28 abstracts received!

Result of the ongoing effort to structure the community:

- Coastal Altimetry workshops in Silver Spring (Feb08) and Pisa (Nov08)
- Hydrology from Space Meetings (Toulouse03, Geneva07)
- COASTALT/ESA and PISTACH/CNES initiatives

**COASTAL:**

18 abstracts received → 4 oral pres. + 14 posters

**INLAND:**

8 abstracts received → 2 oral pres. + 6 posters

**INSTRUMENT:**

2 abstracts → 1 oral pres. + 1 poster
Coastal and Inland Altimetry session
Oral Programme (Tuesday 23/06/09)

- **COASTAL**
  - 4:30 Florence Birol: CTOH regional altimetry products: Example of applications
  - 4:40 Ananda Pascual: Synergy between glider and coastal altimetry: Case study in the Balearic Sea
  - 4:50 Graham Quartly: Singular reflections on the Golfo della Botte
  - 5:00 Tracy Haack: High-resolution models of wet-troposphere path delay fields in coastal regions

- **INLAND**
  - 5:10 Franck Mercier: The PISTACH project for Hydrology: project status, products and early results
  - 5:20 Stephane Calmant/ Ana Emilia Souza: Validation of JASON-2 over the Amazon basin rivers

- **INSTRUMENT**
  - 5:30 Jean-Damien Desjonqueres: POSEIDON Diode/DEM coupling mode

- **SUMMARY OF POSTER PRESENTATIONS 5:40**

- **DISCUSSION 5:50**
Coastal and Inland Altimetry session
Poster Programme

- **COASTAL (1/2)**
  - Paolo Cipollini: Advances in Coastal Altimetry: the COASTALT project
  - William (Bill) Emery: Improved altimetric retrievals in the coastal zone
  - Hui Feng: Exploiting ocean altimeter data in the Gulf of Maine and Middle Atlantic Bight region
  - Joana Fernandes: GNSS derived path delay, a method to obtain the wet tropospheric correction for coastal altimetry
  - Guoqi Han: Mean dynamical topography and surface circulation off Atlantic Canada
  - Florent Lyard: Robust methods for high accuracy tidal modelling in coastal and shelf seas
  - Juan Jose Martinez-Benjamin: Operational monitoring level at Barcelona and l'Estartit harbours
COASTAL (2/2)

Franck Mercier: The PISTACH project for coastal altimetry: status, products and early results
Anne-Charlotte Peter: Thermal impact of the coastal waves in the coastal African upwelling areas
Laurent Roblou: The contribution of improved altimetry to a study of NW Mediterranean sea coastal dynamics
Simon Ruiz: Merging altimetry and glider data to estimate vertical motion in the upper ocean
Y. Tony Song: Strait And Inter-Ocean Transport Estimation Using Altimetry SSH And Gravimetry OBP
Alexandre Kurapov: Assimilation of along-track altimeter SSH into a coastal ocean model
Javier Zavala-Garay: Development of an operational analysis/forecast system for the Mid Atlantic Bight.
Coastal and Inland Altimetry session

Poster Programme

- **INLAND**
  - Charon Birkett: Performance of the Jason-2/OSTM instrument over inland waters
  - Marie-Claude Gennero: Water level on rivers & lakes using Jason-2 altimetry data
  - Jinyun Guo: Correlation of El Niño and water level variations of Hulun Lake monitored with TOPEX/POSEIDON
  - Hyongki Lee: Assessment of retracked Jason-2 measurements over Louisiana wetland
  - Frederique Seyler: Cross-comparison of Jason2 data with ENVISAT RA2 and ICESAT data over Amazon basin
  - Stéphane Calmant: JASON-2 IGDRs for flood alert in the Amazon basin
Coastal and Inland Altimetry session

Poster Programme

- **INSTRUMENT**
  Nathalie Steunou: *AltiKa: a new concept of altimeter for the SARAL mission*
Coastal and Inland Altimetry session

COAMPS Water Vapor Forecasts
9 Oct 2009 6-18 UTC

IWVP (kg m\(^{-2}\)) - Path Delay (cm)

Water Vapor (g kg\(^{-1}\)) & Theta (K)
GNSS-derived Path Delay (GPD): a method to obtain the wet tropospheric correction for coastal altimetry
Joana Fernandes et al., Univ. Porto, Portugal

- GPD estimates the wet tropospheric correction at altimeter points with invalid microwave radiometer (MWR) measurements (red points) by combining the following data types (top figure):
  - GNSS-derived zenith wet delays (ZWD) determined at a network of coastal stations, reduced to sea level (pink circles)
  - ZWD values computed from ECMWF global grid fields (blue points)
  - valid MWR measurements (green points)

- Data are combined by using a linear space-time objective analysis technique.
- Bottom figure shows an error map for Envisat cycle 58 (green and light blue points have errors below 2 cm)

See the poster for details!
Wet Tropo Correction

Global « Coastal » corrections now exist:
- S. Brown: to be included in the GDR?
- 2 WTC in the PISTACH products (+ 1 for Hydro)

Development of regional corrections:
- GNSS based corrections (Fernandes)

Improvement of Regional Atmospheric models
- to retrieve high space/time variability (Haack)
Coastal and Inland Altimetry session

Waveform analysis

Ongoing work

- Understand physical causes
- Simulate and remove effects
- Achieve altimetry up to coast

Simple, but common, example
Coastal and Inland Altimetry session

WF Classification: Amazon (Manaus)
Coastal and Inland Altimetry session
Waveform Analysis/Retracking

- A (The) key issue for inland and near shore altimetry:
  - Significant effort in PISTACH and COASTALT projects
  - Local and regional studies also develop retracking strategies (posters by Emery, Lee)

→ Still a lot of work to do on retracking....

- But feasible with Jason-2 data since waveforms are acquired almost everywhere! (not the case for Jason-1)
Other corrections

- Tides, atmospheric loading, ...:
  - Regional solutions exist (FES, GOT, MOG2D, T-UGO, Webtide...). Local solutions too!
  - See presentation/Poster: Birol, Roblou, Lyard, Feng ...

→ How to compile/merge these solutions inside a global altimetry product?
Coastal and Inland Altimetry session

Data distribution:


PRODUCTS: Centre de Topographie des Océans et de l’Hydrosphère

Along track Sea Level Anomalies

Data available via ftp

Conclusion

✓ Ongoing project: other applications under analysis
✓ Strong connection with different scientific groups/projects
✓ The feedback we get from CTOH coastal data users for marginal/coastal applications helps us:
  → to understand the users needs
  → to identify the problems to solve
  → to analyze the potential applications and/or limitations
✓ If you have new corrections or scientific applications you want to test, do not hesitate to contact us!!!

cloh_products@legos.obs-mip.fr
Coastal and Inland Altimetry session

Conclusion

- The PISTACH products include several new state of the art corrections and geophysical information: retracking, wet tropo, geoid, DEM, surface classification ....20Hz sampling

- V1.0 products are freely available since cycle 1, in NRT.

- Validation & Evaluation during next months. They will provide us feedback for improving future versions.

- A light version of the products is under reach more easily non-expert users

- Possible evolution of the prototype T/P, AltiKa ?

- Feedback, comments, questions:
  - Claire.Dufau@cls.fr (Coastal Info)
  - Franck.Mercier@cls.fr (Hydro)

ftp://ftpse.dr.cls.fr/pub/ocean/pistach

High-resolution & coastal coverage

Cycle 24

SLA Jason 2 PISTACH vs SLA Jason2

Using Jason2-PISTACH 20Hz fields provide a better spatial coverage and a higher resolution in the coastal ocean

some noise still remains to be filtered on PISTACH SLA
Coastal and Inland Altimetry session

Products available

- **Dedicated processings/products:**
  - CTOH (LEGOS): post-processing (editing, ...)
  - PISTACH (CNES): JASON-2, pre-processing (retracking, Wet, SSB, local/global corrections ...) → IGDR-like products in NRT, available on FTP
  - COASTALT (ESA): Envisat, pre-processing (retracking, corrections, ....) → soon

- It’s up to users to use these products (+feedback) and make good science!
  - « InSitu Calval »: Birkett, Seyler, Calmant
  - Regional/local studies/applications: Pascual, Ruiz, Feng, Peter, Han, Song, Kurapov, Zaval-Garay, Gennero
Gliders are useful platforms for exploring limitations of coastal altimetry.

New methodology and data processing in the velocity computation improves the altimetry-glider comparisons.

The impact of using HF along track altimetric data is tremendous in the coastal zone (correlation = 0.97, error variance = 5%).

Future work:
- Dedicated mean dynamic topography
- Multi-sensor approach experiments
- Data assimilation into numerical models to better understand coastal and mesoscale dynamics (collaboration with J. Zavala - Univ. Rutgers).
Operational monitoring Sea level by CGFS in the Barcelona and the Estarit harbours

Abstract

Recently, the main objective of the implementation of these HARPBs is to monitor the sea level and to guarantee the safety of the coastal areas of the Barcelona harbour. The HARPBs are installed at the entrance of the harbour, at the mouth of the river, and at the mouth of the sea. The HARPBs are equipped with a radar tide gauge and a GPS system to measure the sea level and the horizontal displacement of the ground.

Coastal and Inland Altimetry

Poster

J.J. Martinez-Benjamin et al.
Vertical motion in the upper ocean from glider and altimetry data

Simon Ruiz, Ananda Pascual, Baltomé Garau, Isabelle Pujol, Joaquín Tintore
(GRL, June 18, accepted)

Western Mediterranean, Data from glider, Jason 1 and Jason 2

DH from glider and ADT from Jason-1 & Jason-2 tandem mission (r > 0.97, rms differences < 1.6 cm).

Vertical section from glider (top) and reconstructed DH field from glider and altimetry at 75 m depth (bottom).
Assimilation of Along-Track Altimeter SSH into a Coastal Ocean Prediction Model
A. Kurapov, G. Egbert, J.S. Allen, P. T. Strub (Oregon State U.)

SST Fields from Model (left, middle) and Satellite (right) – July 24, 2008
prior (free-run) model  model after SSH assim.  GOES daily composite
(not assimilated)

1: extent of separation at 43-44N is reduced; 2: eddy is formed; both effects are consistent with GOES SST

Assimilation of alongtrack SSH altimetry, using a multivariate variational approach, improves prediction of SST – compare SST on left (no SSH assimilation) and middle (SSH assimilation) to right (SST that was not assimilated). Will increased date from interleaved orbits improve the fields further?

SST scale: 7-18C
Coastal and Inland Altimetry: increasing interest

- Promising good performances of Jason-2, even in NRT
- Dedicated altimetry products/solutions already exist
  - Use them!
- Improvements still necessary/possible (retracking, DEM tracking mode...)

Third Coastal Altimetry Workshop (Roma, Sept 2009)