

International Efforts to Enable Science with Coastal Altimetry

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Partners

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Facts

- The need for coastal altimetry is now widely recognized:
 - science topic of great relevance to monitor the coastal environment and assess the impact of global change on the coasts!
 - space agencies and several institutions are supporting it (see our list of sponsors, and projects like PISTACH, COASTALT, some OSTST, etc)
 - Forthcoming missions have promising coastal capabilities

Applications

- Multifold:
 - Sea Level, tides - not only long term studies and climatologies, but also specific hazardous/extreme events (storm surges)
 - Currents, waves
 - Assimilation into coastal models
 - Fisheries, shipping, sediment

Altimetry is a **legitimate component of any coastal observing systems**

– See Cipollini et al Ocean Obs CWP, 2010

A vibrant international community



2nd CA-WS Pisa, Nov 2008

Today the COASTALT-SWT mailing list has ~250 contacts

What needs to be done now?

- Tackle the many remaining **technical challenges** → S1,S2,(S6)
 - Both for the past (~20 ys of data) and for the present/future (Cryosat, AltiKa, Sentinel-3)
- Systematically reprocess the **data** and control their quality → S3,S4
- Promote **applications** and uptake of data by the user community → S5,S6,S7,S8
 - Synergy with in situ/models

Retracking

- Problem – specular reflections giving peaky waveforms. Can they be modelled and removed?
- One possible approach is to avoid treating each waveform in isolation
 - 2-D retracking
 - Linear Bayesian Techniques
- See session 2

How close to the coast?

- Perhaps $>1\text{km}$ in some cases – but high ground can affect tracking window too much
- And does it matter? YES
- Useful to recover coastal currents
- Useful for coastal setup
- Important to ensure consistency from the offshore to the inshore
 - also for the validation with Tide Gauges

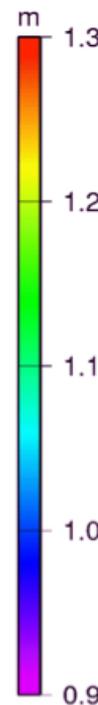
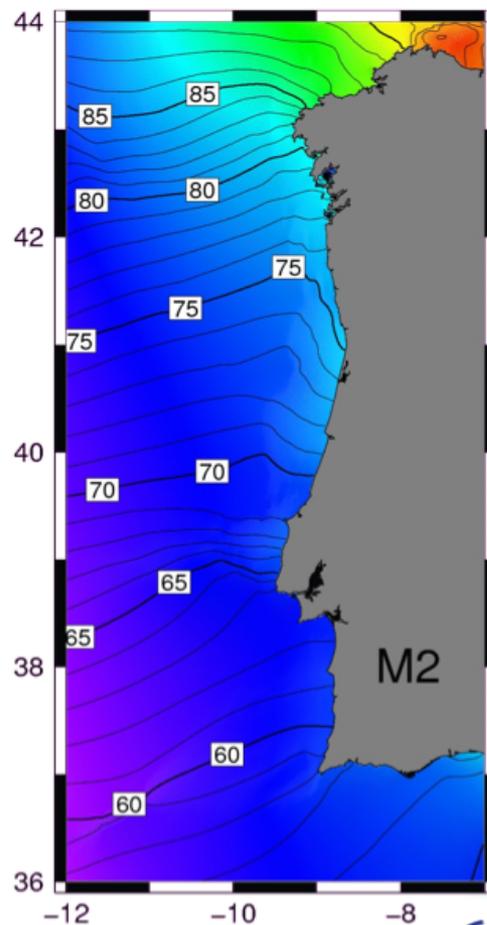
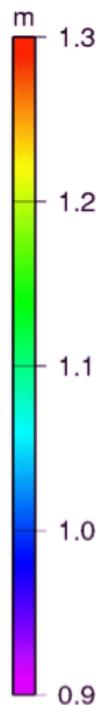
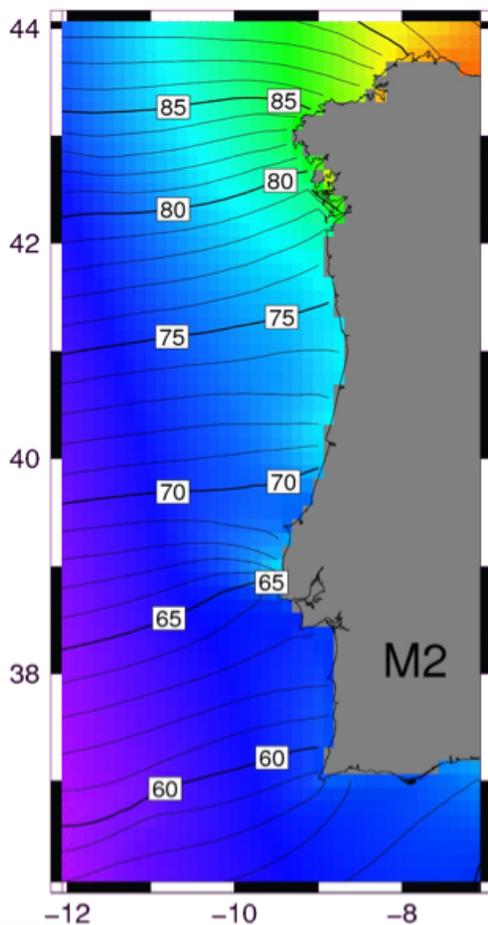
Wet tropospheric correction

- Land Decontamination (PISTACH)
- Mixed-Pixel Algorithm (JPL)
- GPD GNSS-based Path Delay (UPorto for COASTALT)

Tides – local models

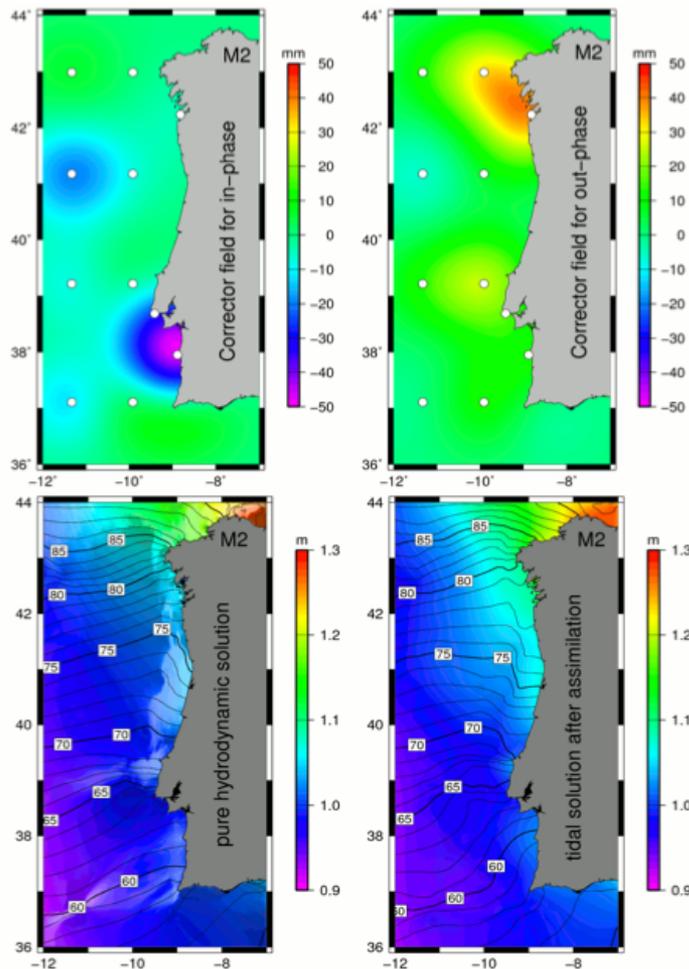
FES2004

WITM



M. Bos

Altimetry and tidal science: give&take



The pure Hydrodynamic solution is adjusted in a way that fits the ALT crossovers and Tide Gauges perfectly

M. Bos

Waves and SSB

- We need to correct for Sea State Bias in the coastal zone but we don't know how...
- Dedicated session 6
- Could be one good example of Coastal altimetry research feeding back into open ocean altimetry

Data are coming!

- PISTACH

- data reprocessed with coastal altimetry techniques available globally over entire Jason-2 mission.

→ *Dufau*

- CTOH Toulouse

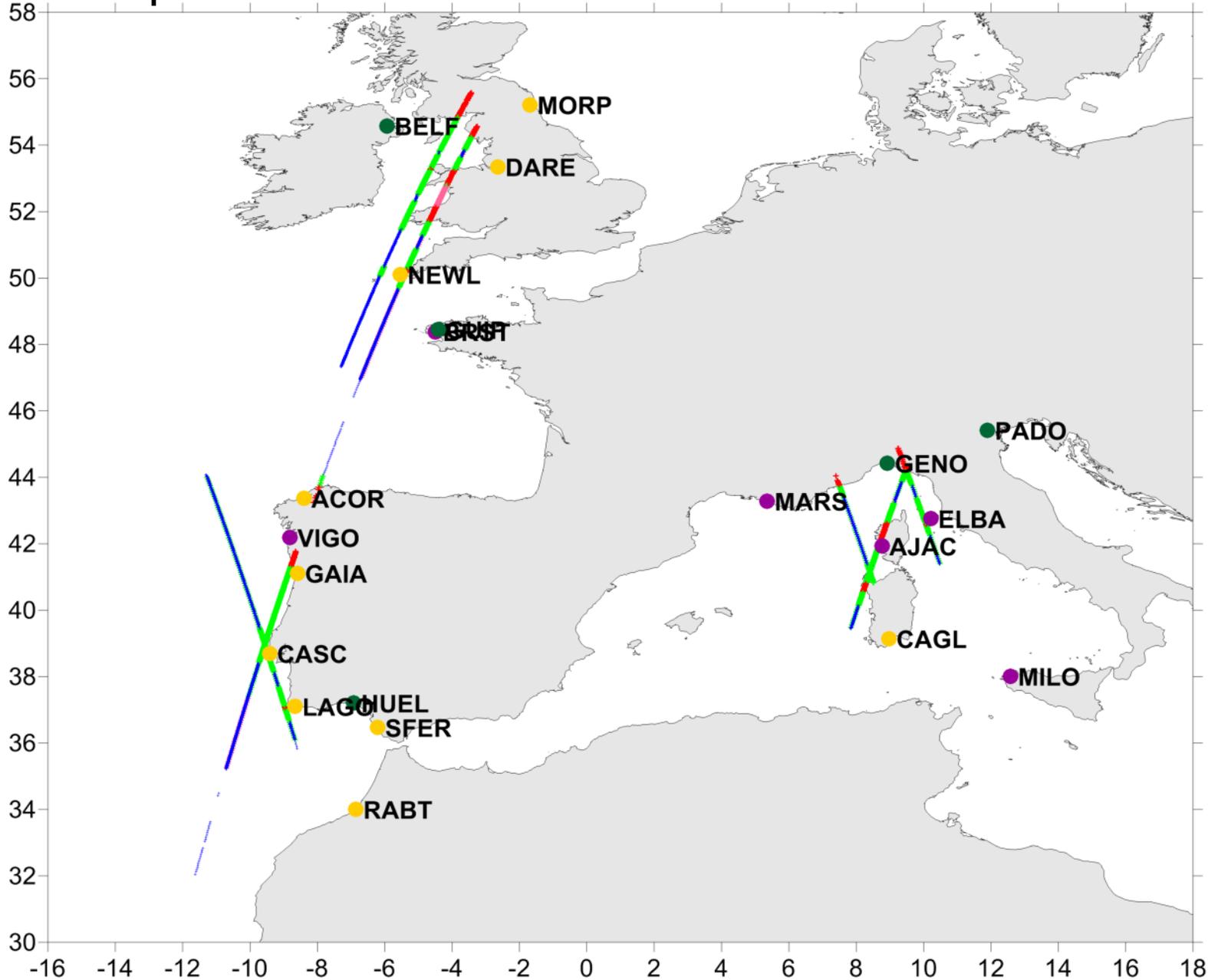
→ *Biol*

- COASTALT

- Test data over 3 pilot areas about to be released (1 Nov 2010)

→ *Snaith*

COASTALT pilot tracks



“Recommendation 3” from 1st CA-WS

(Smith, Strub and Miller)

In order to fulfill the need for long-term altimeter records a **global coastal ocean data set** shall be produced containing all historical along-track and auxiliary data and meta-data. Ideally, this will be

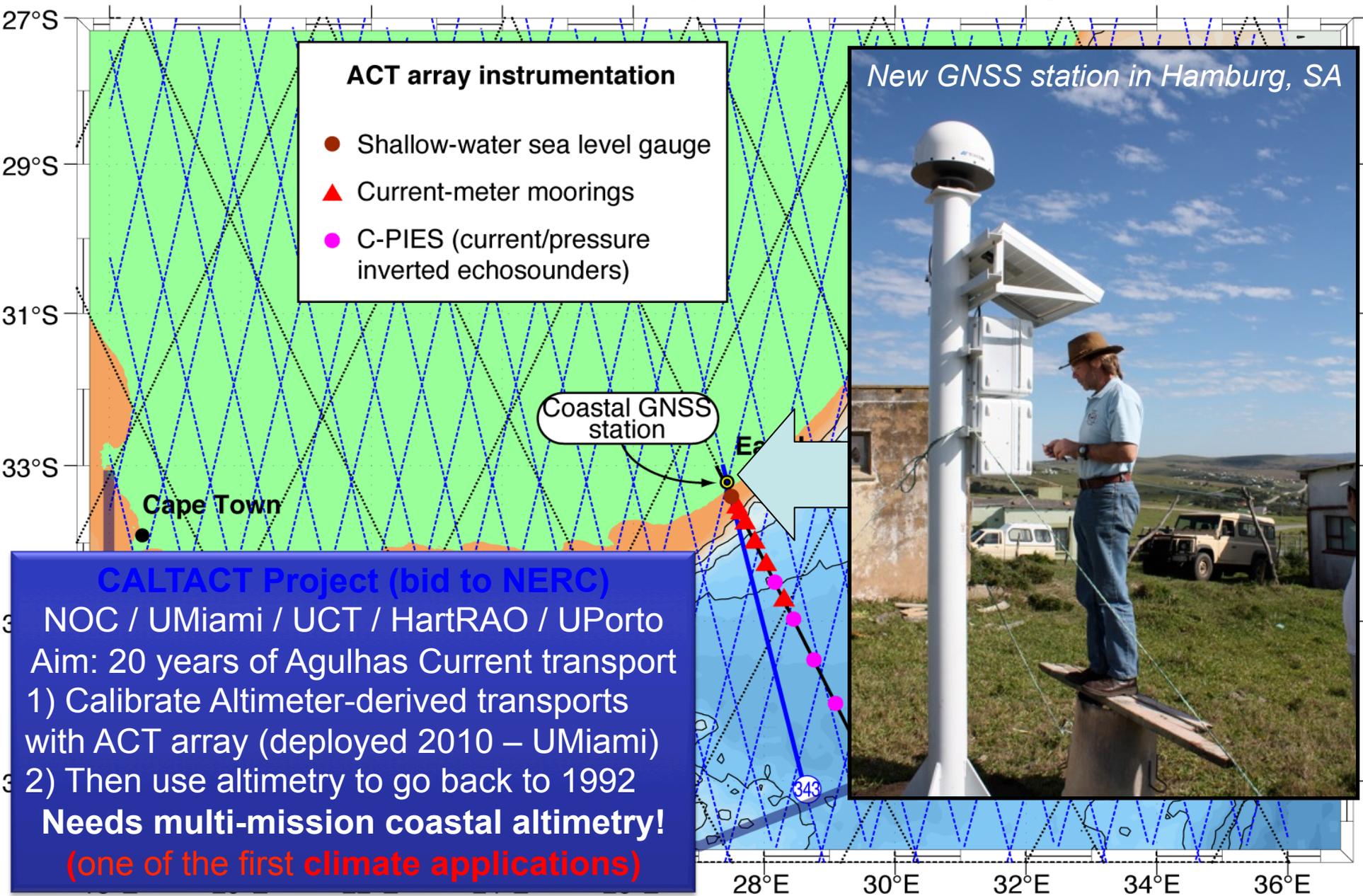
- in a common data format
- processed for multi-satellite consistency
- at the highest resolution possible (10, 18, 20 Hz)
- seamless between coastal and open ocean
- use best-available regional models to the extent possible.

→ We are (slowly?) getting there

Need to promote **applications!**

- We need to make sure that the new data are taken up by scientists and other users in applications to environmental monitoring/assessment, modelling/forecasting, climate studies.....
- I' ll show one example...

Coastal Altimetry in the Agulhas



Conclusions

- Prospects continue to look good for coastal altimetry!
- The considerable technical developments must continue but it is crucial that they are followed by a sustained effort in data reprocessing to support many possible applications.
- **The international efforts are about to enable a good deal of exciting science!!**