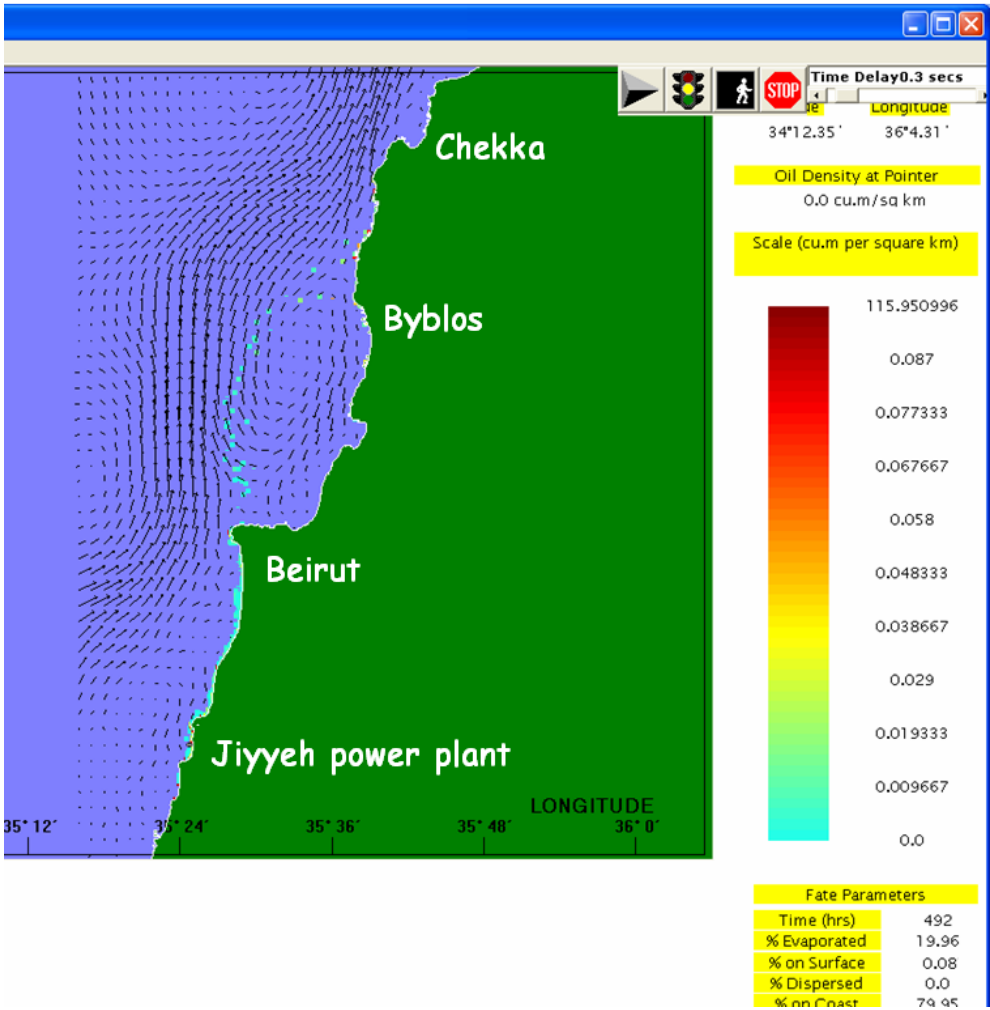
- Gliders and Oceanography in Cyprus
- Project plans and status
- Future Plans

Motivation

- Operational Oceanography: NRT observations and forecasting
- Applied: improved forecasting and monitoring means a cleaner, safer sea (pollution and trajectory modeling, data for regulatory agencies)
- Basic: circulation, mesoscale variability, biogeochemical processes
- The best way forward considering capability and cost is gliders: infrastructure grant from national funding body

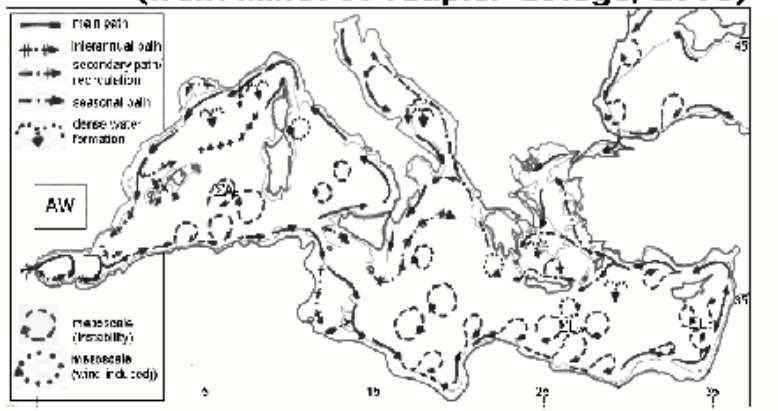
Operational Use / Near Real Time

- Support operational forecasts:
  - Data assimilation
  - Drive drift models, oil spill fate models
  - Support search and rescue operations, coastal management
- Environmental monitoring: Inform authorities, business, and public



Why do we want glider data? Basic Research

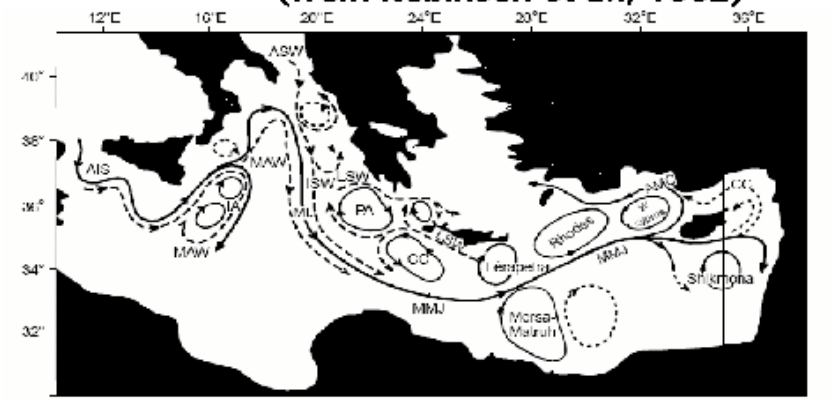
(from Millot *et* Taupier-Letage, 2005)



- High resolution data are hard to find.
- Costs of traditional methods large.
- Maps with arrows are still debated.
- General circulation and TS structure.
- Mesoscale structure and variability.
- Long-term monitoring.

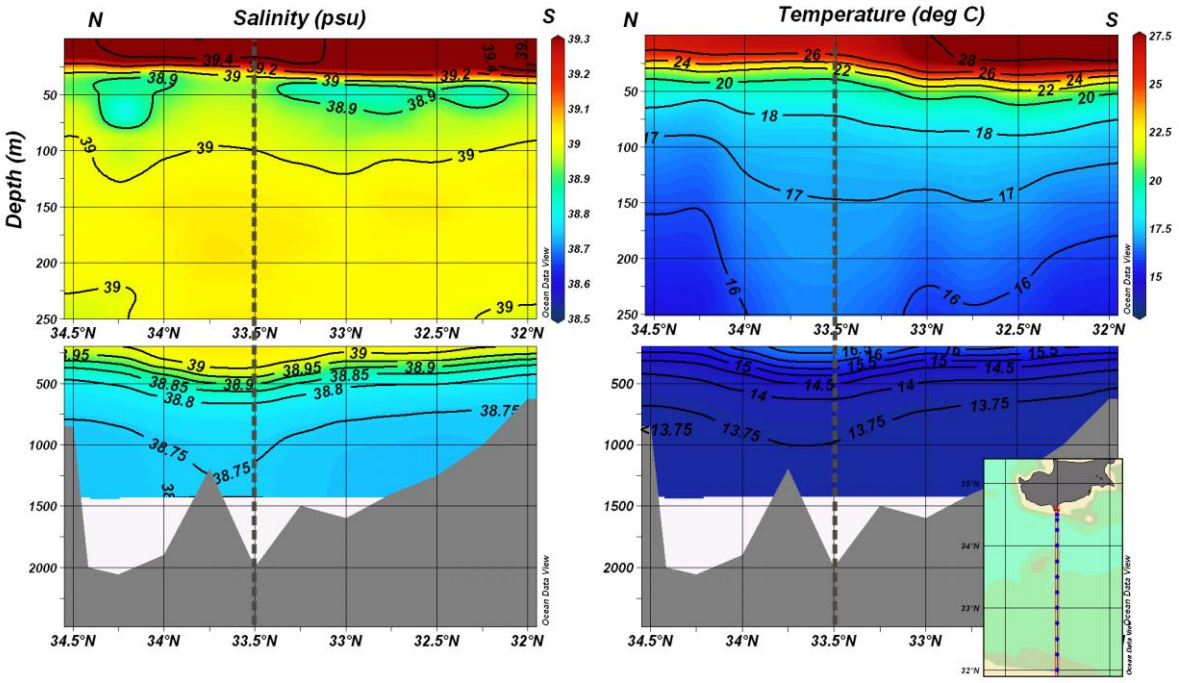
(from Pinardi *et al.*, 2004)

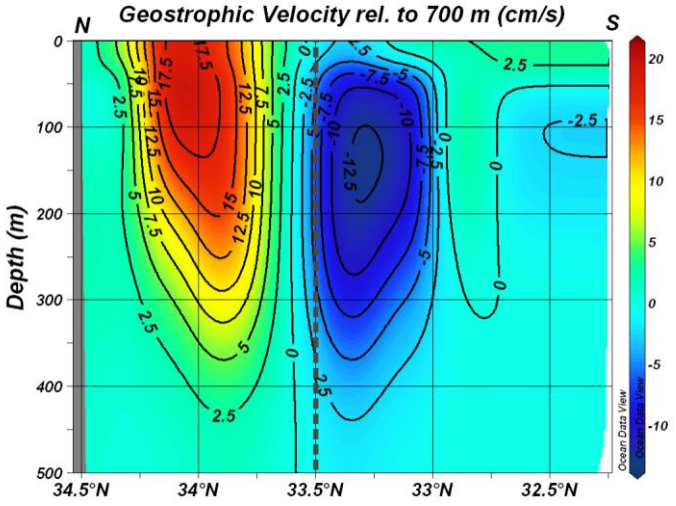
(from Robinson *et al.*, 1992)

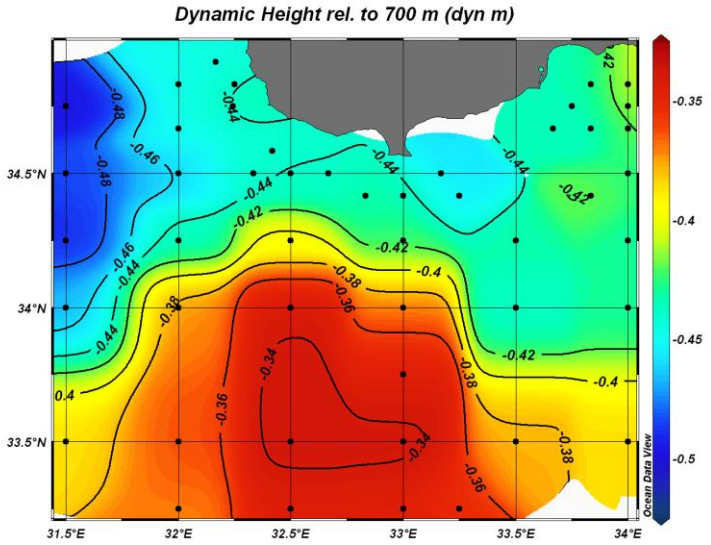


Hydrographic cruises

- CYBO-19, Sep. 2005
- 4 Water masses
- Atlantic water debated
- What is persistence or recurrence of features?
- Small-scale features?
- Coastal phenomena?

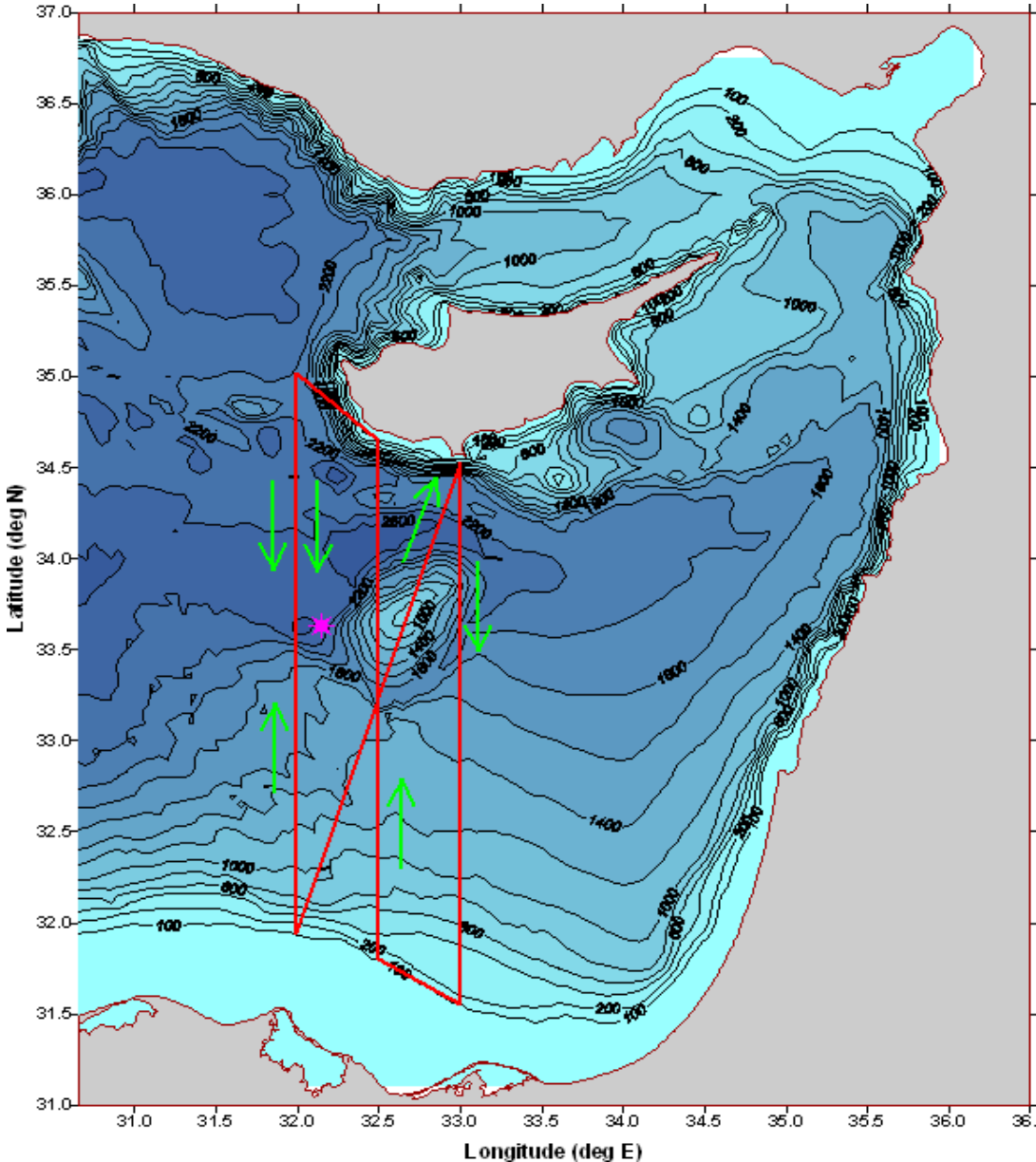






What was planned in 2006?

- 2 gliders
- 4 years of 3-month missions, 2000 km, 1000 m depth cycle every 5 km.
- Budget: 440kEuro
- Gliders--240kEuro
- Refurbishment--41kEuro
- Transponder--13kEuro
- Iridium--25kEuro
- Person-months--55kEuro
- Other/travel/PC--16kEuro
- overhead--50kEuro

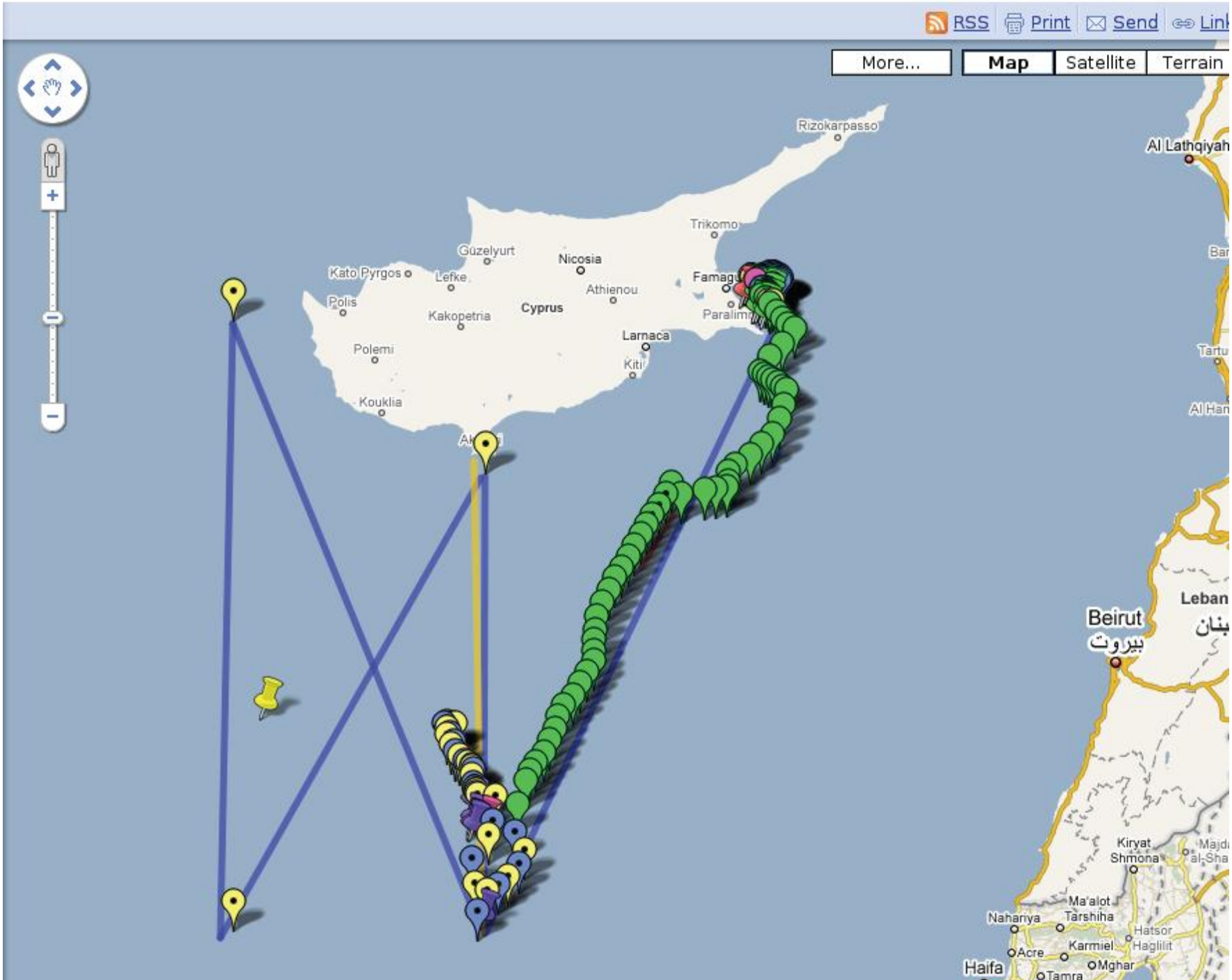


What was planned?

Month:	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
WP1: Sea Operations: training and testing	●	●														
routine transects			**A**	**A**	**B**	**A**	**A**	**B**	**A**	**A**	**B**	**A**	**A**	**B**	**A**	**A**
intensive observation						**B**			**B**			**B**			**B**	
WP2: Data Stream	●	●	●	●												
WP3: Data Analysis: technical	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WP4: Data Analysis: oceanographic			●	●	●	●	●	●	●	●	●	●	●	●	●	●
WP5: Data Assimilation													●	●	●	●

What has been achieved?

Month:	0	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
WP1: Sea Operations: training and testing	**A B**	**A B**		**B**												
routine transects				**A**	**B**		**B**	**B**	**A**	**B**	**B**	**A**	**A**	**B**	**A**	**A**
intensive observation												**B**			**B**	
WP2: Data Stream	●	●	●	●												
WP3: Data Analysis: technical	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
WP4: Data Analysis: oceanographic			●	●	●	●	●	●	●	●	●	●	●	●	●	●
WP5: Data Assimilation													●	●	●	●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Cyprus Glider Fleet

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- [ ] Pheidippides (SG149)
- [x] Atalanta (SG150)

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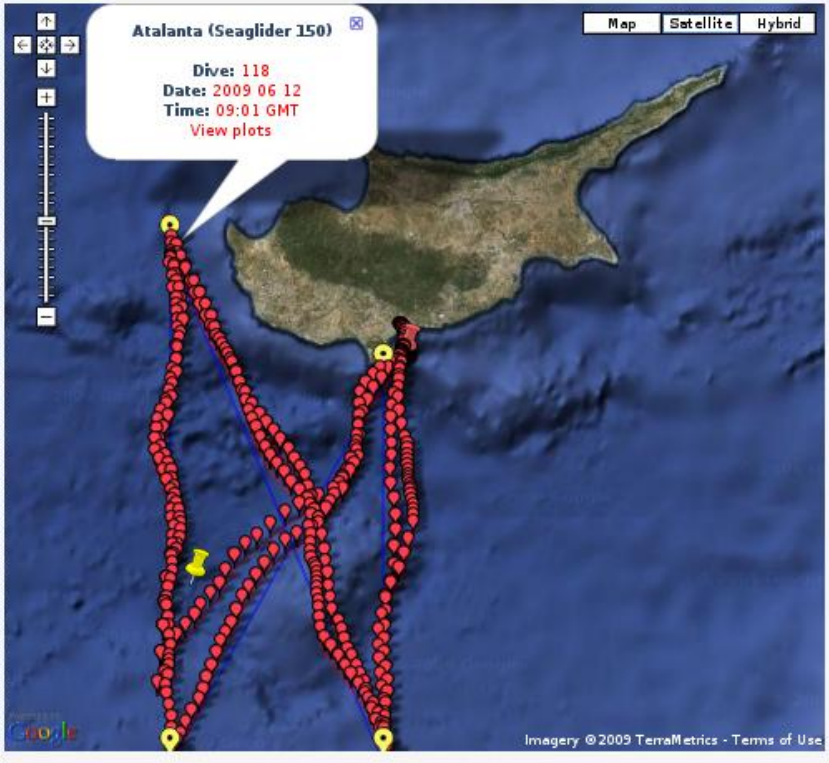
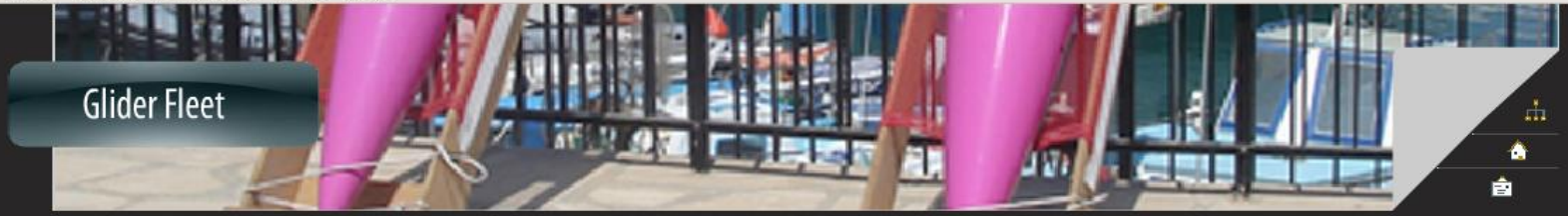
For interactive graphics for this mission, click HERE (courtesy Pierre Testor)





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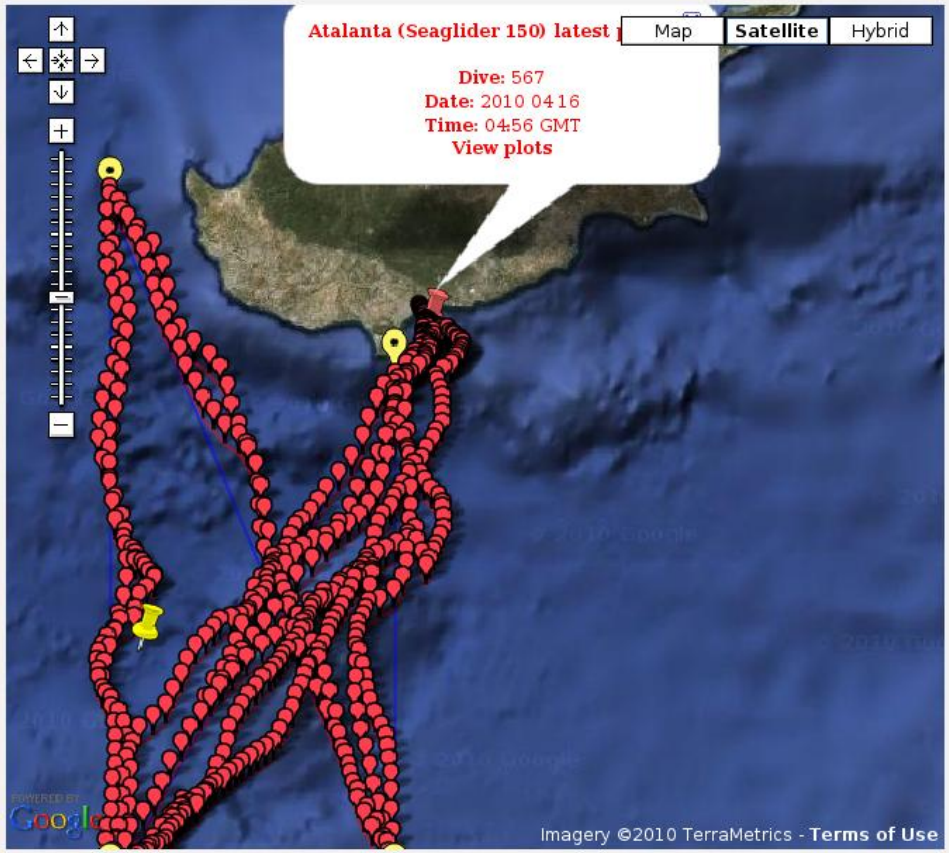
Tue May 04 2010



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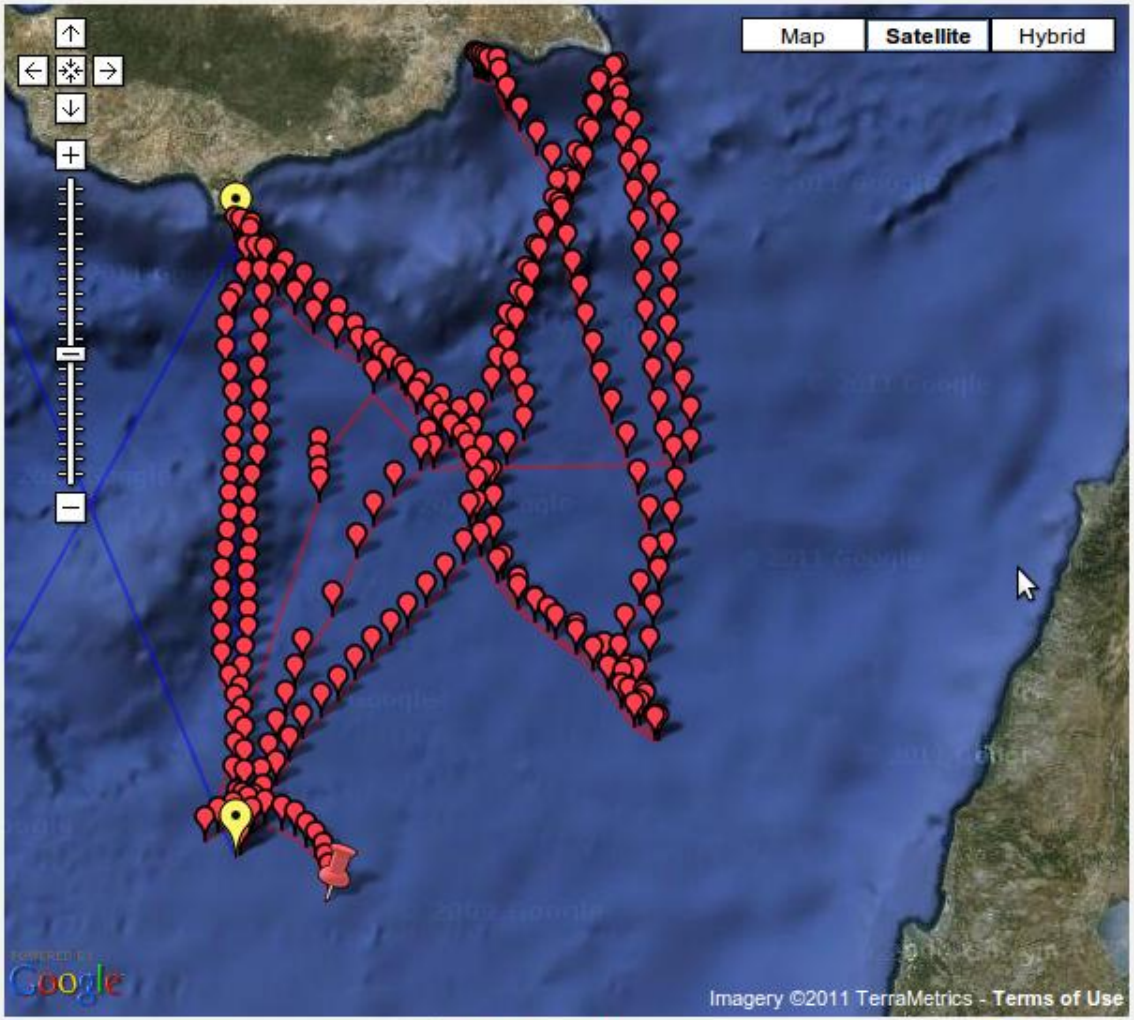
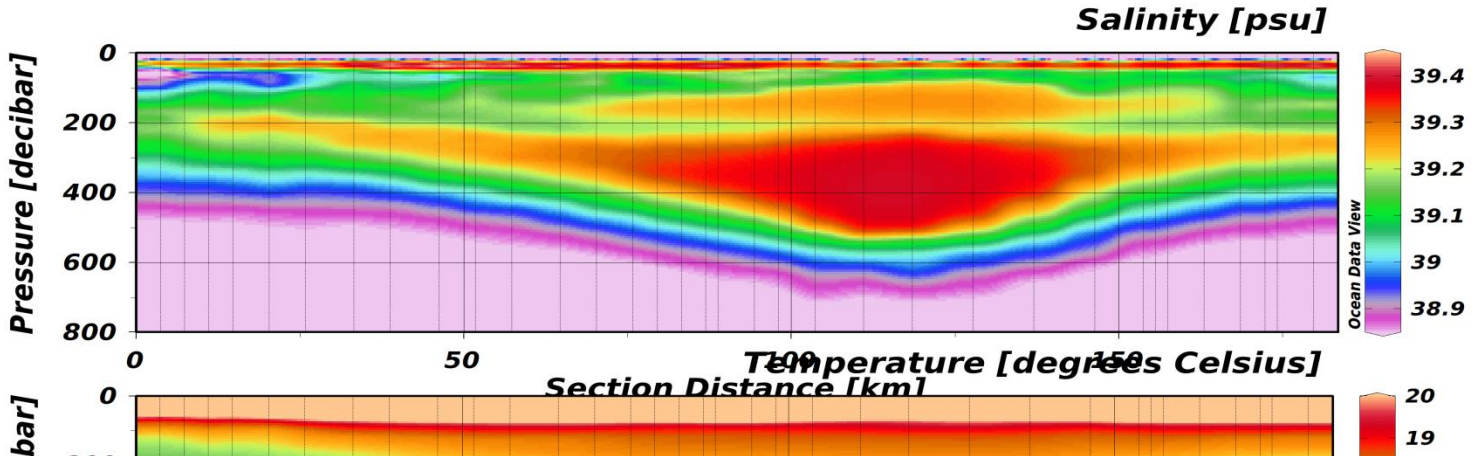
Cyprus Glider Fleet

Mon Mar 14 2011



What has been achieved?

- 2 gliders received 1 year late (could lose 1/5 funding)
- Since July 2008, glider/pilot/basestation trials and 4 missions > 1 month (1486 dives, 6000 km)
- 3 missions ended near catastrophically (helicopter recovery, Marine Police, and Israeli fisherman)
- No down time except in customs, ports, refurb. (never back in time to replace active glider)
- Within budget (if project extended)



Personnel and facilities

- PI, 1 technician, 1 part-time IT/web/programming support
- Small zodiac and crew from Department of Fisheries and Marine Research
- Search and Rescue and Marine Police
- 1 laboratory

Problems faced

- Shipping nightmares
- Glider malfunctions
- Iridium reliability poor—ARGOS for redundancy, RUDICS for reliability?

Future Plans

- Continue lines, in cooperation with hydrographic cruises whenever possible (CYBO)
- Validate oxygen, chlorophyll and suspended matter with traditional methods for our region
- Extend lines or join with lines to neighboring countries (Israel?, Egypt?) MOU or joint project
- Supplement the gliders with new types of sensors.
- Finish data assimilation implementation in Cyprus regional model.
- In-depth analysis of the Cyprus Eddy