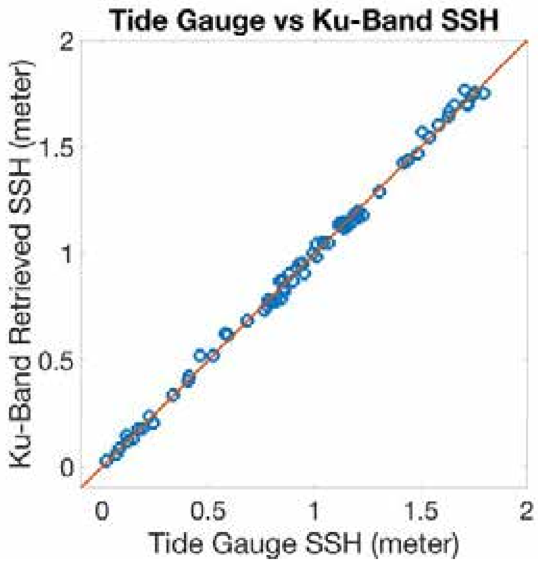
Coastal Altimetry Using Ku/Ka-Band Signals of Opportunity: Results From a Recent Experiment at Platform Harvest

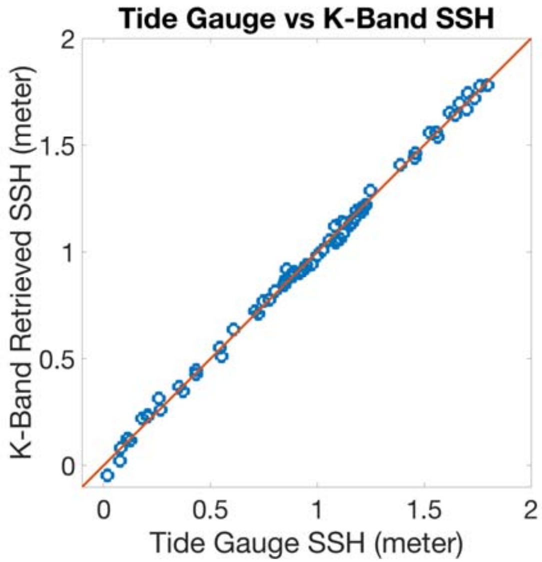
Shah et al.

KU/K-Band Antennas

Receiver

Antennas and receivers at Platform Harvest. The antennas are located at approximately 27 meters above the ocean surface.



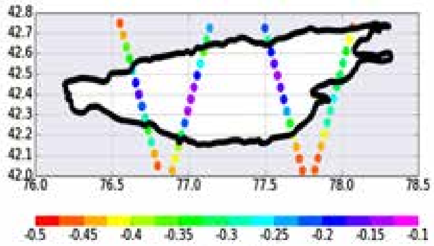


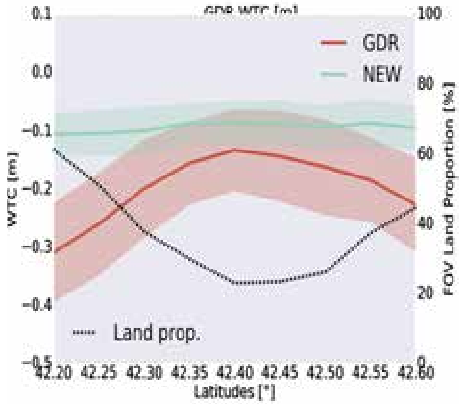
Scatter plot of retrieved SSH from Ku-band (left) and K-band (right) LHCP data and SSH from tide gauge. The error in retrieval of Ku-band and K-band is 2.69 cm and 2.61 cm, respectively.

A Wet Tropospheric Correction (WTC) dedicated to hydrological and coastal applications

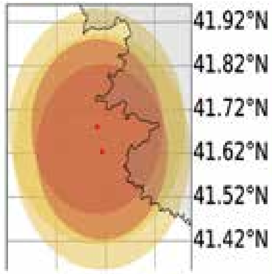
B. Picard, M. Fréry, M. Pardé (CLS), P. Bonnefond (ObsPM), O. Laurain (GeoAzur), J-F Crétaux (LEGOS

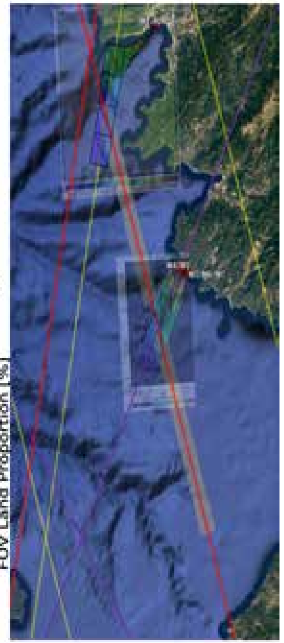
Issy-Kul Lake



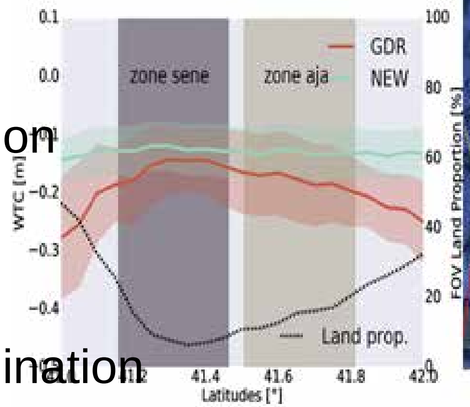


Ajaccio, Corsica



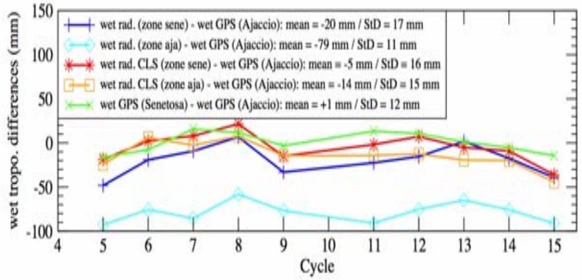


Current GDR WTC,
impacted by land contamination
correlated to Land proportion



New WTC
Not impacted by land contamination

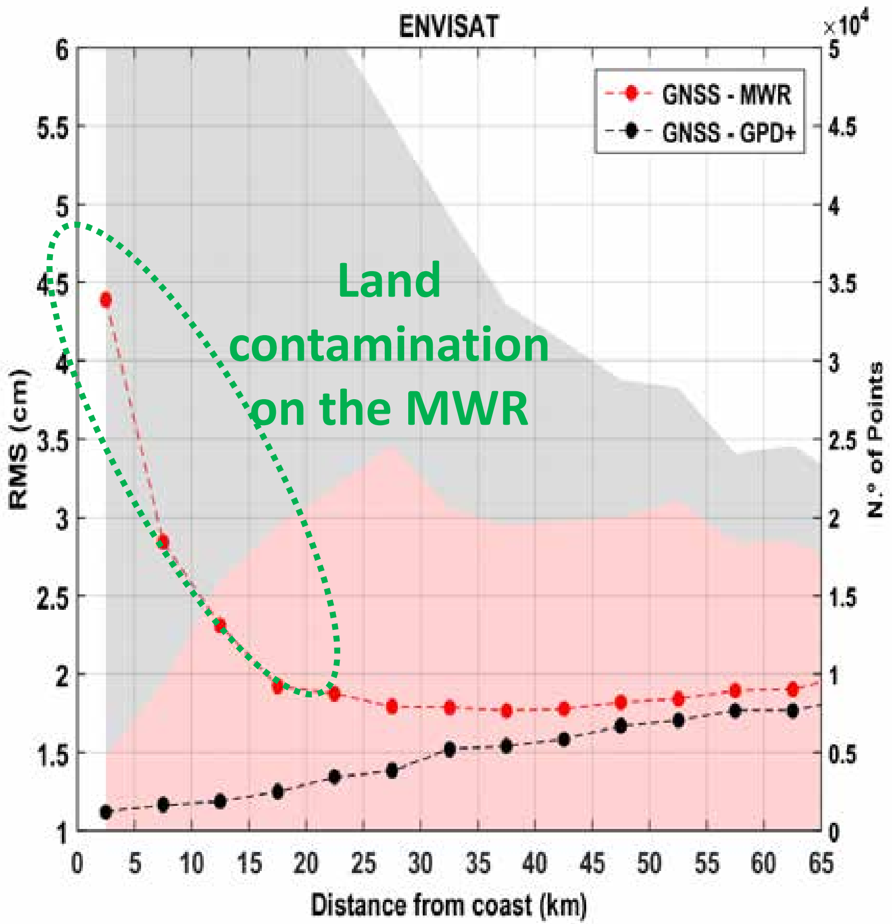
Comparison to Ajaccio GPS ➔
Bias correction OK
Accuracy improvement TBC



Independent assessment of Microwave Radiometer measurements in coastal zones using tropospheric delays from GNSS

Telmo Vieira, M. Joana Fernandes, Clara Lázaro

Universidade do Porto, Portugal



Objectives:

(i) to exploit the potential of GNSS to monitor the stability of microwave radiometers (MWR) in coastal regions;

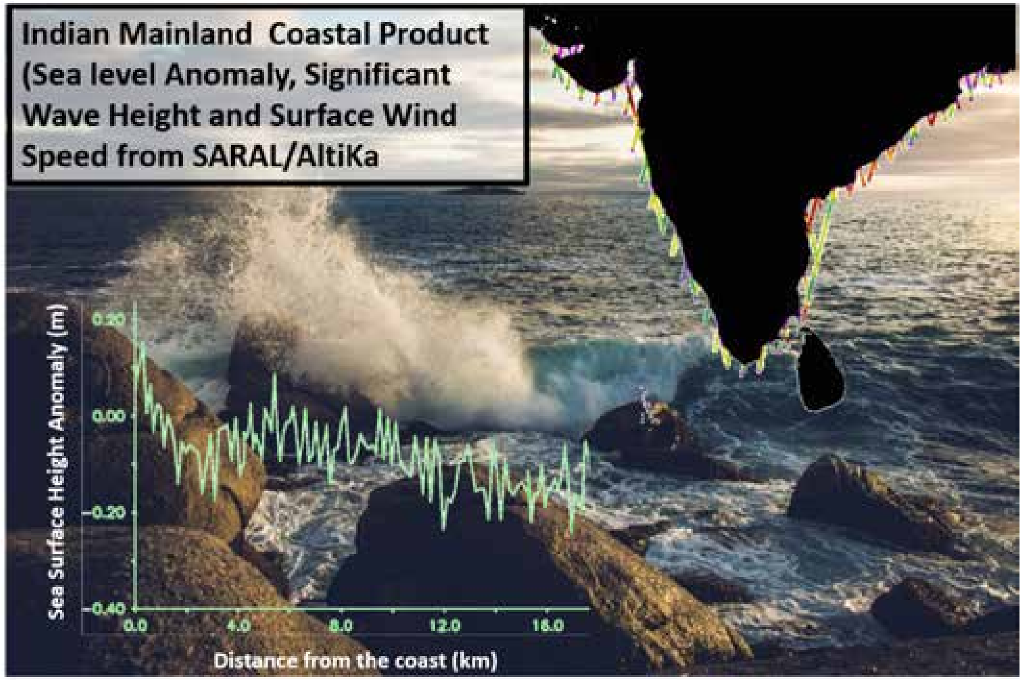
(ii) to study the impact of land contamination on the MWR.

Performance of the GPD+ algorithm to improve WTC retrieval over coastal regions is also analysed.

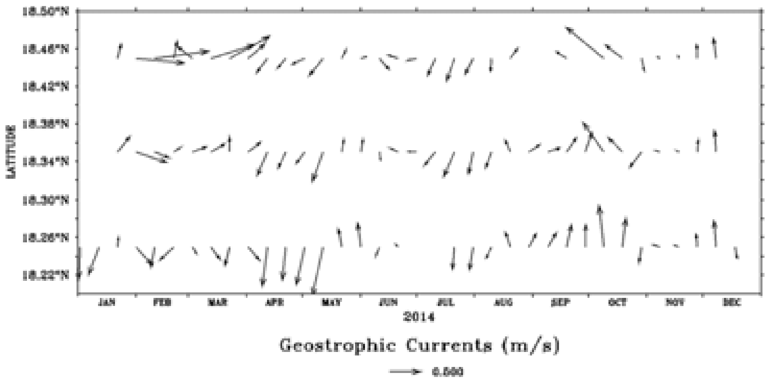
←Fig. shows non-collocated WTC comparison (RMS of differences) for Envisat, function of distance from coast:

- **GNSS - MWR;**
- **GNSS - GPD+.**

Coastal altimetry with SARAL/AltiKa: Emphasis to Indian mainland coastal region: Chaudhary et al.



BETA5, BETA9, BAGP algorithms were used to derive geophysical parameters near the Indian coastal region.



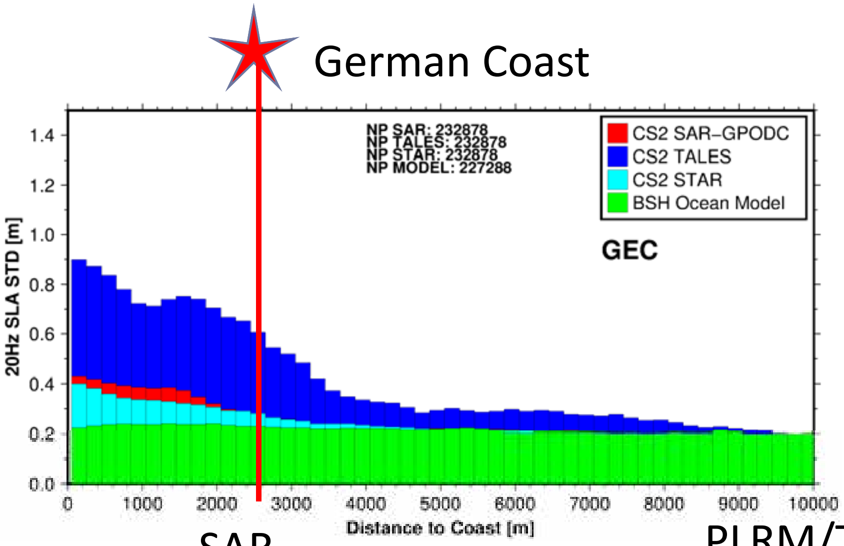
Current patterns in the coastal region near 18.3 º N
picked by the coastal product.

Sea Level Anomalies and Mesoscale Activity using Altimetry Along the African Coasts in the Eastern Tropical Atlantic Ocean (OSTST Alti-ETAO)

B. Dieng et al.

Coastal SAR ALT: sea level change and MDT

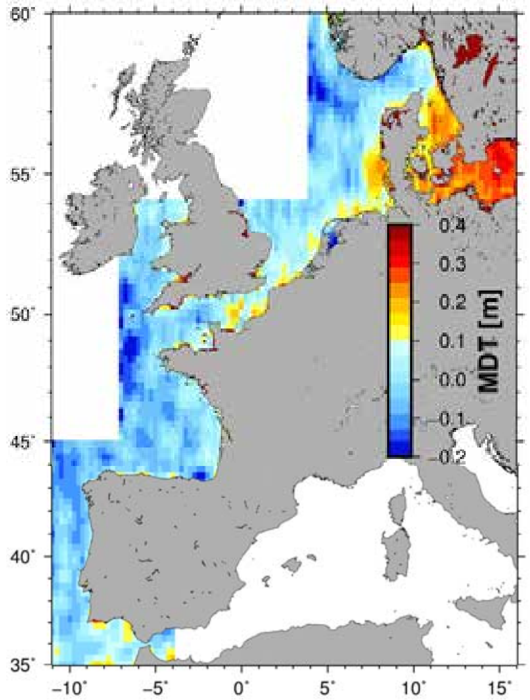
Fenoglio et al.



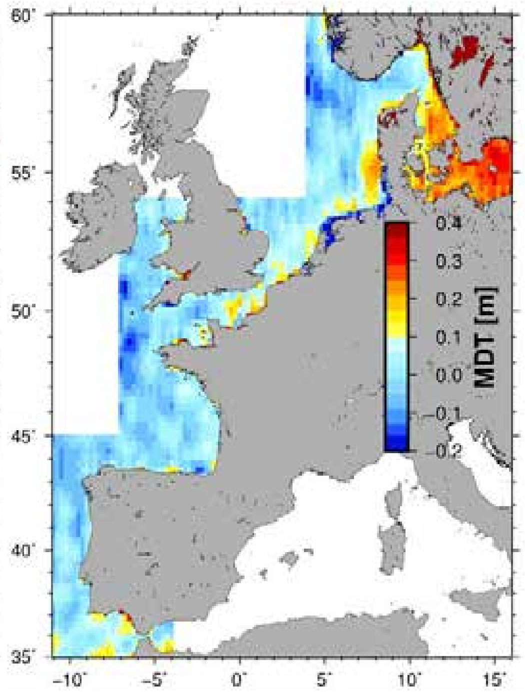
LEFT: SAR Coastal altimetry @ > 2-3 km from coast has variability comparable to ocean model

BELOW LEFT: Mean Dynamic Topography (MDT) 0.25°x 0.25° from 6 y along-track CryoSat-2 SSH has stdd 6.8 cm with DTU2015, agrees better than PLRM/TALES

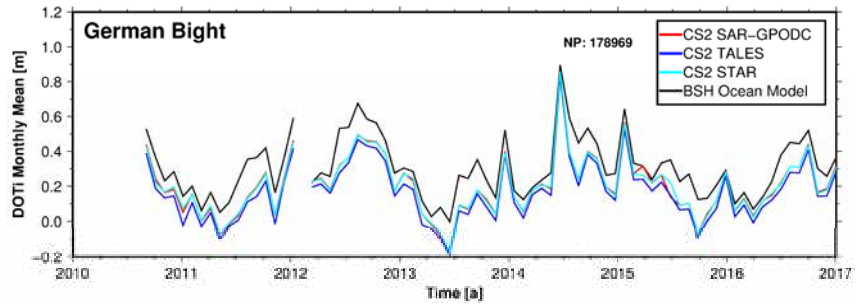
SAR

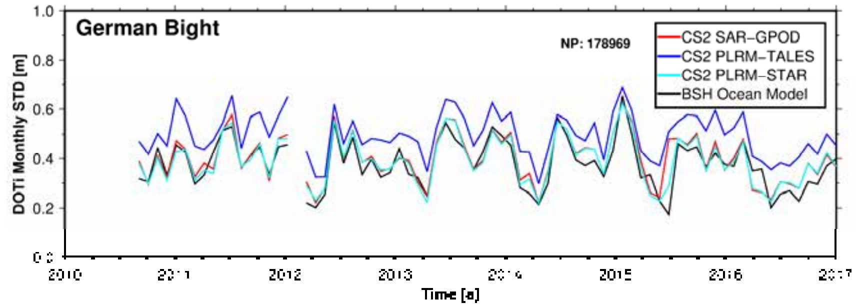


PLRM/TALES



BELOW RIGHT: Monthly instantaneous dynamic topography in 2-10 km from coast & its STD agree at best with regional model





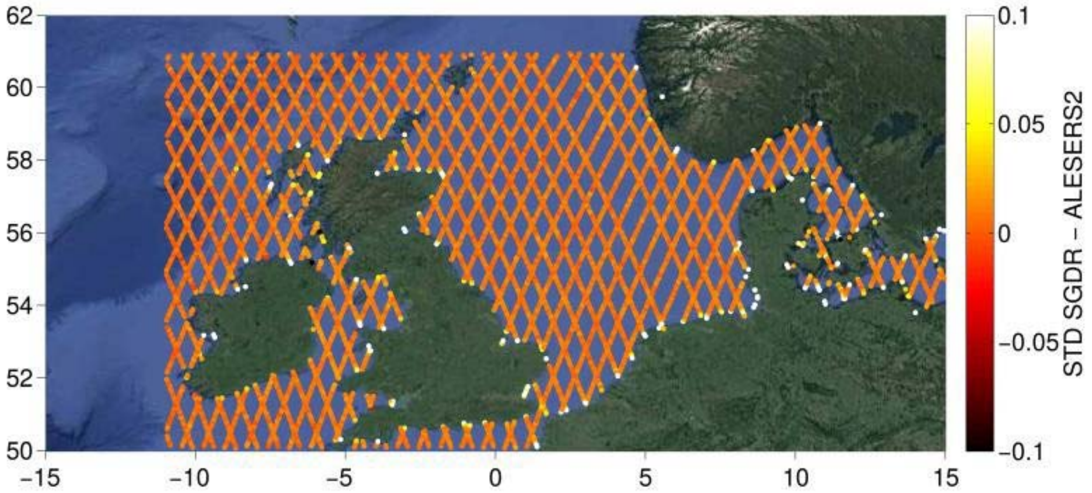
Linking Sea Surface Height Variations with Hydrographic Variability Around the Greenland Ice Sheet to Improve Understanding of Sea Level Rise

I. Fenty et al.

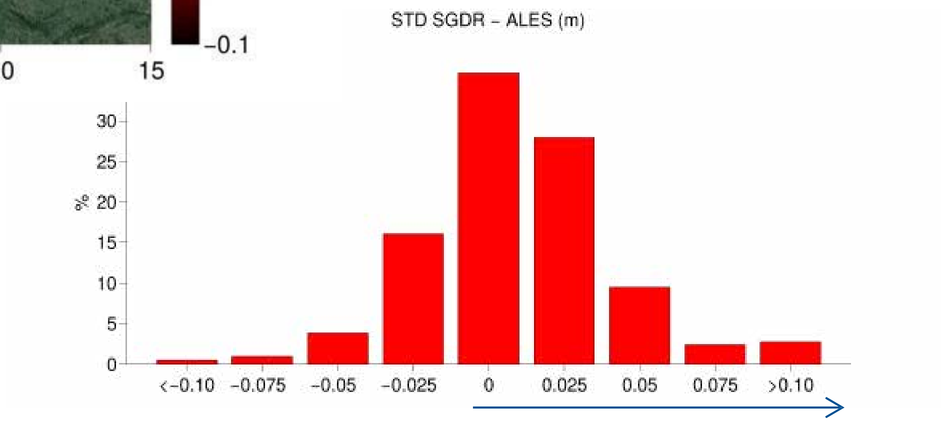
Deutsches Geodätisches Forschungsinstitut (DGFI-TUM)
Technische Universität München

COSTA v.1.0: DGFI-TUM Along Track Sea Level Product for ERS-2 and Envisat (1996-2010) in the Mediterranean Sea and in the North Sea

Marcello Passaro and Denise Dettmering



Figures: Precision of 1-Hz measurements, standard processing – ALES COSTA for ERS-2 mission



COSTA IS BETTER

15% decrease in noise in the open ocean. Larger improvements at the coast

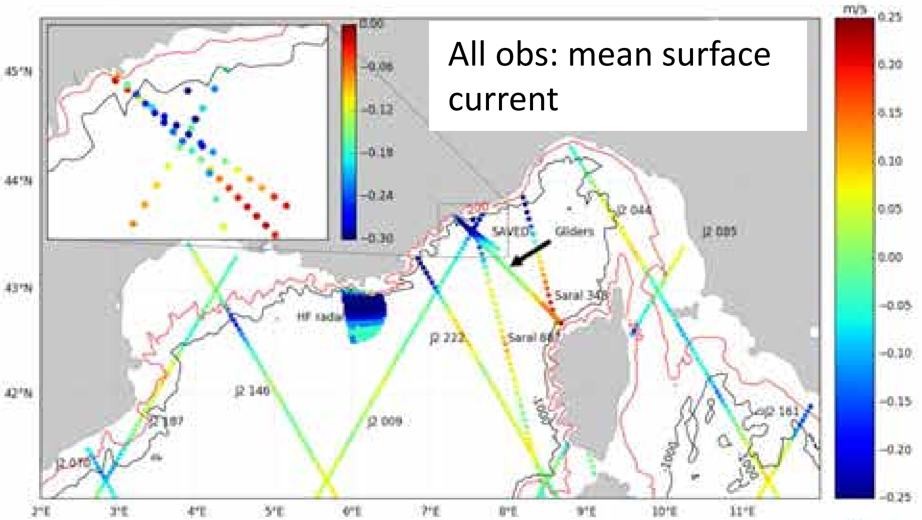
Monitoring Sea Level and Topography of Coastal Lagoons Using Satellite Radar Altimetry: The Example of the Arcachon’s Bay in the Bay of Biscay

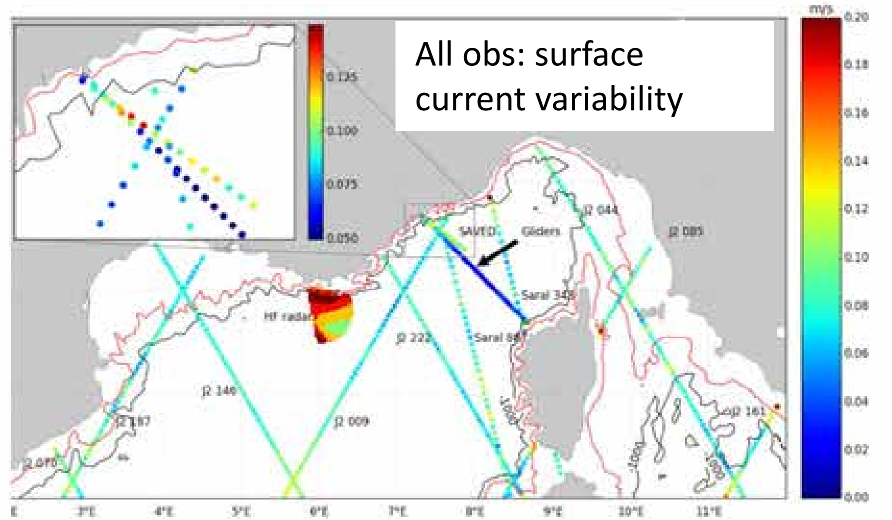
E. Salameh et al.

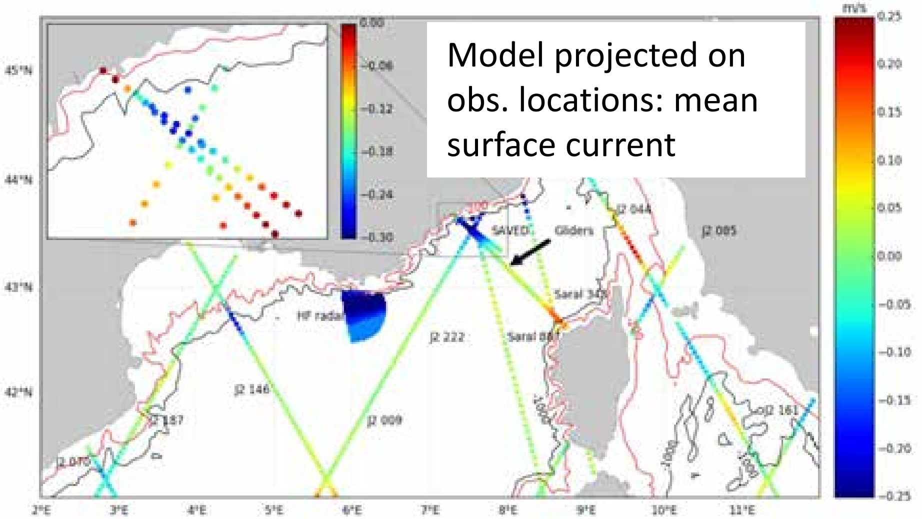
A study of the fine-scale dynamics in the North-Western Mediterranean Sea using altimetry, in-situ data and a high resolution regional model

A. Carret (LEGOS), F. Birol (LEGOS), C. Estournel (L.A.)

Objective: analyze altimetry in parallel with other ocean observing systems and high resolution numerical modelling to study the circulation in the Northwestern Mediterranean Sea







Data:
- Altimetry: Jason-2, SARAL, (Sentinel-3 will be added)
- Mounted-ship ADCP (101 sections), gliders (173 sections), HF radar

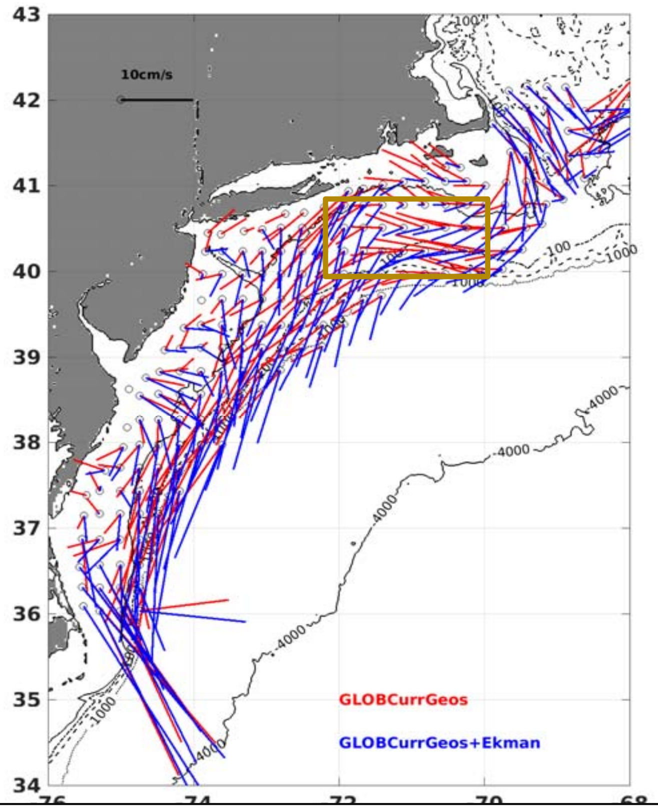
Model:
- Symphonie at 1 km resolution

Multi-Scale analysis of Coastal Altimetry Data. Multi-Sensor Observations and Numerical Modeling Over the North Western Mediterranean Sea

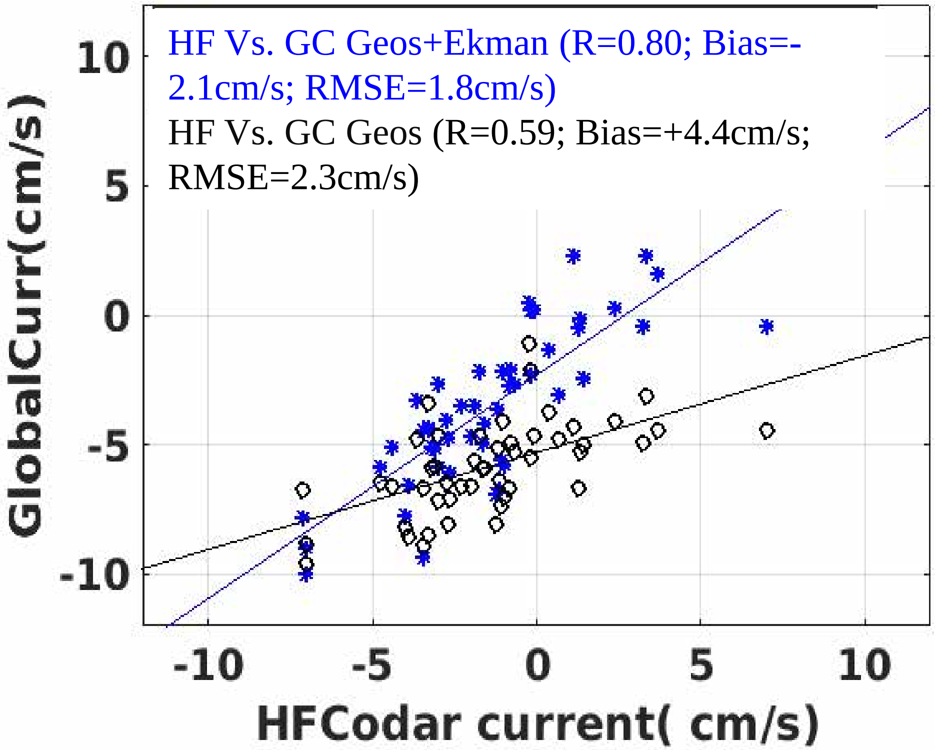
M. Meloni et al.

Evaluation and application of operational altimeter product on the NW Atlantic shelf : H. Feng, D. Vandemark, J. Levin and J. Wilkin

The study presents an overall evaluation of ALT GlobCurrent in terms of available in-situ (Buoys and HF CODAR) current measurements an explores its application for regional dynamic oceanography.



Altimeter-based GlobCurrent mean geostrophic current U_{geo} (**BLUE**) and Geostrophic +Ekman U_{geo} +U_{geo}(**RED**)

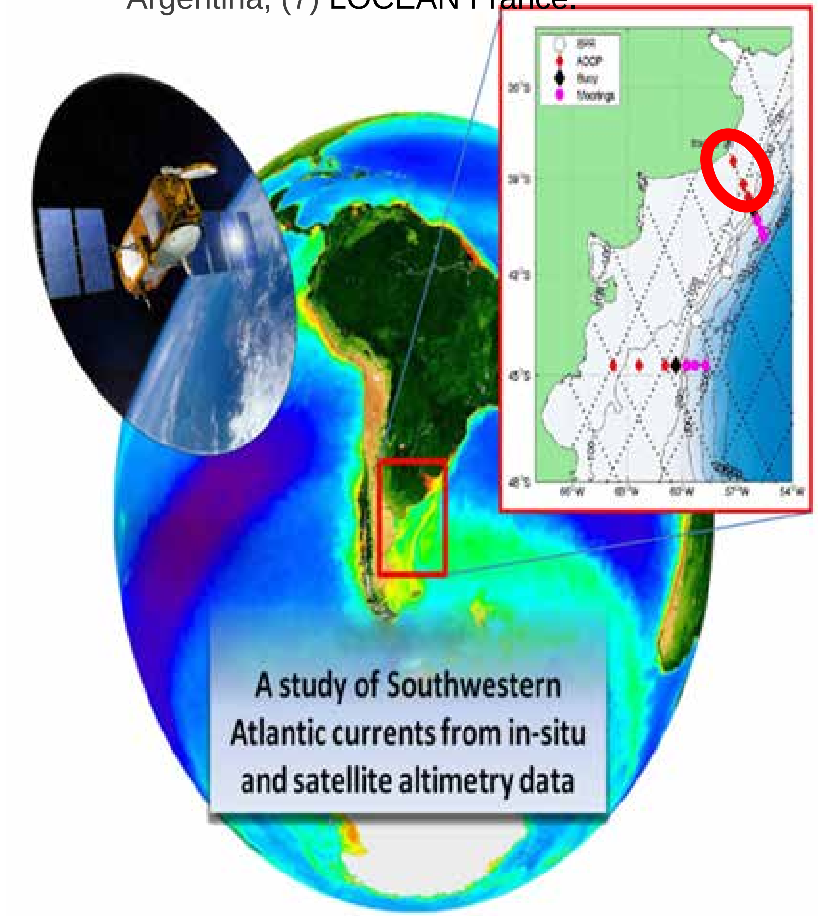


Scatter plots of mean alongshore surface current of GlobCurrent U_{total} =U_{geo} +U_{ekman} and U_{geo} against HF Codar, (with the statistics of correlation, Bias and RMSE shown) in the MAB (Black box).

Satellite altimetry in the continental shelf of the Southwestern Atlantic, Argentina

Lago LS [1,2,3], Saraceno M [2,3,4], Martos P [5,1], Guerrero R [1], Paniagua GF [2,3], Piola AR [6,3], Ferrari R[2,4], Artana CI[7], Provost C[7]

(1) INIDEP, Argentina. (2) CIMA, Argentina. (3) DCAO-UBA, Argentina. (4) UMI IFAECI (5) UMP, Argentina. (6) SHN, Argentina, (7) LOCEAN France.



http://www.cima.fcen.uba.ar/malvinascurrent/

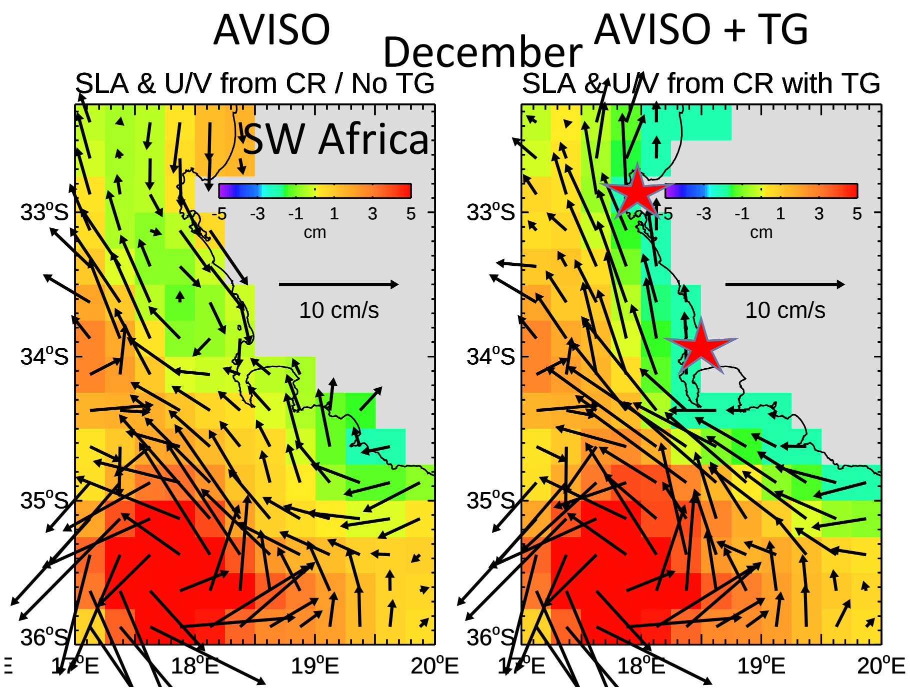
Altimetry products are compared with in situ time series of currents, T and S obtained in two moorings located under Jason track #26 at about 40ºS. Each single correction applied to altimetry data to construct SLA is considered.

Results

- Gridded and along track 1Hz data SLA correlation is weak (0.5)
- Total water level from in situ bottom pressure measurements and Jason-2 SGDR along track 20Hz data are very well correlated (0.95) and have low RMSD (10cm).
- Ocean tide is the correction that mostly affects the SLA comparison.

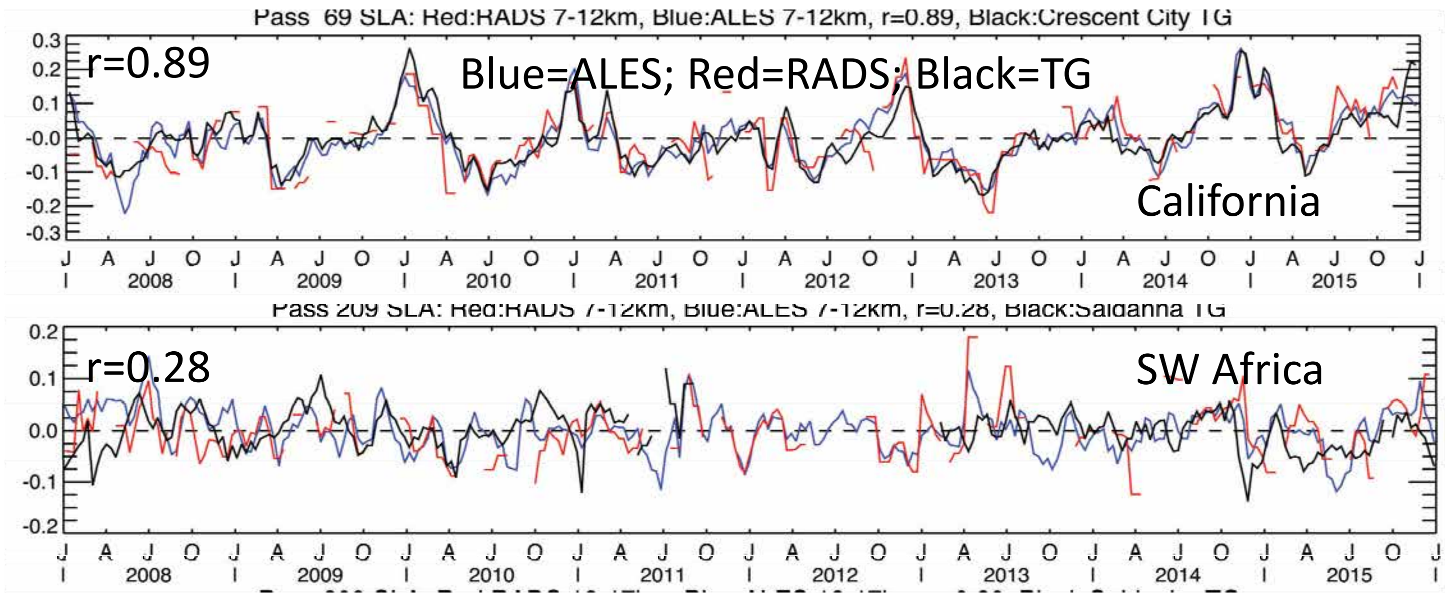
Seasonal Coastal ALT: Alongtrack ALT vs Tide Gauges

Strub et al.



LEFT: Tide gauge data (stars) help to correct the original gridded data in the 75-100 km coastal band.

BELOW: Monthly ALES alongtrack altimeter SLA in the 7-12 km next to the coast (ALES=blue; RADS=red) approximate the TG data (black trace) well off California, not so well off SW Africa.



Scharroo et al:

1) Considering SWOT, which 'corrections' are expected to have the greatest small-scale spatial variability, in both alongtrack and cross-track directions? What is needed to better estimate these fields?

2) Random errors decrease in temporal averages. Are there systematic errors in some correction terms that would be retained in the seasonal mean height fields?

3) Are the present corrections/fields for sea state bias, tides and mean sea surface in the coastal zone adequate? What more can be done?

Bouffard:

1) Among the possible sources of complementary, repetitive coastal measurements (moorings, gliders, tide gauges, HF radars, …) needed to produce a 4-D view of coastal ocean variability, what would be the minimum requirements for a nation without a coastal observation system and low budget; or for a nation of relatively good resources?

2) What type of independent measurements can we use to assess which scales of coastal variability the altimeter really measures?

3) Sentinel-3 offers co-located SSH, SST and Ocean Color observations. What are the most promising new applications made possible by synergistic use of these fields?

Wilkin:

1) If models assimilate altimeter data with high spatial resolution and coarse temporal sampling (10-21 day repeats), how long does the improved spatial variability of the observations persist, before it is lost due to intrinsic variability?

2) Can the models use altimeter data from the non-repeating orbits at present? Are errors in the MDT fields the limiting factor? Will the altimeters improve the MDT fields to the point where non-repeat orbits can be assimilated?

3) What is the advantage of assimilating 'simplified, unified, multi-satellite "L4" altimeter products' rather than lower level SSH observations and what are the requirements for error estimates?