Performing glider missions along altimeter tracks: what can we learn?

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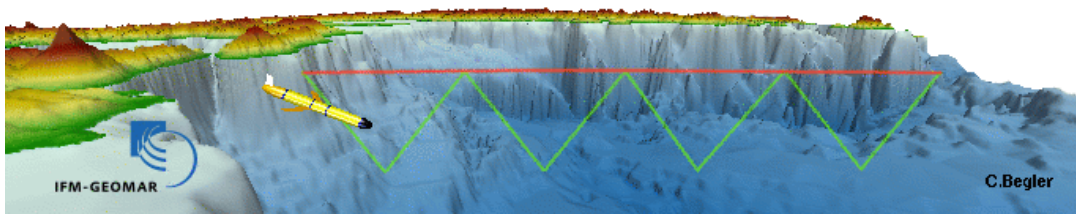
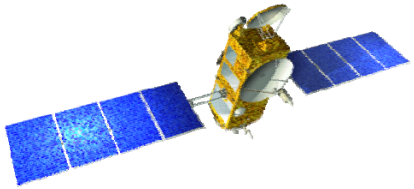
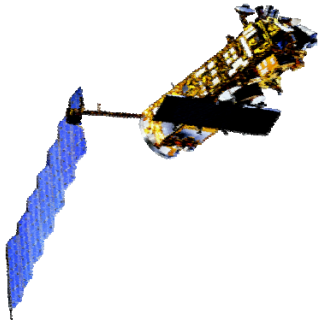
Gliders and altimetry measurements

Glider data

- **Variables:**
  P, T, S, oxig., chl., turb.
- **Vertical extension:**
  10-180 m
- **Horizontal resolution:**
  400 m
- **Dynamic height computed from P, T, S profiles.**





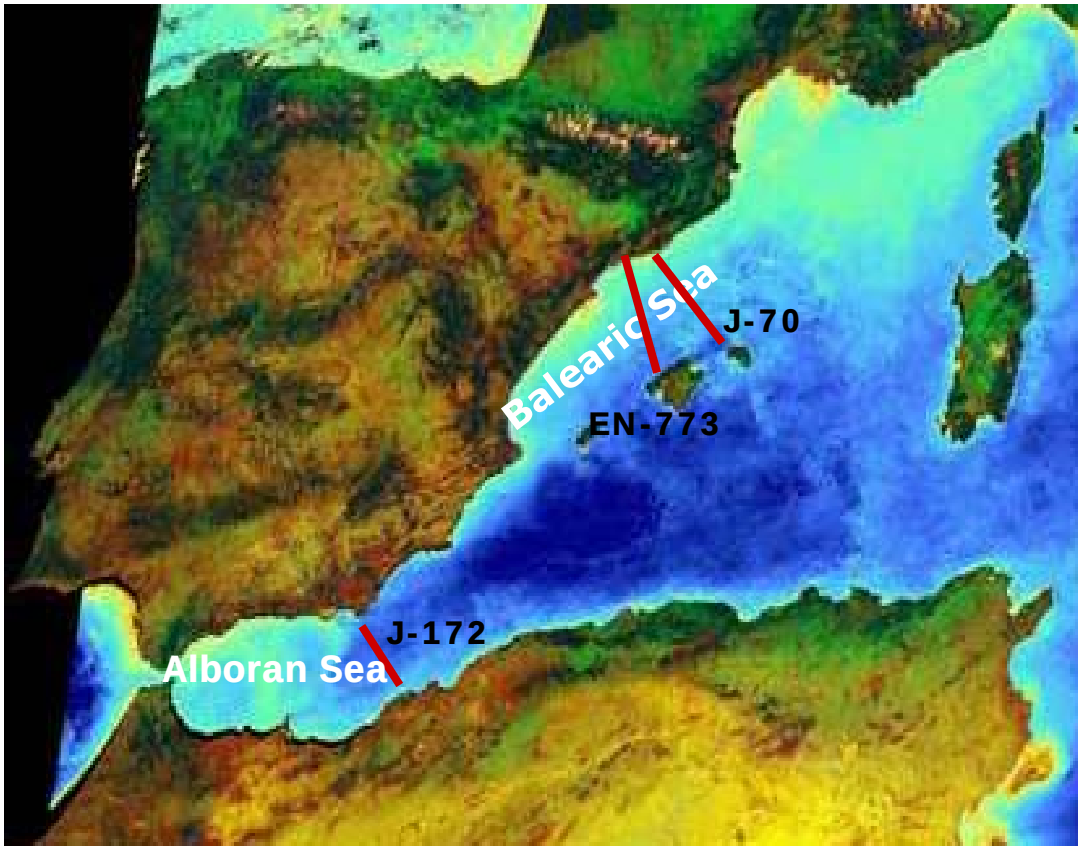


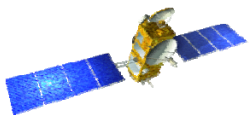
Envisat / Jason data

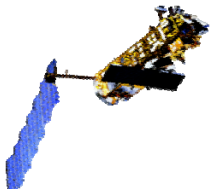
- Along track SLA (AVISO/CLS) + MDT (Rio et al JMS 2007)
- Delayed time product (calval) / real-time (duacs, interim)
- Horizontal resolution: 7 km

Samplings

8 glider missions (July07 - August08) following altimeter tracks



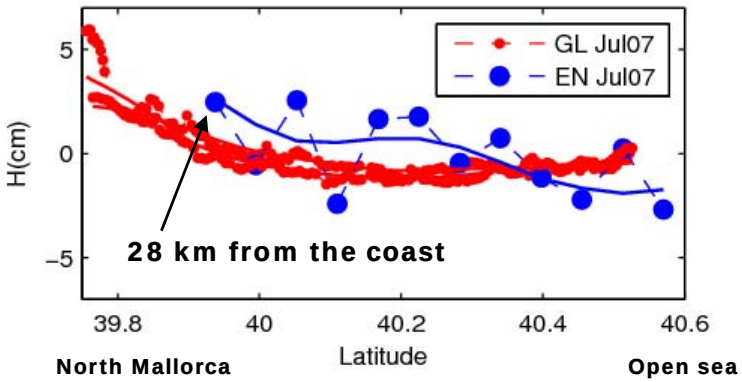


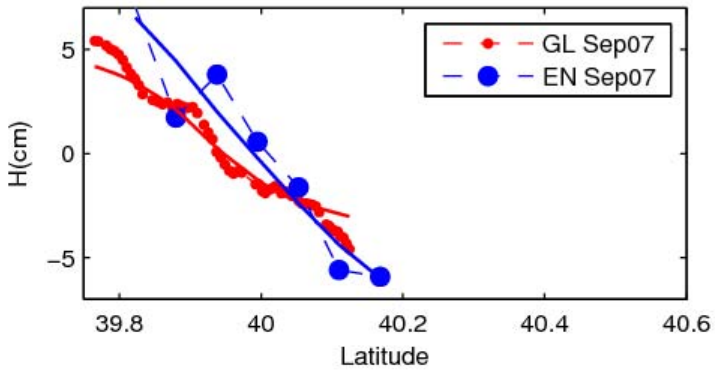


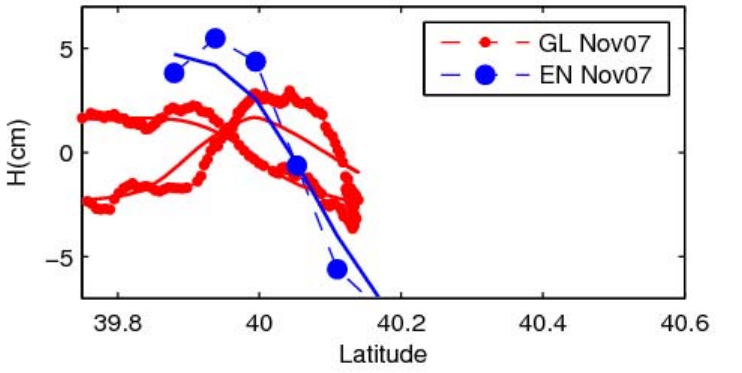
4000 full CTD casts + oxigen, chlorophyll turbidity (180 m)

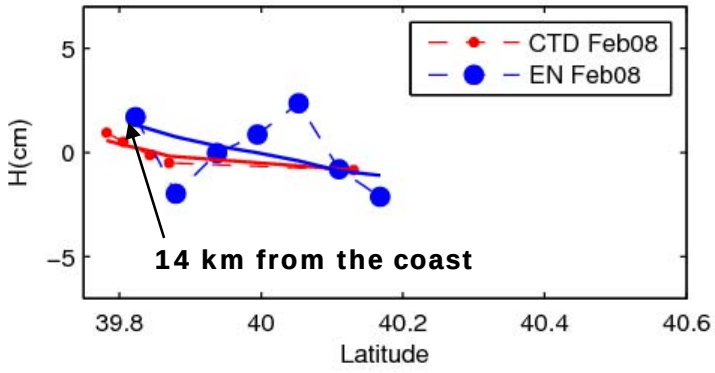
- ENVISAT:
  - **Balearic Sea**: T-773. Sustained glider observations (every 70 days): 6 missions up to now.
- JASON-1/2:
  - **Alboran Sea**: T-172 (July 2008). Cycles Jason-2: 0 & 1
  - **Balearic Sea**: T-70 (August 2008). Cycles Jason-2: 4 & 5

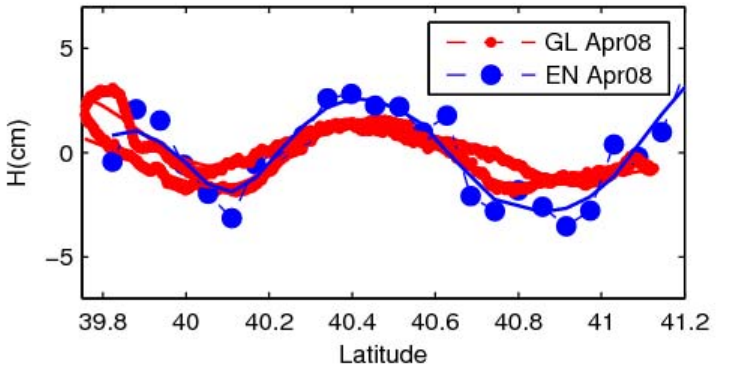
Glider DH vs ENVISAT ADT

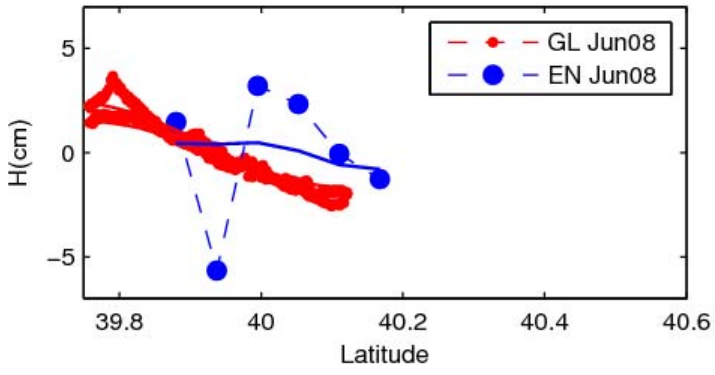








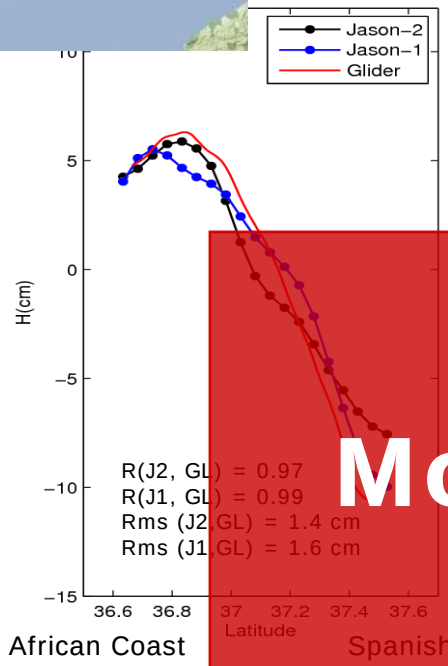


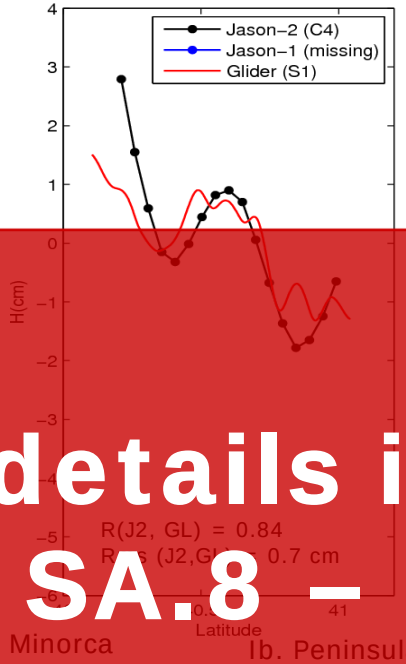


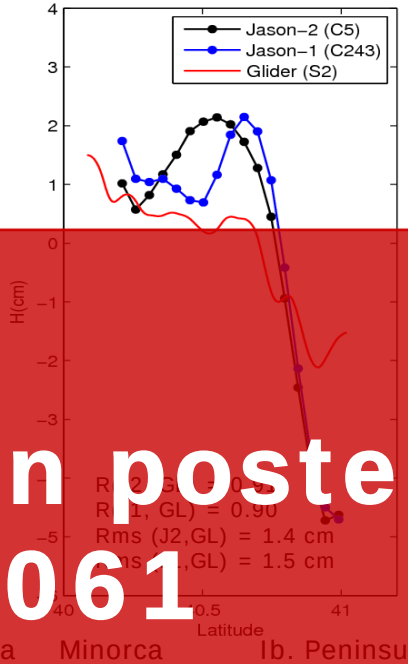
Raw (dashed-dotted) and filtered (continuous) glider and ENVISAT data. For the glider measurements, both sections (go and return) are displayed when available.

Reasonable coherence between absolute dynamic topography from ENVISAT and dynamic height from the glider CTD data. Altimetry observations near the coast are often missing. High noise to signal ratio.

Jason-1/2 missions







More details in posters:

SA.8 – 061

S4.43 - 109

- Alboran Sea:
  - Intense gradients.
  - Very good correlation between altimetry and glider data.
  - Jason-1 (IGDR) and Jason-2 (DUACS) ADT profiles correlate well (0.96).
- Balearic Sea:
  - Weak gradients (large noise to signal ratio).
  - Agreement between altimetry and glider data is lower.
  - Strong variability in 10 days. Problem of synopticity with the glider data?
  - Sensititivity to the ref. level in DH computation and mean dynamic topography.

Ongoing and future work:

Testing other MDT.

Applying specific altimetric algorithms (XTRACK/PISTACH/COASTALT) for coastal areas.

Combination of glider geostrophic velocities and integrated GPS currents

$$Vabs_{surf} = Vg_{surf_{180}} + Vg_{180_{bottom}} + V_{bar} + V_{ag}$$

$$\overline{Vabs} = \overline{Vg}_{180} + Vg_{180_{bottom}} + V_{bar} + \overline{V_{ag}}$$

$\bar{}$ *denotes vertical average over the upper 180 m (vertical extension covered by the coastal glider)*

Assuming : $\overline{V_{ag}} \approx V_{ag}$

$$Vabs_{surf} = Vg_{surf_{180}} + \overline{Vabs} - \overline{Vg}_{180}$$