



TUM

l'Observatoire de Paris
SYRTE

FC
PORTO

UCA
Universidad de Cádiz

UNIVERSITY of HAWAII
MANOA

cnes



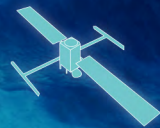
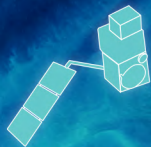
EUMETSAT

University of New Hampshire

esa

12th COASTAL ALTIMETRY WORKSHOP

Coastal Altimetry Training



PROGRAMME

4-7 February 2020 | ESA-ESRIN | Frascati (Rome), Italy

Tuesday 4 February 2020
Moderators: *Marcello Passaro, Marco Restano, Stefano Vignudelli, Jérôme Benveniste*
Training course Objectives

- 1** Introduce altimetry missions and technologies to a non-expert audience
- 2** Present applications for oceanography and discuss challenges in coastal zone altimetry
- 3** Provide a description of existing altimetry datasets
- 4** Present toolboxes and online processing platforms

Time	Title	Lecturer
9:00	Welcome and Introduction	Jérôme Benveniste
ALTIMETRY: PRINCIPLES, ISSUES AND PROGRESSES IN THE COASTAL ZONE		
9:10	Altimetry Principles	Marcello Passaro
10:00	Coffee Break	
10:15	Advanced Altimetry	Marco Restano
DATASETS FOR COASTAL ALTIMETRY		
11:00	Sea Level_cci+ Going Coastal (ALES, X-TRACK)	Florence Birol & Marcello Passaro

Tuesday 4 February 2020

12:00	Lunch	
FIELDS OF APPLICATION FOR COASTAL ALTIMETRY		
13:00	Coastal Circulation and Currents	Fabien Léger & Florence Birol
13:30	Wave Climate Variability and Coastal Impacts	Guillaume Dodet
14:00	Synergy and Validation with Tide Gauges	Jesús Gómez-Enri
14:30	Synergy with Models	Jonh Wilkin
EO DATA ACCESS, ONLINE PROCESSING PLATFORMS & TOOLBOXES		
15:00	Access to EO data provided by ESA	Véronique Amans
15:15	Coffee Break*	
15:45	SARvatore and BRAT Demos	Marco Restano
17:45	Open Discussion, Questions & Answers, Outlook*	
18:15	Ice Breaker	
19:00	End of Training	

*with EO help desk members to answer questions and make demos in Room Cook on February 4th & 5th

Wednesday 5 February 2020

DAY 1

Opening Session

9:00 | Welcome and Introduction – Jérôme Benveniste & Anny Cazenave

9:10 | Altimetric measurement of sea surface height with increasingly high resolution and its applications to the coastal oceans (*solicited*) – Lee-Lueng Fu

	SESSION 1: Technical issues in coastal altimetry	Chairs: Jérôme Benveniste, Anny Cazenave
9:40	Improving sea level mapping methodology and high-resolution hydrodynamic model for altimetry calibration/validation in the “Pertuis Charentais” area (La Rochelle, FRANCE)	<u>C. Chupin</u> , Y.T. Tranchant, L. Testut, V. Ballu
10:00	Revisiting the small-scale variability in coastal areas thanks to altimetry constellation	<u>M. Raynal</u> , S. Labroue, M-L. Denneulin, B. Picard, G. Dibarboue, N. Picot
10:20-10:50	COFFEE BREAK	
	SESSION 1: Technical issues in coastal altimetry (cont'd)	Chairs: Luciana Fenoglio, Francesco Nencioli
10:50	Proving that Sentinel-3 Altimetry can be a Shore Success	<u>F. Nencioli</u> , G. Quartly
11:10	Improving the Validation Technique for Coastal Sea Level Rates from Satellite Altimetry and Tide Gauge Observations	<u>A. Shaw</u> , F. M. Calafat, C. Gommenginger, C. Banks, N. Dayoub, J. Benveniste

11:30	CalNaGironde: The Gironde Experiment	<u>P. Bonnefond</u> et al.
11:50	SAR Altimetry performance and improved retrieval methods in the Coastal Zone. Results and recommendations from the SCOOP project.	<u>D. Cotton</u> et al.
12:10	Assessment of Sentinel-3 and Jason3 Altimetry Data in The Coastal Zone	<u>N. Dayoub</u> , C. Gommenginger, A. Shaw, C. Banks, H. Snaith
12:30-12:50	Discussion	
12:50-14:00	LUNCH	
	SESSION 1: Technical issues in coastal altimetry (cont'd)	Chairs: Jesús Gómez-Enri, Matthias Raynal
14:00	Retracker bias characterization in coastal zones	<u>F. Niño</u> , F. Birol, D. Blumstein, H. N. Ngo, F. Léger
14:20	Round Robin Assessment of Radar Altimeter LRM and SAR Retracking Algorithms for Significant Wave Height: A Coastal Point of View	<u>F. Schlembach</u> et al.
14:40	Defining a retracking manifold within a radargram stack to improve satellite altimetric water level over coastal seas: A feasibility study	<u>M. Tourian</u> , O. Elmi, N. Sneeuw
15:00	Assessing the quality of 80 Hz Sentinel-3A SRAL sea level data around Spanish coasts	A. Aldarias, <u>J. Gómez-Enri</u> , I. Laiz, B. Tejedor, S. Vignudelli, P. Cipollini
15:20	SWOT Datasets for the Coastal Areas	<u>J. Hausman</u> , M. Gangl, M. Gierach, C. Oaida, S. Vannan
15:40-16:00	Discussion	

16:00-16:30	COFFEE BREAK	
	SESSION 2: Applications of coastal altimetry data	Chairs: David Cotton, Mathilde Cancet
16:30	Bathymetry Improvement and Tidal Modelling at Regional Scales	<u>M. Cancet</u> , F. Toubanc, F. Lyard, G. Dibarboure, N. Picot, T. Guinle
16:50	MSS improvement in the coastal zone - result from the Baltic Sea	<u>O. B. Andersen</u> , A. Abulatitjiang
17:10	Examining the Performance Sentinel-3A SAR Altimetry Retracker and Hydrodynamic Models Using a High-Resolution Geoid Model in the Baltic Sea	<u>N. Delpeche-Ellmann</u> , M. Mostafavi, A. Ellmann
17:30	New CNES-CLS18 Mean Dynamic Topography of the global ocean from altimetry, gravity and in-situ data	S. Mulet, M.-H. Rio, H. Etienne, N. Picot, G. Dibarboure, <u>M.-I. Pujol</u>
17:50-18:10	Discussion	
18:10-19:00	POSTER SESSION & Cocktail	
20:00-22:30	Social Dinner [No-Host]	

	SESSION 2: Applications of coastal altimetry data (cont'd)	Chairs: Marcello Passaro, Florence Birol
9:00	Toward Higher resolution Level-3 altimeter products	<u>M.-I. Pujol</u> , Y. Faugère, S. Dupuy, O. Vergara, Q. Dagneaux, G. Dibarboure
9:20	The New Generation of High-Resolution X-TRACK/ALES Regional Altimetry Product and the Coastal Applications Associated	<u>F. Léger</u> et al.
9:40	On The Use of Satellite Altimetry for Validating a Pan-European High Resolution Storm Surge Hindcast (ANYEU-SSL)	<u>T. Fernández-Montblanc</u> , P. Ciavola, M. Vousdoukas, L. Mentaschi
10:00	Coastal Altimetry Circulation (CryoSat-2): Comparison with High-Frequency Radar	<u>R. Mulero-Martinez</u> , J. Gómez-Enri, M. Bruno
10:20-10:50	COFFEE BREAK	
	SESSION 2: Applications of coastal altimetry data (cont'd)	Chairs: Kaoru Ichikawa, Martín Saraceno
10:50	Assessment and application of Sentinel-3 fully-focused SAR altimeter range data for enhanced detection of coastal currents along the Northwest Atlantic shelf	<u>H. Feng</u> , A. Egido, D. Vandemark, J. Wilkin
11:10	Wave-current interactions in the Agulhas current system	<u>S. Ponce De Leon Alvarez</u> , C. Guedes Soares, J. A. Johannessen
11:30	Toward a New Coastal Altimetry-Based Algorithm for the Detection of Current Intrusions Into the Gulf of Lion	<u>D. Casella</u> , M. Meloni, A. M. Doglioli, A. Petrenko, J. Bouffard

11:50	The Zone of Influence: Matching along-track coastal altimetry data with high-frequent tide gauge observations for vertical land motion estimation	<u>J. Oelmann</u> , M. Passaro, D. Dettmering, L. Sanchez, C. Schwatke, F. Seitz
12:10	Coastal Altimetry using ICESat-2 Photon-Counting Laser Altimeter	<u>B. Wang</u> , M. Tourian, N. Sneeuw
12:30	The use of Sentinel-1, Sentinel-2, and SWOT-type data for monitoring the topography of coastal intertidal areas	<u>E. Salameh</u> , B. Laignel, F. Frappart, I. Turki
12:50-14:00	LUNCH	
	SESSION 2: Applications of coastal altimetry data (cont'd)	Chairs: David Cotton, Mathilde Cancet
14:00	The assimilation of high frequency altimeters wave data in the model MFWAM: a relevant perspective for wave submersion warning	<u>L. Aouf</u> , A. Dalphinnet, D. Hauser, C. Tourain
14:20	CFOSAT Mission: A Proposal for Testing Sites in the North-Western Russia	<u>A. Kostianoy</u> , S. Lebedev, S. Badulin, V. Grigorieva, A. Kouraev, V. Tcepelev
14:40-15:00	Discussion	
	SESSION 3: Synergistic and climate studies	Chairs: Paolo Cipollini, Guillaume Dodet
15:00	Coastal Sea Level rise at Senetosa (Corsica), the calibration site of altimetry missions	Y. Gouzenes, F. Léger, <u>A. Cazenave</u> et al.

15:20	Coastal altimetry at high-latitudes: the Baltic SEAL project observing sea level among jagged coastline and sea ice	<u>M. Passaro</u> et al.
15:40-16:10	COFFEE BREAK	
	SESSION 3: Synergistic and climate studies (cont'd)	Chairs: Fabien Léger, Slim Gana
16:10	Coastal Extreme Sea Levels From Satellite Altimetry: A Global Study	<u>H. Lobeto</u> , M. Menendez
16:30	Combining Coastal Altimetry Data With High-Frequency Radar and Drifter Data to Monitor the Dynamics in the South-East Bay of Biscay	A. Caballero, <u>N. Ayoub</u> et al.
16:50	Case Study of Wind-Driven Waves in the White Sea During the Tandem Phase of Jason-2 and Jason-3 Missions	<u>S. Badulin</u> , V. Grigorieva, P. Shabanov, V. Sharmar, I. Karpov, S. Lebedev, A. Kostianoy
17:10	Understanding Ocean Wave Climate Variability in the Open Ocean and at the Coast	<u>C. Gommenginger</u> , B. Timmermans
17:30-18:00	Discussion	
18:00-19:00	POSTER SESSION & Cocktail	

	SESSION 3: Synergistic and climate studies (cont'd)	Chairs: Christine Gommenginger, Marco Restano
9:00	Freshwater-induced coastal water level variability from SAR altimetry	<u>C. Slobbe</u> et al.
9:20	Continuum of Waters and Estuaries	<u>L. Fenoglio</u> et al.
9:40	SMASH: a mission concept to better monitor inland waters and estuaries	<u>D. Blumstein</u> et al.
10:00-10:30	Discussion	
10:30-11:00	COFFEE BREAK	

	CLOSING SESSION	Chairs: Marcello Passaro, Marco Restano
11:00	Report from Session Chairs (10' each)	
11:30-13:00	Final Discussion, Recommendations and Closing Remarks	

SESSION 1 - Technical Issues in Coastal Altimetry

1	Inland radar altimetry for intermediate scale water bodies with nadir specular echoes and a constellation of small satellites	<u>R. Abileah</u> , S. Vignudelli, A. Scozzari
2	Improving Conventional Altimetry in coastal area: Review of the performances derived from innovative LRM retrackers	<u>M. Raynal</u> , A. Guérou, H. Roinard, F. Birol, S. Labroue, P. Thibaut, F. Piras, N. Picot
3	SAR single and multi looks water level over small inland water bodies	<u>S. Roohi</u> , S. Dinardo, R. Scharroo
4	The algorithm for processing specular echoes	<u>R. Abileah</u> , S. Vignudelli, A. Scozzari
5	Regional In Situ CalVal of Sentinel-3 Altimeter Range	<u>M. Cancet</u> , P. Bonnefond, C. Watson, B. Haines, F. Lyard, O. Laurain, P. Féménias
6	A Regional Evaluation of Sentinel-3 SRAL Derived Geophysical Parameters in Open Ocean and Coastal Areas in The North Sea	<u>H. Ranndal</u> , O.B. Andersen, K. Nielsen
7	Validation of Multi-Satellite Altimetry Data Utilizing a High-Resolution Marine Geoid for the Baltic Sea	<u>M. Mostafavi</u> , A. Ellmann, N. Delpeche-Ellmann
8	Monitoring marine litter with ocean current products in the North Atlantic Ocean	M. Lux, E. Sahuc, <u>M. Cancet</u>
9	A new high-resolution coastal model in Kerguelen Island for CAL/VAL operations	<u>Y. Tranchant</u> , C. Chupin, L. Testut, V. Ballu, O. Laurain, P. Bonnefond
10	Sentinel 3A approaching the coast: effects of track orientation and coastal topography	<u>J. Gómez-Enri</u> , A. Aldarias, S. Vignudelli, P. Cipollini

11	Recalculation plan for altimetry measurements of Russian GEO-IK satellites No 1-9 ((1985-1995))	<u>S. Lebedev</u>
12	Systematic Differences Between Tide Gauges and Altimetry Related to Coastal Tidal Dynamics	<u>S. Esselborn</u> , J. Illigner, T. Schöne
13	The TUDaBo Processor for SAR and RDSAR Mode	<u>L. Fenoglio</u> , C. Buchhaupt
14	Fully Focused SAR Altimeter Processor for Assessing the Full Capabilities of SAR-mode Altimeter Missions	<u>T. Moreau</u> , P. Rieu, J-C. Poisson, F. Borde, F. Boy, S. LeGac, N. Picot
15	GEO-IK Space Geodetic System	V. Kosenko, V. Zvonar, V. Karnaukhov, D. Shapovalov

SESSION 2 - Application of Coastal Altimetry Data

16	Waveform retracking analyses of satellite altimetry data on shallow Natuna waters and its surrounding, Indonesia	<u>B. Nababan</u> , R.D. Permana, M.E. Sinurat, J.P. Panjaitan
17	Identification Sea Ice Edge Position based on Satellite Altimetry	<u>S. Lebedev</u> , A. Kostianoy , D. Soloviev
18	CoastalSWH : Supporting Future Operational Ina-WAVES Products using Sentinel 3B and HF RADAR Data Assimilation	<u>K.R. Pratama</u> , E.L. Siadari, B.E. Pratama
19	Lake Monitoring Using Multi-Mission Satellite Radar Altimetry	R. Muzafter, <u>S.U. Haque</u>
20	Altimeter Wave Data Used to Compare with the Data from the Offshore Wave Glider System	<u>T. Kim</u> , J. Lee

21	Observed sea level changes at different coastal sites from retracked altimetry over 2002-present	<u>Y. Gouzenes</u> , A. Cazenave, F. Léger, F. Birol, M. Passaro, F. Niño, J.F. Legeais, J. Benveniste
22	Synergy of Coastal Altimetry and Tide Gauge Data in Monitoring Sea Level. A Case Study in the Aegean Sea	<u>N. Flokos</u>
23	Sea surface height variations in the slick-rich Sulawesi Sea determined by a new coastal retracking algorithm eliminating inhomogeneous smooth sea surfaces within footprints	<u>K. Ichikawa</u> , X.F. Wang, D. N. Wei
24	Potential Applications of the SWOT Mission to the Coastal Oceans	<u>L.L. Fu</u>
25	Performance of Recent Global Tide Models at The Entrance of The Gulf of California With Application to Altimeter Data	J.Valle, <u>J. Gómez</u> , A. Trasviña
26	X-TRACK Regional Altimeter Products for Coastal Applications: 2020 Release	<u>F. Léger</u> , F. Birol, F. Niño, D. Allain
27	Wave Model Confidence Index: A metocean decision support tool	<u>C. Skandrani</u> , E. Munesa, L. Grignon
28	River Water Level Monitoring from Satellite Radar Altimetry Multi Missions: A Case Study of the Amazon and Danube Rivers	<u>M. Mostafavi</u> , S. Roohi, A. Ellmann, N. Delpeche-Ellmann
29	Determination of Sea Level Trends of the Marmara Sea from Satellite Altimetry and Tide Gauges Data (2010-2019)	<u>M.H. Erkoç</u> , U. Do-an
30	Coastal HF Radars and Remote Sensing Altimetry: Complementary Process for Wave Height Observations	<u>I. Bué</u> , A. Semedo, J. Catalão

31	Access to Sentinel-3 Marine Center data	<u>B. Lucas</u> , R. Scharroo, C. Nogueira Loddo, C. Martin-Puig, S. Dinardo, I. Parodi
32	S3 Marine Centre status	<u>B. Lucas</u> , R. Scharroo, C. Nogueira Loddo, C. Martin-Puig, S. Dinardo
33	Satellite Altimetry: Coastal Region Research to Applications	<u>M. Srinivasan</u>
34	Highlights of Spatial Altimetry Activities in CNES Related to Coastal Processes	S. Pena Luque, <u>A. Collet</u> , N. Picot, A. Giros
35	Exploring the Trend of Sea Level Rise and Its Impacts on Coast of Pakistan Using Satellite Radar Altimetry	<u>T. Naseer</u> , A. Zaidi, S. Vignudelli
36	Indus River Level Monitoring using Sentinel 3A data	<u>A. Zaidi</u> , R. Muzaffar, V. Panhwar, S. Zafar
37	2-D Flood Model Validation in the Lower Indus reach Using Satellite Altimetry	<u>V. Panhwar</u> , A.Zaidi, N. Babar
38	Use of Sentinel3-A satellite altimeter data for Geoid determination over the Western Mediterranean	<u>T. Benkouider</u>
39	SAR and SARin Altimetry Processing on Demand for Cryosat-2 and Sentinel-3 at ESA G-POD	J. Benveniste, S. Dinardo, G. Sabatino, <u>M. Restano</u> , A. Ambrózio
40	The BRAT and GUT Couple: Broadview Radar Altimetry and GOCE User Toolboxes	<u>A. Ambrózio</u> , M. Restano, J. Benveniste
41	Validation of Sentinel-3 Coastal Altimetry Data on the Baltic Sea and Estonian Lakes	<u>A. Liibus</u> , T. Kall, S. Rikka, R. Uiboupin

SESSION 3 - Synergistic and Climate Studies

42	Satellite Altimetry and In Situ Observations: Estimating Relative and Absolute Sea Level Rise at the Adriatic Sea coast (Venice and Trieste)	<u>F. De Biasio</u> , G. Baldin, A. Papa, S. vignudelli
43	The Impact of the Large-Scale Atmospheric Patterns in the North Atlantic on the Northern European Sea Level	<u>F. Mangini</u> , L. Chafik, E. Madonna, C. Li, L. Bertino
44	Exploring the Synergy between Optical Imaging Radiometry and Radar Altimetry for Inland Waters: an Experience on the Nasser Lake	<u>A. Scozzari</u> , S. Vignudelli, N. Galal, M. Khairy, A. Negm
45	On the Synergy Between Altimetric data and a WebGis Platform to Understand Coastal Hydrodynamic Processes: The ODYSSEA Project	<u>S. Gana</u>
46	Quantification of the Signature of the Northern Current in Sea Level Variations or How Can We Optimally Use Altimetry Observations in Coastal Circulation Studies	<u>A. Carret</u> , F. Birol, C. Estournel
47	Extreme Sea Level in the Coastal Zone – Pathway to Improved High-Temporal-Resolution Gridded Sea Level Product over the Baltic Sea	<u>I.M. Ringgaard</u> , J.L. Høyer, K.S. Madsen, A. Abulaitijiang, O.B. Andersen
48	The first fours years of Sentinel-3 Altimetry – The latest Reprocessing	<u>B. Lucas</u> , R. Scharroo, S. Dinardo, C. Nogueira Loddo, C. Martin-Puig
49	The Sea-level Budget on the Northwestern European Shelf in the Satellite Era	<u>C. Camargo</u> , R. Riva, T. Hermans, A. Slangen



TUM

l'Observatoire
de Paris | SYRTE

FC
UNIVERSITÉ
DE PORTO

UCA
Universidad
de Cádiz

UNIVERSITY
of HAWAII
MANOA

cnes



EUMETSAT

University of
New Hampshire

esa

Detailed technical and scientific information
can be found at: www.coastalaltimetry.org



Link to the Coastal Altimetry Community: www.coastalt.eu