FINAL
GENERAL ASSEMBLY

Joint European Research Infrastructure for Coastal Observation

BREST - 2, 3, 4, 5 JULY 2019

ABSTRACTS BOOK

→ POSTERS (ALL WPs)

→ TNA ORAL PRESENTATIONS

More information about the JERICO-NEXT GENERAL ASSEMBLY WEEK on: www.jerico-ri.eu

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https://docs.google.com/document/d/1Y4xeaaw58Lw05raZbYaV0XhLu6zBS9vz44n2OjbzoUY/edit?usp=sharing

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ABSTRACT N°	AUTHORS	PRESENTS	EMAIL OF PRESENTER	INSTITUTE	TITLE
WP1.1	Paul Gaughan, Kieran Reilly	Paul Gaughan	Paul.Gaughan@Marine.ie	MI	Using economic cost benefit analysis methodologies to underpin the sustainability and strategic planning of coastal ocean research infrastructures in europe.
WP4.1	Grassi Kelly, Poisson-Caillault Emilie, Lefebvre Alain	Lefebvre Alain	alain.lefebvre@ifremer.fr	IFREMER	Extreme event detection from multivariate data time series. Application to marine observation.
WP4.2	Jaime Hernandez-Lasheras, Baptiste Mourre, Emma Reyes, Eva Aguiar, Adèle Revélard, Mélanie Juza, Alejandro Orfila, Joaquín Tintoré	Baptiste Mourre	jhernandez@socib.es	ICTS-SOCIB	Impact of hf radar data assimilation on surface currents in the ibiza channel
WP4.3	Arnaud Louchart (CNRS-LOG), Reinhoud de Blok (U. Ghent), Elisabeth Debusschere (VLIZ), Alain Lefebvre (IFREMER), Fabrice Lizon (CNRS-LOG), Jonas Mortelmans (VLIZ),	Arnaud Louchart	arnaud.louchart@etu.univ-littoral.fr		ADDRESSING THE TIMING AND EXTENSION OF PHYTOPLANKTON BLOOM THROUGH THE EASTERN CHANNEL - SOUTHERN NORTH SEA CONTINUUM IN SPRING: AN AUTOMATED APPROACH.
WP4.4	Artigas L. F. (CNRS LOG), Karlson B. (SHMI), Aardema H. (RWS), Brosnahan M.L. (WHOI), Claquin P. (CNRS BOREA), Créach V (CEFAS), de Blok R. (UGent), Debusschere E. (VLIZ),	Felipe Artigas	felipe.artigas@univ-littoral.fr		ON THE IMPLEMENTATION OF AN INTEGRATED PLATFORM FOR PHYTOPLANKTON AUTOMATED OBSERVATION IN EUROPEAN COASTAL WATERS: A JERICO-NEXT (H2020) JOINT RESEARCH ACTION.
WP7.1	(SYKE), Stemmann L. (CNRS OOV), Veen A. (RWS), Wacquet G. (CNRS LOG), Puillat I. (IFREMER)	A. King	andrew.king@niva.no	NIVA	Seasonal variability in carbonate chemistry in the southern Aegean Sea
WP7.2	L. Shirley(ANB Sensors), N. Lawrence (ANB Sensors)	someone from SYKE	nlawrence@anbsensors.com	ANB Sensors	Testing an Autonomous Self-Calibrating pH Sensor with On-Board QA/QC
WP7.3	J. Seppälä (SYKE)	J. Seppälä	jukka.seppala@ymparisto.fi	SYKE	FluorMed-1. Phytoplankton fluorescence studies in Mediterranean - Part 1: Feasibility and comparability of different methods in oligotrophic seas
WP7.4	J. Costa (University of Aveiro)	access providers	joao.pinto.da.costa@gmail.com	University of Aveiro	Microplastics in the marine environment: estimation and ecotoxicological assessment
WP7.5	K. Mylona (HCMR), M. Tsapakis (HCMR), F. Smedes (RECETOX), J. Sobotka (RECETOX , R. Prokeš (RECETOX),	Authors part 2 : B. Vrana (RECETOX), F. Riminucci (CNR-ISMAR), M. Ravaioli (CNR-ISMAR) V. Slabakova (IO-BAS) and I. Kalantzi (HCMR)	kalantzi@hcmr.gr	HCMR	Monitoring of Organic Contaminants in the water of the Southern Europe with Passive Sampling
WP7.6	N. Montero (UNICA), M.J. Belzunce (AZTI), M. Schintu (UNICA), A. Marrucci (UNICA), C. Frangoulis (HCMR), M. Ntoumas(HCMR), A. Kalampokis (HCMR), G. Petihakis (HCMR), L. Perivoliotis (HCMR), F. Smedes (RECETOX), J. Sobotka (RECETOX),	Authors part 2 : R. Prokeš (RECETOX), B. Vrana (RECETOX), B. Marras (UNICA), A. Bettoschi (UNICA), M. Pettas (HCMR), M. Tsapakis (HCMR), I. Kalantzi (HCMR), K. Mylona	natalia.montero.ruiz@gmail.com	Università degli Studi di Cagliari (UNICA)	Monitoring of organic contaminants by passive samplers in Southern Europe coastal areas: MONICOAST Project
WP7.7	Adriana Galindo Dalto, Márcio Murilo Barboza Tenório, Antoine Grémare, Bastien Lamarque	Antoine Grémare	agdalto@gmail.com	Federal University of Rio de Janeiro - UFRJ	Assessment of the ecocological quality status of the west gironde mud patch, taken as an example of offshore marine systems, using sediment profile imagery
WP7.8	A. Lavín (IEO), C. Gonzalez-Pola (IEO)	A. Lavín	alicia.lavin@ieo.es	IEO	FinisGlider: Pilot experience to incorporate Glider technology to the Finisterre (NW Spain) repeated hydrographic section
WP7.9	A. Caballero (AZTI), A. Rubio (AZTI), Ivan Manso (AZTI), Jeff Carpenter2, Lucas Merckelbach2, Julien Mader (AZTI), Gabriel Jordà3	A. Rubio	arubio@azti.es	AZTI	BB-TRANS glider mission: development and results
WP7.10	P. Bouruet-Aubertot (UPMC- LOCEAN)	P. Bouruet-Aubertot	pascale.bouruet-aubertot@locean-ipsl.upmc.fr	UPMC-LOCEAN	Dynamics and turbulence in the Sicily channel
WP7.11	M.-L. Tercier-Waeber (University of Geneva), M. Abdou (University of Geneva), J. Schäfer (University of Bordeaux), A. Novellino (ETT), S. Alloisio (ETT), L. Bonofiglio (ETT)	Luca Bonofiglio	luca.bonofiglio@ettsolutions.com	ETT S.p.A	MEPHY field campaign: Synergism of state-of-the-art sensing tools to monitor bioavailable metal species, phytoplankton, macronutrients and examine their sources, behavior and interaction
WP7.12	K. Kebkal (EvoLogics), Ivan Masmitjà (UPC9, J. del Rio (UPC)	J. del Rio	joaquin.del.rio@upc.edu	Universitat Politecanica de Catalunya (UPC)	Long term Underwater localization in extreme conditions.
WP7.13	R. Witbaard (NIOZ), P. Fischer (AWI)	P. Fischer	Rob.Witbaard@nioz.nl	NIOZ	To Gape or not to Gape. On-line monitoring of Valve Gape of Arctica islandica
WP7.14	A. Drago (University of Malta), A. Gauci (University of Malta), A. Galea (University of Malta)	A. Drago	aldo.drago@um.edu.mt	University of Malta	GLIDER missions in the SOUTHern Sicilian Channel
WP7.15	A.L.King (NIVA), E.P. Achterberg (GEOMAR), K. Sørensen (NIVA), P.F. Jaccard (NIVA), M. Esposito (GEOMAR), M. Martinez-Cabanas (GEOMAR)	A. King	andrew.king@niva.no	NIVA	NitrateComp: In-situ inter-comparison of nitrate sensors
WP6.1	Milla Johansson, Jonni Lehtiranta, Sami Kielosto, Martt	Lauri Laakso	milla.johansson@fmi.fi	FMI	Utö Atmospheric and Marine Research Station data portal.
WP6.2	Jukka Seppälä, Jani Ruohola, Anne-Mari Lehto, S	Jukka Seppälä	jukka.seppala@ymparisto.fi	SYKE	SYKE Alg@line Data from the Baltic Sea.
WP6.3	Cristian Muñoz, Xisco Notario, Paz Rotllán, Inmaculada Ruíz, Miguel Charcos, Miquel Ángel Rújula, Sonia Gómara, Miquel Gomila, Juan Gabriel Fernández, Joaquín Tintoré	Cristian Muñoz	cmunoz@socib.es	ICTS-SOCIB	SOCIB Products & Services: Providing VA capabilities for end users
WP6.4	L Mousseau, J-M Grisoni, O Boëbion, J-O Irisson, V taill	-	laure.mousseau@obs-vlfr.fr	IMEV	Environmental Observatory of the Littoral
WP6.5	Christiane Eschenbach, Klas Ove Möller, Wilhelm Petersen	Klas Ove Möller	klas.moeller@hzg.de	HZG	COSYNA: User interaction to foster spreading of coastal information
WP6.6	Kate Collingridge, Roi Martinez, Keith Cooper, Oliver Williams, Laura Hanley, Véronique Créach	Veronique Creach	Veronique.creach@cefas.co.uk	Cefas	Cefas Data Hub and Applications in Cefas Open Science
WP6.7	Kate Collingridge and Veronique Creach	Kate Collingridge	kate.collingridge@cefas.co.uk	CEFAS	Phyto-OPS: a tool for visualisation of phytoplankton data from FerryBox, HPLC and flow cytometry
WP6.8	Palazov A. (IO-BAS), Slabakova V. (IO-BAS), Marinova V. (IO-BAS), Stefanov (IO-BAS), Valcheva N. (IO-BAS)		palazov@io-bas.bg	*IO-BAS*	Virtual Access to the Bulgarian Sea Level Service
WP6.9	Mantovani C. , Corgnati L. , Berta M. , Griffa A.	Maristella Berta	carlo.mantovani@cnr.it	CNR	CNR LiSO-HFR data portal: HF Radar derived currents for operational services
WP6.10	Mader J. (AZTI), Rubio A.(AZTI), Asensio J.L. (AZTI), Del Campo A.(AZTI), Aranda J.A. (DAEM)	Mader J. (AZTI)	jmader@azti.es	AZTI	Virtual Access to HF Radar products from EuskOOS
WP6.11	Alicia Romero-Ramirez, Guillaume Bernard, Antoine Grémare	Guillaume Bernard	guillaume.bernard@u-bordeaux.fr	CNRS	SpiArcBase software
WP6.12	Thierry Carval, Armel Bonnat, Stefane Tarot	Thierry Carval	thierry.carval@ifremer.fr	Ifremer	CORIOLIS
WP3.1	Machteld Rijkeboer, Arnold Veen, Thomas Rutten	Machteld Rijkeboer	machteld.rijkeboer@rws.nl	RWS	Automated characterization of phytoplankton community into size and pigment groups based on flow cytometry
WP 3.2	J. Evrard, M.Tardivel, B.Forest, A.Bocher, S. Laurentd, F. Colas	M.Tardivel	morgan.tardivel@ifremer.fr	Ifremer	Underwater Surface Plasmon Resonance Imaging sensor for the detection of marine biotoxins
WP3.3	Wacquet G. (CNRS-LOG), Louchart A. (CNRS-LOG), Blondel C. (Ifremer), Hébert P.-A. (LISIC ULCO), Poisson-Caillault E. (LISIC ULCO), Gomez F. (CNRS-LOG), Lefebvre A. (Ifremer)	G. Wacquet	Guillaume.Wacquet@univ-littoral.fr	CNRS	COMBINATION OF "MACHINE LEARNING" METHODOLOGIES AND AUTOMATED DATA ACQUISITION SYSTEMS FOR PHYTOPLANKTON DETECTION AND CLASSIFICATION

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WP1- Integrated Science Strategy and governance from local to European Scales

1.1 USING ECONOMIC COST BENEFIT ANALYSIS METHODOLOGIES TO UNDERPIN THE SUSTAINABILITY AND STRATEGIC PLANNING OF COASTAL OCEAN RESEARCH INFRASTRUCTURES IN EUROPE.

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The JERICO-RI (Joint European Research Infrastructure for Coastal Observatories, http://www.jerico-ri.eu) is a Network of Coastal Observatories which are being integrated into a sustainable system of systems. Initiated in 2010, the basic elements of the system are nationally funded observing platforms, i.e. Ferrybox, fixed platforms (moorings, cabled observatories, piles), coastal gliders, HF radar, coastal profilers and vessels of opportunity. One of the main challenges for the European marine research community is now to increase the consistency and the sustainability of these dispersed networks and infrastructures by integrating their future within a shared Pan-European framework/infrastructure. A comprehensive cost benefit and value analysis for the Research Infrastructure is presented, outlining both the direct costs and benefits, but also the non-quantifiable costs and benefits associated with the operation of an integrated network of coastal marine observing systems. We show how the results of the economic appraisal and Cost Benefit Analysis outputs are best represented by the calculation of the Net Present Value (NPV) for each of the governance options considered. This value, in combination with the Benefit Cost Ratio (The ratio of the total benefits to total costs when total benefits and total costs are expressed in discounted present value terms) are calculated and presented with the high values in both cases illustrating the strong rationale for the development of a permanent Pan-European Research Infrastructure for coastal observations.

WP4 - Valorisation through applied joint research

WP4.1 JRAP#1 Channel and North SeaEXTREME EVENT DETECTION FROM MULTIVARIATE DATA TIME SERIES. APPLICATION TO MARINE OBSERVATION.

Grassi K. (WeatherForce, Ifremer, LISIC), Poisson-Caillault E. (LISIC), Lefebvre A. (Ifremer)
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Marine Observation programmes have considerably evolved in recent years with the use of automated high frequency (HF) measurement systems. The general phytoplankton dynamics (from seasonal to long-term characteristics in response to different types of forcing) is now better understood. Nevertheless, the role and impact of extreme events on this dynamic are only partially addressed due to the lack of an appropriate, optimized numerical methodology to extract information from HF data series. To fill this gap, a Multi-layer Spectral Clustering (M-SC) architecture has been developed to segment HF series from general to specific patterns. The proposed method, tested on a set of simulated and manually labelled data, is generally more powerful than the existing methodologies and do not require the stationarity constraints of the signals. After validation, M-SC was applied to a data set from the MAREL Carnot fixed-platform (eastern English Channel). While the first classification level make it possible to automatically identify the main phases of phytoplankton development and even sensor failures, the higher levels of segmentation correspond to extreme events (short duration, exceptional amplitude). This new approach suggests an enhanced ability to better understand pressure/impact relationships and thus it will improve our prediction capabilities for events such as, for examples, harmful phytoplankton blooms, and anoxia.

WP4.2 JRAP #6 IMPACT OF HF RADAR DATA ASSIMILATION ON SURFACE CURRENTS IN THE IBIZA CHANNEL

Jaime Hernandez-Lasheras (jhernandez@socib.es), Baptiste Mourre, Emma Reyes, Eva Aguiar, Adèle Révélard, Mélanie Juza, Alejandro Orfila, Joaquín Tintoré

High Frequency radars (HFR) provide continuous and high-resolution surface current measurements in coastal areas, allowing to better understand surface ocean dynamics and providing valuable data to improve numerical model predictions through data assimilation. Since
2012, SOCIB operates two coastal HFR antennas with the purpose of monitoring the surface currents in the Ibiza Channel (Western Mediterranean Sea).
Several experiments have been carried out to evaluate the improvement in model forecasts when assimilating HFR measurements in addition to multiplatform observations from satellite and ARGO floats, with the objective of being able to be implemented in the operational system. A control simulation assimilating multiplatform observations without including HFR velocities allows to characterize the influence of HFR measurements on the forecast performance.
Results have been assessed comparing against HFR fields and independent surface drifter. They show the capacity of the model to correct surface currents when using DA. The correction is furtherly strengthen when adding HFR observations.

WP 4.3 ADDRESSING THE TIMING AND EXTENSION OF PHYTOPLANKTON BLOOM THROUGH THE EASTERN CHANNEL - SOUTHERN NORTH SEA CONTINUUM IN SPRING: AN AUTOMATED APPROACH.

Arnaud Louchart (CNRS-LOG), Reinhoud de Blok (U. Ghent), Elisabeth Debusschere (VLIZ), Alain Lefebvre (IFREMER), Fabrice Lizon (CNRS-LOG), Jonas Mortelmans (VLIZ), Machteld Rijkeboer (RWS), Klaas Deneudt (VLIZ), Arnold Veen (RWS), Luis Felipe Artigas (CNRS-LOG) arnaud.louchart@etu.univ-littoral.fr

The eastern Channel and southern North Sea are continuously influenced by the Atlantic waters and freshwaters inputs, as well as by tidal fronts. At the French coast, brackish waters from estuaries are driven from the Channel to the North Sea by the residual tidal current creating a “coastal flow”. It leads to a Region of Freshwater Influence (ROFI) that flows from the Bay of Seine to the Scheldt and Rhine estuaries, supplementing and maintaining a high nutrient concentration along the French, Belgian and Dutch coast.
During recent years, semi-automated techniques were applied in these areas at a high resolution to highlight spatial and temporal patterns in phytoplankton successions and outbursts. They provide rapid estimates of abundance and chlorophyll *a* content for the whole community, at the single-cell or colony level, from small picoeukaryotes up to large microphytoplankton.
The timing and extension of phytoplankton blooms was addressed during a series of three consecutive cruises in spring 2017 (PHYCO-CNRS cruise, Lifewatch-VLIZ cruise, Zirfaea-RWS cruise) in the frame of regular monitoring networks and the Joint European Research Infrastructure for Coastal Observation - New Expertise (JERICO-Next H2020) project. The cruises started after the onset of spring blooms in the eastern Channel and followed their extension along the eastern Channel towards the southern bight of the North Sea. A multi-spectral fluorometer and a pulse-shape recording flow cytometer were deployed for continuous and/or discrete sampling analysis. Both techniques highlighted patchiness and sharp variations in abundance and fluorescence per group with some inshore-offshore gradients and decreasing distance from estuaries. Multivariate analysis was used to reveal relations between nutrients and phytoplankton communities.

WP4.4 ON THE IMPLEMENTATION OF AN INTEGRATED PLATFORM FOR PHYTOPLANKTON AUTOMATED OBSERVATION IN EUROPEAN COASTAL WATERS: A JERICO-NEXT (H2020) JOINT RESEARCH ACTION.

Artigas L. F. (CNRS LOG), Karlson B. (SHMI), Aardema H. (RWS), Brosnahan M.L. (WHOI), Claquin P. (CNRS BOREA), Créach V (CEFAS), de Blok R. (UGent), Debusschere E. (VLIZ), Deneudt K. (VLIZ), Gómez F. (CNRS LOG), Grégori G. (CNRS MIO), Kromkamp J. (NIOZ), Lefebvre A. (IFREMER LER/BL), Lehtinen S. (SYKE), Lizon F. (CNRS LOG), Louchart A. (CNRS LOG), Möller, K. (HZG), Rijkeboer M. (RWS), Thyssen M. (CNRS MIO), Seppälä J. (SYKE), Stemmann L. (CNRS OOV), Veen A. (RWS), Wacquet G. (CNRS LOG), Puillat I. (IFREMER) felipe.artigas@univ-littoral.fr

In order to better understand phytoplankton temporal and spatial distribution in coastal systems, automated *in vivo* approaches are being deployed since the last decade. These innovative techniques provide new insights into the detection of phytoplankton community changes affecting growth rates, size structure, taxonomic and/or pigmentary composition, which can occur at different time and spatial scales, evidencing rapid as well as long-term changes in

environmental conditions. When implemented in automated environmental monitoring platforms, as fixed stations, moorings, research vessels and/or ships of opportunity, these techniques can represent valuable “near-real time” and “early-warning” systems of community changes which can evidence changes in ecosystem state, as the occurrence of blooms and, in particular, of harmful algal blooms (HAB), which can lead to disruption of marine food webs and mass mortalities of marine organisms and which are of special interest in areas of fishing, aquaculture and tourism. Therefore, there is need to improve the discrimination and operability of automated techniques addressing phytoplankton diversity (at nearly taxonomical and/or functional levels) and productivity. In the frame of the Joint European Research Infrastructure network for Coastal Observatories – Novel Expertise (JERICO-Next – H2020, 2015-2019), scientists inter compare, work on technical and analytical improvements and apply a combination of phytoplankton automated observation approaches, based on single cell/particle or bulk optical characteristics, in several European coastal systems ranging from oligotrophic (West Mediterranean) to mesotrophic (southern Bay of Biscay, Celtic seas) and eutrophic systems (eastern Channel, southern North Sea, Skagerrak/Kattegat, Baltic Sea), characterised by different phytoplankton communities, timing and extension of blooms (and potential HABs developments of dinoflagellates, diatoms, haptophytes, cyanobacteria). Three main groups of techniques, image in-flow or *in situ* acquisition and analysis, pulse shape-recording automated flow cytometry, as well as multispectral and variable fluorometry and spectrophotometry, are being critically explored and implemented in different sites and platforms. A summary of the main results gathered by a combination of these techniques is presented and discussed.

WP7 - JERICO-NEXT GA Brest – TNA session

9:00-11:40 Oral presentations (20 minutes each, including questions. The session is opened by an introduction of S. Sparnocchia- 20 minutes)

11:40-13:00 Posters (TNA & VA)

ORAL PRESENTATIONS

1. TNA Projects acronym: ABACUS 3; ABACUS 4
Title: ALGERIAN BASIN CIRCULATION UNMANNED SURVEYS

Authors: Yuri Cotroneo[1], Giuseppe Aulicino[1,2], Simon Ruiz[3], Antonio Sánchez Román[3], Marc Torner Tomàs[4], Ananda Pascual[3], Giannetta Fusco[1,5], Joaquín Tintoré[3,4], and Giorgio Budillon[1,5]

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5 Consorzio Interuniversitario Nazionale per la Fisica delle Atmosfere e delle Idrosfere, CINFAI,Tolentino (MC), Italy

Abstract

We present data collected in the framework of the Algerian BAsin Circulation Unmanned Survey - ABACUS project supported by EU JERICO 3rd call (2014) and JERICO-NEXT calls from 1st to 3rd (2016-2018).

ABACUS main objective is the monitoring of the basin circulation and of the surface and intermediate water masses physical and biological properties in a key region of the Mediterranean Sea circulation.

Data presented here have been collected through repeated deep glider surveys between the Island of Mallorca and the Algerian Coast (Western Mediterranean Sea), mainly during the fall season.

Several repeated transects were obtained which enabled us to investigate the basin scale circulation and the presence of mesoscale structures utilising both the adaptive sampling capabilities of the gliders and the higher resolution of the data.

Temperature and salinity measurements collected in the first 975 m of the water column describe the main water masses and their characteristics improving the understanding of the Algerian Basin dynamics. Data have been compared to those previously collected in the area from 1909 to 2011. The comparison with observations previously collected in the area from 1909 to 2011, shows similar overall distribution, ranges and variability, with no outliers in the surface or deep layers. Our measurements have also been compared to model output and satellite altimetry and salinity observations collected along the glider tracks. Results have been successfully published,

analysed and discussed in four scientific papers and in the framework of several international conferences also with the aim of enlarging the ABACUS community.

2. *TNA Project acronym*: Easy On-Line microLFA

***Title*: FIELD TEST OF A RELIABLE AND EASY TO USE MICROLFA BASED NUTRIENT SENSOR PACKAGE FOR FERRYBOX ON-LINE MONITORING APPLICATIONS**

Authors: L. Sanfilippo[1]

[1] *SYSTEA S.p.A., Italy*

Abstract

A specific task under JERICO-NEXT Transnational Access program was activated to test in operative conditions an updated version of the SYSTEA Micromac-1000 on-line analyzers, to be extensively used in FerryBox systems for unattended nutrients monitoring in sea and surface water.

The unattended measurement test was running along January-June 2019 in the Ferrybox NorFerry/Color Fantasy (FA), managed by NIVA along the route Oslo-Kiel; the on-line analyzers are configured to sequentially measure two methods each: 1. PO4 (fluorimetric) and NH3 (fluorimetric), 2. NO3 and NO2, 3. PO4 and SiO2 by wet-chemistry spectrophotometric methods and they were integrated in the existing FerryBox system layout and local control unit. The on-line analyzers were provided by SYSTEA already prepared to be installed and operated unattended.

Runtime measurement data were accessible through FTP files to regularly check the analyzers' performance; NIVA provided the logistic support to access, install and maintain the monitoring devices. Auxiliary data from the host facility including temperature, salinity, chlorophyll and fluorescence, and manually collected nutrient samples were analysed and reported.

2. *TNA Project acronym*: MultiFluoro

***Title:* DESIGN AND DEPLOYMENT OF A NEW MULTIPARAMETER FLUOROMETER IN COMPLEX ENVIRONMENTS**

Authors: J. Attridge[1] , J. Kirkbride[1], S.Kirby[1], J. Seppälä[2]

[1] *Chelsea Technologies Group Ltd, UK*

[2] *Finnish Environment Institute (SYKE), Finland*

Abstract

Chelsea Technologies Group has developed VLux, a new miniature multi-parameter fluorometer configured to provide high quality in situ detection of Algae, Aromatic Hydrocarbons or Tryptophan. Fluorescence readings are automatically corrected for turbidity, absorbance and temperature to provide robust data collection over extended deployments in environments where significant background interferences from turbidity or intrinsic sample absorbance can be an issue. The presentation will cover the design principles behind VLux and present data from the MULTIFLUORO project, which deployed an early algal prototype variant of the VLux, with 4 excitation bands and one emission band, in a 'FerryBox' system to assess optically complex coastal waters in the Baltic.

3. *TNA Project acronym*: INTERCARBO

***Title:* INTERCOMPARISON OF INSTRUMENTS FOR CARBONATE SYSTEM MEASUREMENTS (INTERCARBO)**

Authors: L. Laakso[1], M. Honkanen[1], S. Kielosto[1,3], T. Laurila[1], T. Mäkelä[1], A. King[3], K. Sörensen[2], R. Bellerby[2], S. Marty[2], J. Seppälä[3], G. Rehder[4], J. Müller[4], C. Le Gall[5], L. Thomas[5], L. Delauney[5], C. Cantoni[6], W. Petersen[7], M. Gehrung[7], F.Bastkowski[8]

[1]Finnish Meteorological Institute (FMI), Finland; [2]Norwegian Institute for Water Research (NIVA), Norway; [3]Finnish Environment Institute (SYKE), Finland; [4]Leibniz-Institut für Ostseeforschung Warnemünde (IOW), Germany; [5]L'Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), France; [6]Consiglio Nazionale delle Ricerche - Istituto di Scienze Marine (CNR-ISMAR), Italy; [7]Helmholtz-Zentrum Geesthacht Zentrum für Material- und Küstenforschung GmbH (HZG), Germany; [8]Physikalisch-Technische Bundesanstalt (PTB), Germany

Abstract

Carbon fluxes in coastal seas are more complex than those in the open ocean, in part due to high spatiotemporal variability in biological activity and physical processes. The aim of the INTERCARBO experiment, partly funded by Jerico-Next TNA was to bring together large number of pCO2, pH and total alkalinity sensors used on European coastal seas and to compare measurements using different sensors on the same seawater samples. During the activity, 17 experiments were carried out in 1 m3 tanks that were filled with seawater at salinity 5, 20, and 35 and carbon dioxide target values of approximately 200, 400, and 800 parts per million (ppm). The measurements were made on seawater at 10 °C and 20 °C. The preliminary results indicate that while most instruments used are suitable for coastal monitoring 1) there are clear differences between the instruments; 2)

time-responses of some instruments may be too low to detect rapid variations observed on e.g. coastal VOS-lines; 3) there are specific aspects which make the installation of the carbonate system instruments on different platforms challenging, e.g. related to water inlet and outlet pressures; 4) Instrument intercomparison experiments are mandatory for creating a harmonized and reliable coastal observing network.

4. *TNA Project acronym*: FOULSTOP
***Title:* FOULING PROTECTION FOR MARINE OPTICAL SYSTEMS**

Authors: L. Delauney[1]
[1]*Ifremer, France*

Abstract

Biofilm and Biofouling growth on marine in situ sensors is a well-known bottleneck when autonomous in situ monitoring is performed in seawater. Technological solutions have been under investigations for many years now. Still new improvements are studied.

This project consist to test in the Mediterranean sea environment an innovative technique to protect optical windows that are part of optical oceanographic sensors or more generally part of optical devices like underwater cameras and lights. The biofouling protection is achieved by a conductive layer that coats the optical window and is used to generate very low quantity of hypochlorous acid by controlled in situ chlorination of seawater.

This biofouling protection technology has been fully integrated to TriOS commercial optical sensors and an HD camera. The deployment at sea is performed on an underwater-cabled structure equipped with an EMSO COSTOF II junction box.

5. *TNA Project acronym*: ADVANCE
***Title:* AUTOMATIC DATA AND VIDEO ACQUISITION FOR UNDERWATER MONITORING ACROSS COASTAL ENVIRONMENTS**

Authors: S. Marini[1], E. Fanelli[2], E. Azzurro[3], C. Costa[4], M. Nogueras[5], M. Carandell[5], J. Del Rio Fernandez[5], R. Chumbinho[6], S. Burke[6], A. Berry[7], M. Wemyss[8], J. Aguzzi[9]
[1]*National Research Council of Italy (CNR-ISMAR), Italy;* [2]*Polytechnic University of Marche, Italy;* [3]*Institute for Environmental Protection and Research (ISPRA), Italy;* [4]*Consiglio per la ricerca in agricoltura e l'analisi dell'economia agraria (CREA), Italy;*
[5]Obsea-SARTI Research Group, Universitat Politècnica de Catalunya; [6]SmartBay, Ireland; [7]*Marine Institute, Galway, Ireland;* [8] *P&O Maritime, Galway, Ireland;* [9]*Instituto de Ciencias del Mar (ICM-CSIC), Spain.*

Abstract

Many devices are currently available for the acquisition of underwater images. Most of them have been designed to be towed by supporting vessels or to be installed on cabled observatories. On the contrary, very few devices have been designed to be stand-alone (not wired), autonomous (without human interaction) and suitable for working over extended periods of time.

The objective of the ADVANCE project was the test of the imaging device GUARD1 as a stand-alone and autonomous sensor capable of quantifying biological activities at individual, population, and community levels. The GUARD1 device is a low-power system conceived for installation either on fixed or mobile platforms for acquiring images of objects or organisms from 1 mm to 100 cm in size, for extended periods of time. These images are automatically analysed on board and their content can be stored or transmitted to the land.

Two different GUARD1 prototypes were tested in three deployments at the Smartbay CPO (https://www.smartbay.ie/) and OBSEA (www.obsea.es) facilities. Overall, 3080 images were acquired with different acquisition settings. At the same time, images and short video clips were also acquired in the same field of view by the video-cameras permanently installed in the two facilities.

GUARD1 data provide new information with a high temporal resolution on the dynamic of species abundances at diel and seasonal scale. Research is currently ongoing to study fish species diel rhythms and to implement the system with new computer vision and pattern recognition algorithms, capable to automatically extract the relevant content form the acquired images.

POSTER PRESENTATIONS

1. *TNA Project acronym*: CarbonAS
Title: SEASONAL VARIABILITY IN CARBONATE CHEMISTRY IN THE SOUTHERN AEGEAN SEA

Authors: A. King[1]
[1]*Norwegian Institute for Water Research (NIVA), Norway*

Abstract

An underway spectrophotometric pH sensor was deployed on the H/S/F Festos Palace FerryBox that transits between Heraklion, Crete and Piraeus, Greece in the Eastern Mediterranean Sea. The sensor successfully collected pH data on ~100 trips between March and June 2018. The data preliminarily shows that while pH is relatively spatially homogenous between Crete and Greece, the nearshore regions on both the northern and southern end of the transect were slightly lower in pH (~0.02-0.04). From March to June, pH exhibited seasonal variability of ~0.2 pH units in the study region from ~8.05-8.15 in March to ~7.95-8.00 in June. The theoretical thermodynamic warming effect on pH between March and June was not able to account for the observed ~0.2 pH decline, and therefore suggests that this region is a sink for CO2 during this time of year.

2. *TNA Project acronym*: pHIMS

***Title:* TESTING AN AUTONOMOUS SELF-CALIBRATING PH SENSOR WITH ON-BOARD QA/QC**

Authors: L. Shirley[1], N. Lawrence[1]

[1]ANB Sensors, United Kingdom

Abstract

ANB Sensors is developing a solid state self calibrating pH sensor. Working with SYKE, ANB Sensors have undertaken field trials of their latest version of the sensor. The field trials have allowed ANB Sensors to debug the design and provide validation of the sensor in operation. The valuable lessons learnt from these trials have been implemented in their next generation sensor which is currently being tested on board a ROV in California.

3. *TNA Project acronym*: FluorMed-1

***Title*: FLUORMED-1. PHYTOPLANKTON FLUORESCENCE STUDIES IN MEDITERRANEAN - PART 1: FEASIBILITY AND COMPARABILITY OF DIFFERENT METHODS IN OLIGOTROPHIC SEAS**

Authors: J. Seppälä[1]

[1]*Finnish Environment Institute (SYKE), Finland;*

Abstract

The FluorMed-1 project aims in providing information on the applicability and comparability of various fluorescence detection methods for phytoplankton community structure at a high frequency in the oligotrophic conditions of the Mediterranean waters. Those methods are used in contemporary online phytoplankton diversity and physiology research on various platforms (buoys, bench with pumped water, ships of opportunity, scientific vessels) and are mostly tested in eutrophied sea areas, where diversity and biomass are important. Since bulk or specific fluorescence sensors are not well defined in terms of detection limits but that they are depicted as required when selecting technology for monitoring the biological state of marine areas, it is important to define the possible applications in the oligotrophic conditions, and when developing the methodology further.

The validation and combination between bulk and physiology analysis in oligotrophic areas will be coupled with single cell analysis using high frequency pulse shape recording flow cytometry. This project will enable to get insight on the picoplankton community functioning, dominating oligotrophic areas.

4. *TNA Project acronym*: Microplastox

***Title*: MICROPLASTICS IN THE MARINE ENVIRONMENT: ESTIMATION AND ECOTOXICOLOGICAL ASSESSMENT.**

Authors: J. Costa[1]

[1] *University of Aveiro, Portugal*

Abstract

Microplastics (plastics < 5mm) are present in many household items and are also formed due to the cracking and embrittlement of larger plastic particles. Owing to their inherent physical and chemical characteristics, MPs are persistent and ubiquitous aquatic contaminants that can be potentially ingested by benthic and planktonic organisms, thus entering food webs. Additionally, studies have shown that the microbial communities that colonize these materials differ enormously from the indigenous free-living marine communities. All these threats are further exacerbated by these materials' ability to adsorb other contaminants, namely, persistent organic pollutants. However, the exact prevalence of these materials in the environmental remains a topic of debate. Therefore, a detailed quantitative and qualitative monitoring of microplastics and their effects in the marine environment is highly recommended by the Marine Strategy Framework Directive.

Hence, within the framework of the Project MicroPlastox, samples were collected at different European sites using different sampling methodologies and in order to establish a wider understanding of the real prevalence of these materials in European waters.

Subsequently, the isolated microplastics will be used to accurately evaluate their ecotoxicological effect, as most studies focusing on this subject resort to unrealistic concentrations of these materials, thus putting into question the environmental validity of such findings.

5. *TNA Project acronym*: MoCo Sea Pass

***Title:* MONITORING OF ORGANIC CONTAMINANTS IN THE WATER OF THE SOUTHERN EUROPE WITH PASSIVE SAMPLING**

Authors: K. Mylona[1], M. Tsapakis[1], F. Smedes[2], J. Sobotka[2], R. Prokeš[2], B. Vrana[2], F. Riminucci[3], V. Slabakova[4] and I. Kalantzi[1]

[1]Institute of Oceanography, HCMR, Greece

[2]Masaryk University, Faculty of Science, Research Centre for Toxic Compounds in the Environment (RECETOX), Brno, Czech Republic

[3]CNR - Ismar Institute of Marine Science, Marine Geology Section, Bologna, Italy

[4]Department of Ocean Technologies, Institute of Oceanology-BAS,Varna, Bulgaria

Abstract

Organic contaminants, in particular persistent organic pollutants (POPs), adversely affect water quality and aquatic food webs across the globe. To date, there is no globally consistent information available on concentrations of dissolved POPs in water bodies. The advance of passive sampling techniques has made it possible to establish a global monitoring program for these compounds in the waters of the world, which we call the Aquatic Global Passive Sampling (AQUA-GAPS) network. The main objective/ goal of the project was the use of state of the art passive sampling devices for monitoring and study the process (air sea exchange) govern the fate of POPs in marine boundary layer. This technique contributed to reach the aims of AQUA-GAPS including the investigation of the global distribution of POPs without discrepancies caused by individual or local approaches. Through this project this objective was implemented in the water of Southern Europe including the following:

1. Evaluation of the present state of POPs pollution in the water of the Southern European coastal areas
2. Investigation of different sites with different sources of anthropogenic inputs and different environmental characteristics (e.g. depth, salinity, currents etc).
3. Study of the air-sea exchange of organic contaminants.

6. *TNA Project acronym*: MONICOAST

***Title:* MONITORING OF ORGANIC CONTAMINANTS BY PASSIVE SAMPLERS IN SOUTHERN EUROPE COASTAL AREAS: MONICOAST PROJECT**

Authors: N. Montero[1], M.J. Belzunce[2], M. Schintu[1], A. Marrucci[1], C. Frangoulis[3], M. Ntoumas[3], A. Kalampokis[3], G. Petihakis[3], L. Perivoliotis[3], F. Smedes[4], J. Sobotka[4], R. Prokeš[4], B. Vrana[4], B. Marras[1], A. Bettoschi[1], M. Pettas[3], M. Tsapakis[3], I. Kalantzi[3], K. Mylona[3]

[1]Università degli Studi di Cagliari (UNICA, Italy)

[2]AZTI-Tecnalia (Spain)

[3]Hellenic Centre for Marine Research (HCMR, Greece)

[4]Research Centre for Toxic Compounds in the Environment (RECETOX, Czech Republic)

Abstract

Regulatory monitoring of water contamination consists in the measurement of contaminants in spot water samples. This approach presents several drawbacks, especially in highly dynamic systems and in waters presenting low contaminant concentrations. Passive samplers have been suggested as an alternative to spot sampling, as accumulate contaminants continuously during the deployment time, integrating their temporal variability and enabling their measurement at very low concentrations.

While the deployment of passive samplers in some water bodies (i.e. rivers, lakes, estuaries) is relatively easy, the monitoring of contaminants in coastal areas and offshore entails important logistical problems. Thus, the overall aim of MONICOAST is to evaluate the presence and distribution of organic pollutants, especially POPs (persistent organic pollutants), in Southern European coastal areas by installing specific air and water passive samplers in offshore buoys.

MONICOAST, developed in the framework of the Jerico-Next Transnational Access (TNA) Call, is a collaborative project between the University of Cagliari (UNICA, Italy), AZTI (Spain) and the Hellenic Centre for Marine Research (HCMR, Greece). Air and water passive samplers were deployed for two consecutive periods (June-October 2018 and October 2018 -June 2019), at two buoys located in the Mediterranean Sea (Greece) and affected by various sources of contamination.

The long-term deployment of passive samplers in these buoys ensured that contaminant concentrations were measurable and representative of the contamination in the study area. Additionally, the use of water and air passive

samplers will enable to investigate the air-sea exchange of organic pollutants in order to determine their potential long-range transport.

7. *TNA Project acronym*: WGMP-SPI

***Title*: ASSESSMENT OF THE ECOCOLOGICAL QUALITY STATUS OF THE WEST GIRONDE MUD PATCH, TAKEN AS AN EXAMPLE OF OFFSHORE MARINE SYSTEMS, USING SEDIMENT PROFILE IMAGERY**

Authors: Adriana Dalto[1], Bastien Lamarque[2], Guillaume Bernard[2], Antoine Grémare[2]

[1]Federal University of Rio de Janeiro, Brazil; [2]Université Bordeaux, France

Abstract

The West Gironde Mud Patch (WGMP) is a muddy belt surrounded by sands located 25 km off the mouth of the Gironde Estuary in the Bay of Biscay. WGMP is the primary depository of the sediment particles originating from the Gironde Estuary. It is a mobile mudbelt where sedimentation and resuspension both contribute to control the structuration and the functioning of benthic ecosystems. Within JERICONext, WGMP was studied within both WP4 (JRAP-2) and WP7 (WGMP-SPI). This last component was conducted by scientists from the federal University of Rio de Janeiro with the support of JERICO-Next WP7. Surface sediment characteristics (D50, particular organic carbon and chlorophyll-like pigments) and sediment profile images (SPI) characteristics were assessed at 32 stations (30-80 m in depth) located all over the WGMP. For most assessed sedimentary parameters, there were clear inshore-offshore gradients. Except for the 7 shallowest stations, which were characterized by the presence of superficial transitory sand deposits, surface sediments consisted of muds. Organic carbon concentrations were between 0.35 and 1.56 %DW and significantly increased with depth. Most of SPI characteristics also showed inshore-offshore gradients (except for nutrition structures and fauna). Average total numbers of biogenic structures per image were between 6.7 and 34.8, and significantly increased with depth. This trend also held for the thickness of the apparent RedOx potential discontinuity depth and the Benthic Habitat Quality index. Multivariate analysis based on the numbers and depths of biogenic structures also showed discrepancies between the 7 shallowest stations and the other ones. Spatial patterns of surface sediment and SPI characteristics thus tended to be similar and related to depth, which can be put in relation with WGMP hydrodynamics, with modern sedimentation at shallowest sites being prevented due to wave's action.

8. *TNA Project acronym*: FinisGlider

***Title:* FINISGLIDER: PILOT EXPERIENCE TO INCORPORATE GLIDER TECHNOLOGY TO THE FINISTERRE (NW SPAIN) REPEATED HYDROGRAPHIC SECTION.**

Authors: A. Lavín[1], C. Gonzalez-Pola[1]

[1]Spanish Institute of Oceanography, Spain

Abstract

The objectives of the Finisglider mission were part of a broad long-term monitoring program of the ocean hydrography in the Western Iberia Margin. The VACLAN-RADPROF program maintains continuous observation of ocean climate variability in this region of the North Atlantic eastern boundary. A full-depth hydrography and biogeochemistry sampling is performed yearly through a ship-based deep section perpendicular to the coast, extending to 250 nm off Cape Finisterre into the Iberian Abyssal Plain basin (north-western Iberia, 43ºN, 9-15ºW, > 5000 m). In summer 2017, in the framework of JERICO-NEXT UE project, a glider mission was scheduled to overlap with the annual ship cruise in order to provide an independent dataset of the hydrographical/biogeochemical conditions. Both glider mission and the cruise were successfully accomplished. BondPland glider took slightly over 20 days each way, from June 29 to August 12. Cruise occupation of the section lasted 5 full working days from July 4 to July 8. The overlapping of a cruise and a glider mission provided, besides insights in the shor-term hydrographical variability, a rare opportunity to make these same estimates for biogeochemical variables, as dissolved oxygen and chlorophyll, whose spatial structure depends strongly on hydrography but also on biological factors. The success of the experience demostrates the suitability of glider missions to suplement classical ship-based regular monitoring.

9. *TNA Project acronym:* BB-Trans

***Title:* BB-TRANS GLIDER MISSION: DEVELOPMENT AND RESULTS**

Authors: A. Caballero[1], A. Rubio[1], Ivan Manso[1], Jeff Carpenter[2], Lucas Merckelbach[2], Julien Mader[1], Gabriel Jordà[3]

[1]Azti Foundation, Spain

[2]Helmholtz-Zentrum Geesthacht, Germany

[3]Spanish Institute of Oceanography, Spain

Abstract

During May and June of 2018, a deep and a shallow glider flew the south-eastern Bay of Biscay, with the aim of recovering measurements of the water column with two main objectives: first, to evaluate the accuracy of coastal altimetry along-track data; and second, to assess the performance of different methodologies for deriving transport in the water column, by means of HF radar and glider data blending.

In this contribution we show the results of the analysis of the hydrography during the mission, as well as, of the mesoscale structures observed during the mission. The shallow-glider crossed an anticyclonic structure around 26 May. Around this date, a down-lifting of the seasonal thermocline is observed in the vertical profiles of the shallow-glider. The down-lifting is more evident in the salinity and density profiles and has a clear impact in the fluorescence, whose Deep Chlorophyll Maximum reaches deeper waters. Some days after, around 2-3 June, the deep-glider arrived at the periphery of a cyclone. In this occasion, an up-lifting of the shallower isotherms (from surface to around 100 m depth) and a down-lifting of the intermediate isotherms (from around 100 to 400 m depth) is observed. The core of this cyclone was close to the position of the anticyclone mentioned before. Finally, we show the methodology that will be applied to blend glider measurements along the water column with surface currents fields from the HF radar."

10. *TNA Project acronym*: DYNAS

Title: DYNAMICS AND TURBULENCE IN THE SICILY CHANNEL

Authors: P. Bouruet-Aubertot[1]

[1]*Universitè Pierre et Marie Curien (UPMC)- LOCEAN, France*

Abstract

The Sicily channel is a key region crossed by different water masses exchanged between the Eastern and Western Mediterranean basins. Tow mooring lines are deployed there in the two deep passages, at CO1 and CO2, to track long-term changes in water-masses. It is also a very dynamical area characterized by meso and submesoscale processes with a strong variability and internal wave activity. As a consequence the turbulence level is high as recently quantified directly with microstructure measurements (Ferron et al, 2017; Vladoiu et al, 2018).

This work focuses on higher frequency dynamics, from mesoscale to turbulence. To this aim additional temperature and conductivity sensors as well as high frequency acoustic Dopler profiler were deployed at CO1 and CO2 from May 2018 until April 2019. The first results of the analysis are presented. The different components of the flow are identified with a focus on tidal frequencies, diurnal and semi-diurnal as well as near-inertial. Estimates of kinetic energy dissipation rates are then inferred from the moorings measurements and the origin of the various event of strong turbulence is discussed. Finally, turbulence measurements performed in the channel are presented thus giving an overview of the strong variability of turbulence in relationship with the complex topography.

11. *TNA Project acronym:* MEPHY

Title: MEPHY FIELD CAMPAIGN: SYNERGISM OF STATE-OF-THE-ART SENSING TOOLS TO MONITOR BIOAVAILABLE METAL SPECIES, PHYTOPLANKTON, MACRONUTRIENTS AND EXAMINE THEIR SOURCES, BEHAVIOR AND INTERACTION.

Authors: M.-L. Tercier-Waeber[1], M. Abdou[1], J. Schäfer[2], A. Novellino[3], S. Alloisio[3], L. Bonofiglio[3]

[1]University of Geneva, Switzerland; [2]University of Bordeaux, France; [3]ETT S.p.A., Italy

Abstract

We report here on the main outcome of the MEPHY field campaign performed at the COSYNA Stationary FerryBox platform (COSYNA_SFB) from May 6 to 16, 2019. The COSYNA-SFB is installed at the mouth of the Elbe River in the German Southern North Sea coastal area characterized by Spring and Summer phytoplankton blooms and impacted by anthropogenic sources of trace metals and macronutrients issued mainly from the Elbe River.

The purpose of the MEPHY field studies was two-fold: 1) study of the dynamic behaviour of the bioavailable fraction of a range of trace metals, algal-bacterial species, and macronutrients; 2) assessment of the sources and behavior of the metals, phytoplanktons and macronutrients targeted and of their interaction.

Two innovative sensing tools were installed in parallel to the COSYNA FerryBox sensors: an integrated multi-channel Trace Metal Sensing Module (TMSM); and a miniature, low-cost multiwavelength fluorometer, based on Advanced Luminescence-Based Phytoplankton Analysis and Classification Appliance (ALPACA). The TMSM and ALPACA enable real-time detection of the bioavailable fraction of a range of essential or toxic trace metals, and discrimination of relevant phytoplankton groups combined with an approximation of the cell density respectively. The data collected by these new sensing tools coupled to those of master bio-physicochemical parameters and macronutrients recorded by the COSYNA FerryBox are presented. Potentiality provided by synergising these tools with FerryBox sensors to (i) extend capability of coastal area sentinel systems; ii) assess bio-chemical processes which regulate transport and behavior of trace metals and nutrients; ii) study relationships between micro-nutrients/pollutants, macro-nutrients and phytoplankton (community, diversity, bloom), are discussed.

12. *TNA Project acronym:* EvoLUL
***Title:* LONG TERM UNDERWATER LOCALIZATION IN EXTREME CONDITIONS.**

Authors: K. Kebkal[1], Ivan Masmitjà[2], J. del Rio[2]
[1]EvoLogics GmbH, Germany; [2]Universitat Politecanica de Catalunya

Abstract

The main idea of this project was to study the performance of range-only single-beacon localization algorithms, with which both static and moving target can be localized and tracked using autonomous underwater vehicles. These kind of methods can be used, for example, to follow a tagged animal. Moreover, it can be implemented in a fleet of autonomous vehicles to know the position between them, as a future work, if the results in terms of accuracy and feasibility are acceptable.

A long term deployment experiment was offer the possibility to ensure robustness of the range estimation at different meteorological and sea conditions, and quality of the data along time. Variability of the measurements was studied and correlated with sea conditions since OBSEA platform is measuring waves, currents and water properties.

13. *TNA Project acronym:* ReMoBiB
***Title:* TO GAPE OR NOT TO GAPE. ON-LINE MONITORING OF VALVE GAPE OF ARCTICA ISLANDICA.**

Authors: R. Witbaard[1], P. Fischer[2]
[1]Netherlands Institute for Sea Researh (NIOZ), the Netherlands; [2]Alfred-Wegener-Instituts (AWI), Germany

Abstract

Between February 2018 and February 2019 a so called valve gape monitor was deployed and connected to the Cosyna underwater node at Helgoland. The used valve gape monitor is an instrument which was developed by NIOZ for off-line use and was successfully deployed for 5 years in northern Norway. To continue with the development of this instrument modifications were made so that on-line data transfer between the gape monitor placed at the sea floor and a server on land was made possible. This new setup has been tested at the underwater node in Helgoland.

The recorder was equipped with 8 specimens of the ocean quahog (Arctica islandica) and the setup was deployed by the AWI diving team at Helgoland. With the connection of the recorder to the under water node a new biological monitor was added to the COSYNA measurement platform.

Although we encountered some problems related to disturbance and predation of the experimental bivalves by crabs or lobsters we were able to collect a valuable data set in which the valve gape response of Arctica islandica at its most southern limit in the North Sea was logged with a ~ 1Hz frequency which data will subsequently be used for behavioural comparisons between specimens from different origin and used to understand the environmental forcing of the behavior.

The ReMoBiB project was funded under the H2020 Framework program Jerico Next as grant agreement No. 654410.

14. *TNA Project acronym:* GLIDER SOUTH
***Title:* GLIDER MISSIONS IN THE SOUTHERN SICILIAN CHANNEL**

Authors: A. Drago[1], A. Gauci[1], A. Galea[1]
[1]Physical Oceanography Research Group, University of Malta

Abstract

The stretch of sea between the Maltese Islands and Libya is practically an unexplored area of the Mediterranean Sea. Except for a very limited number of oceanographic surveys, hydrographic data is very scarce and provides only a coarse description of the hydrographic conditions of the region. Knowledge about the thermohaline characteristics and the water mass circulation in the southern Sicilian Channel is mainly derived from regional-scale numerical simulations. The significant extent of the African (Tunisian and Libyan) continental shelf, with a large portion of very shallow bathymetry, renders sampling efforts and the characterisation and location of water masses somewhat demanding. Furthermore, the legal/political issues in the bordering countries do not favour international collaboration for oceanographic research, while national structures for data acquisition, even in the coastal sea areas, is greatly lacking. GLIDER SOUTH was a major physical oceanography research initiative, in which the Physical Oceanography Research Group collaborated with the Centre National de la Recherche Scientifique – Institut National des Sciences de l'Univers (CNRS-INSU) to deploy a glider to sample intensively this historically under-sampled area of the Sicily Channel. The mission was also supported by the release of a number of surface Lagrangian drifters. The collected data helped to study the vertical water column structure associated to mesoscale and sub-mesoscale circulation features, investigate the extension and seasonality of the Bifurcation

Atlantic Tunisian Current (BATC) through its subsurface signatures, assess any particular water column structure and water masses in association to bathymetric differences, observe and trace evidence of deep-water formation from the Libyan continental shelf, and obtain direct observations on the westward Levantine Intermediate Water (LIW) flow south of the Maltese Islands. The collected high-quality datasets also served for model validation.

15. *TNA Project acronym:* NitrateComp
***Title:* NITRATECOMP: IN-SITU INTER-COMPARISON OF NITRATE SENSORS**

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Abstract

Nitrate is a key macronutrient of the marine environment. Natural and anthropogenic processes contribute to generate large temporal and spatial variability in the concentration of nitrate.

High levels of reactive nitrogen affect ecosystem functions by increasing biomass production and leading to water hypoxia. Monitoring nitrate levels is of great importance in order to decrease eutrophication and restore ecosystem health. Here we present a TNA project that tested the analytical procedures for the determination of nitrate concentrations using two different in-situ sensors: Opus UV and Lab on Chip on a stationary FerryBox system in Oslofjord, Norway.

WP6 - JERICO-NEXT GA Brest – VA session

WP6.1: VIRTUAL ACCESS ACTIVITY
UTÖ ATMOSPHERIC AND MARINE RESEARCH STATION DATA PORTAL.

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During JERICO-NEXT, WP6 activity at the Finnish Meteorological Institute (FMI) focused on providing real-time access to data measured at the Utö Atmospheric and Marine Research Station. The station, located at Utö Island at the outer edge of the Finnish archipelago in the Baltic Sea, is jointly operated by FMI and the Finnish Environment Institute (SYKE).
The wide range of atmospheric measurements at Utö include an automatic weather station, aerosol, trace gas and greenhouse gas observations. Sea water temperature, salinity, CO_2 concentration, oxygen and various phytoplankton pigments are monitored on a flow-through system. A profiling buoy, thermistor chain and bottom-moored ADCP provide vertical profiles of temperature, salinity and currents as well as information on wave conditions. The station is part of HELCOM, EMEP, ICOS and Jerico-RI networks, and is developed to become a national ACTRIS site.
The measured data are transferred to FMI in real-time, processed and quality-checked. The quality-check software developed allows e.g. flagging of data based on information on instrument maintenance cycles, malfunctions etc. The quality-controlled data will be provided to European databases such as SeaDataNet and SOCAT pCO_2 database.
The FMI data portal, operational since early 2017, allows real-time access to Utö measurements. Latest data values and visualisations of the time series up to one year are shown, and data is available for download.
In addition to researchers, the data portal aims at providing real-time weather and marine information for users like marine traffic safety, e.g. piloting, construction and other work at sea and archipelago, as well as for boaters and other leisure time activities at sea.
Connected to this public data portal, a system providing real-time metadata information on station operation, and e-mail alarms on malfunctions, was set up to help the maintenance personnel in ensuring continuous operation of the measurement systems. Currently, QC software is developed to include more observations and to provide a tool for creating necessary metadata to accompany measurement data.

Find below the link for the FMI data portal:
http://swell.fmi.fi/Uto/

WP6.2: VIRTUAL ACCESS ACTIVITY
SYKE ALG@LINE DATA FROM THE BALTIC SEA.

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Automated visualization and data quality check tools have been developed for SYKE Alg@line ferrybox data. The first demonstration product includes ferrybox data from passanger ferry Silja Serenade commuting between Helsinki, Finland and Stockholm, Sweden. Tools consist of python and R scripts for data transfer, QC, and visualization. Plots include transect plots and contour plots for last 1 month period and for the current year. Variables include Temperature, Salinity, CDOM, Chlorophyll a, Oxygen, Phycocyanin and Turbidity. Transect data shows also which parts of the data are flagged as bad quality data. A map showing transects and the current location of ship is also included. Link: www.finmari-infrastructure.fi/ferrybox

WP6.3: VIRTUAL ACCESS ACTIVITY
SOCIB PRODUCTS & SERVICES: PROVIDING VA CAPABILITIES FOR END USERS

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The Balearic Islands Coastal Observing and Forecasting System (SOCIB), is a multi-platform ocean observing system that has the mission to provide streams of observational data and forecasting services in response to both scientific and societal needs. SOCIB was created in 2010 and nowadays has a broad range of platform focused, quality-controlled, and freely available data as well as apps for visualisation. These already represent a benchmark in a new era of ocean observation, however to enable end users access to all SOCIB existing resources (including data, documentation, code libraries, tools, publications and infrastructures), our Data Dissemination System was enhanced by means of the release of fit for purpose products & services. This process was initiated in order to put into value the data assets generated through the entire SOCIB data lifecycle and it was achieved through the Virtual Access activities derived from JERICO-NEXT WP6.
The carried out developments pivoted around the implementation of tools for supporting (1) search and discovery, (2) results traceability and (3) dedicated products and services to provide scientific and societal impact (from data to science and society). The most relevant outputs were achieved with the release of the following tools and services:

- **REST API** that eases the recovery of different observational data sources coming from a wide range of SOCIB platforms. http://api.socib.es/home/
- **Data Catalog** that fully relies on the capacity of the REST API. This is the main entry point to the different data products available in SOCIB. http://apps.socib.es/data-catalog/
- **DOI generator system** registered in DataCite and able to mint DOIs to the SOCIB data products and documentation. https://search.datacite.org/works?query=socib
- **SOCIB web site** (http://www.socib.es) includes updated information and provides access to the rest of existing SOCIB tools and applications. More specifically it allows access to the SOCIB's Data Management Program that contains all the relevant and publically available documentation needed to guarantee SOCIB datasets quality traceability (http://repository.socib.es/repository/entry/show?entryid=5d8ecf68-7a8a-4b1e-a5c8-273af77f3ab7).
- **SOCIB Beach Lifeguards Product** was specifically designed to cover the requirements from the Balearic Islands General Directorate for Emergencies in regards of beach safety by directly consuming the data generated from our forecasting facility. It is comprised by both web app (http://seaboard.socib.es/lifeguard) and an Android app named SocorristaIB.

WP6.4 : VIRTUAL ACCESS ACTIVITY
ENVIRONMENTAL OBSERVATORY OF THE LITTORAL

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EOL is an autonomous platform moored at the mouth of the bay of Villefranche sur mer (French Riviera, Ligurian Sea), over rocky bottom depth of 90 m. Its equipment comprises a weather station, a pH sensor and a seabird CTD moored at a fixed depth (1.5 m). Vertical profiles (0-70 m) of temperature, salinity and fluorescence with a CTD profiler are also available. Subsurface parameters (temperature, salinity and dissolved oxygen) are acquired hourly. Energy for the instrumentation comes from solar tiles, which make the platform "self-sustainable". The platform is part of the COAST HF network. The data are transferred to the IMEV computer server to be process. During the JERICO NEXT period, we have made the data fully visible and available on the web site (http://www.obs-vlfr.fr/data/view/eol/surface/) for the persons interested by. An active link to Coriolis (http://www.coriolis-cotier.org/) is also accessible. The targeted users are the researchers, environment agencies but also the local communities.

WP6.5 : VIRTUAL ACCESS ACTIVITY
COSYNA: USER INTERACTION TO FOSTER SPREADING OF COASTAL INFORMATION

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The Coastal Observing System for Northern and Arctic Seas (COSYNA) has been established in the German North Sea and off Spitsbergen to describe, analyse and predict the environmental status of coastal waters. Combining observations, numerical modelling, data management, and outreach activities COSYNA provides data and knowledge tools to help science, authorities, industry, and the public to make informed decisions. COSYNA products and infrastructure are developed to foster scientific knowledge for sustainable development of coastal ecosystems worldwide. In order to meet the various requirements of the different target groups a broad range of outreach activities has been pursued. Spreading coastal information beyond traditional academia, COSYNA aims at ensuring relevance and societal impact of COSYNA research. COSYNA app and interaction with users are two examples of conveying COSYNA's scientific data to stakeholders and the public.

WP6.6 : VIRTUAL ACCESS ACTIVITY
CEFAS DATA HUB AND APPLICATIONS IN CEFAS OPEN SCIENCE.

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During JERICO-NEXT, WP6 activity focused on increasing the visibility and the aggregation of the data in order to build new products and services targeting user groups identified as environment agencies, monitoring programs, marine based industries, service providers, immediate landscape, and marine research. Through a new web application called the Cefas Open Science, JERICO-NEXT created two new products which combined biological and biogeochemical data and implemented quality control processes associated. The benthic Non Native Species Tool allows users to map the distribution of 20 benthic non-native species across the UK seas, using data from 777 benthic surveys (33,198 samples) collected over a period of 47 years (1969 to 2016). The Phyto-OPS combined data at high frequency measurement from the FerryBox and the flow cytometer, and CTD analyses (HPLC). It allows to assess the phytoplankton biomass and the diversity and contributes to validate remote sensing and modelling outputs used in new approaches for monitoring our regional seas. Beside these two products, JERICO-NEXT supported the investment of the Cefas Data Hub into the best practices for biological data management in collaboration with the marine node of the UK National Biodiversity Network, UK node to the global OBISNetwork, and data support function for HBDSEG.
find below the links for the 2 applications:

https://openscience.cefas.co.uk/invasive_species/; https://openscience.cefas.co.uk/phytoops_tool/

WP6.7 : VIRTUAL ACCESS ACTIVITY
PHYTO-OPS: A TOOL FOR VISUALISATION OF PHYTOPLANKTON DATA FROM FERRYBOX, HPLC AND FLOW CYTOMETRY

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Phytoplankton are the basis of the marine ecosystem and as such in-situ data on phytoplankton abundance, biomass and community composition are vital for scientific understanding of ecosystem processes, ecosystem assessments and validation of model and earth observation data. Over the last few years, biological sensors have been developed and deployed successfully on buoys, research vessels, container ships and ferries. These measure the diversity, biomass and the physiological state of the phytoplankton at high frequency, generating data on line. However, the quantity of data produced as well as their different format compared to traditional approaches makes it difficult to integrate these data types into existing databases. PHYTO-OPS (phytoplankton observations, products and services), is an R shiny application designed to make biological data collected during regular surveys on board the RV Cefas Endeavour around the UK more accessible, by visualising the data and improving their interoperability to inform experts in phytoplankton ecology such as remote sensing scientists and modellers, data managers and monitoring agencies. The application includes data from HPLC analysis of phytoplankton pigments, flow cytometry data on abundance of different phytoplankton functional types, and concurrent FerryBox data including a wide range of parameters such as temperature, salinity, turbidity and fluorescence. Users can explore each dataset, with tabs for quality control, visualisation and data download, and can see information from different data types side by side, for example fluorescence from FerryBox calibrated with chlorophyll concentrations from HPLC, or phytoplankton functional types determined from flow cytometry and HPLC data. In future the tool can be integrated with remote sensing products, and the data used for validation of models. This product is now available through the Cefas website (https://openscience.cefas.co.uk/phytoops_tool/) and as a product in the JERICO-NEXT catalogue.

WP6.8 : VIRTUAL ACCESS ACTIVITY
VIRTUAL ACCESS TO THE BULGARIAN SEA LEVEL SERVICE

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Systematic sea level measurements have been started in Bulgaria in the beginning of the 20th century and nowadays there are 14 coastal sea level stations in operation. Operators of sea level stations are: National Institute of Meteorology and Hydrology (NIMH) – 6 stations; Cadastre Agency, Ministry of Regional Development and Public Works (CA) together with National Institute of Geophysics, Geodesy and Geography, Bulgarian Academy of Sciences (NIGGG) and Institute of Oceanology, Bulgarian Academy of Sciences (IO-BAS) – 4 stations; and IO-BAS – 4 station. The sea level observations in the network of NIMH, performed at six main Bulgarian ports using standard poles, have been started in 1910. The program, implemented on the NIMH stations, includes daily measurements of the sea level with water gauges (poles). The position of a zero mark of the water gauge is checked once per year. The sea level network of the CA, now is operated together with NIGGG and IO-BAS and consists of 4 stations: Varna and Burgas (operational since 1928) and Irakli and Ahtopol (since 1971). These stations were equipped with stilling-well tide gauges and with mechanical writing devices which draws sea level changes on paper. A mechanical paper writing instruments were installed at Varna and Burgas during 1928 and in 1971, a new paper writing instruments of type SUM (Russian) were installed at the stations of Irakli and Ahtopol. Nowadays sea level stations in Varna and Burgas are equipped with high accuracy microwave instruments and provide data online. A set of three sea level stations at the ports of Balchik, Pomorie and Oil port Burgas was built during 2009 in the frame of Port Operational Marine Observing System (POMOS). These stations were equipped with high accuracy microwave instruments and operated by IO-BAS. In 2010 a new sea level station was set up at the IO-BAS coastal research base Shkorpolovtci. The station is equipped with high accuracy microwave instrument. These four stations are providing real time data.
To provide virtual access in the frame of JERICO-NEXT project to the Bulgarian sea level service, measurements from the 6 working online stations are been publishing on the web site of the Bulgarian National Oceanographic Data and Information Centre.

WP6.9 : VIRTUAL ACCESS ACTIVITY
CNR LISO-HFR DATA PORTAL: HF RADAR DERIVED CURRENTS FOR OPERATIONAL SERVICES

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During JERICO-NEXT, WP6 activity focused on establishing and maintaining a reliable real-time data access and distribution infrastructure, and on increasing visibility through data interoperability improvement and link implementation towards main EU data distribution portals.
Links from CNR remote acquisition stations to the central repository have been enhanced, and new THREDDS catalogs were created (http://150.145.136.27:8080/thredds/HF_RADAR/TirLig/TirLig_catalog.html), adding to the historical dataset of Gulf of Manfredonia (http://150.145.136.27:8080/thredds/HF_RADAR/GoM/GoM_catalog.html) new time series of Ligurian Sea from June 2016 until now, with negligible temporal gaps.
JERICO-NEXT greatly contributed to develop and improve software for automatic data processing with the resulting setup of an HFR processing node, intended to be a core component of the European High Frequency Radar Node, able to acquire, process and distribute in real time data coming from an undefined number of HF radar stations.
Thanks to JERICO-NEXT support the data management infrastructure has been kept updated step by step in order to produce and distribute real time data following the state of the art of HFR derived current data management. Data have been processed for file format, metadata creation and Quality Control, according to the recommendations of Jerico-Next Deliverable D5.13 first and D5.14 later, SeaDataCloud Deliverable D9.12, CMEMS-INSTAC requirements. Data access tools are compliant with Open Geospatial Consortium (OGC), data and metadata are compliant with most of the international conventions and directives.
Strengthening real time distribution and interoperability allowed the real time HFR data inclusion into CMEMS In Situ TAC data portal, within the INSITU_GLO_UV_NRT_OBSERVATIONS_013_048 product, and will enable the HFR data inclusion, as historical dataset, in the SeaDataNet infrastructure. Real time access is also encouraging the inclusion of HF Radar data inside industrial research & development projects as valuable product for commercial services/products, like the ongoing SINDBAD project where HF radar data will be included in an ICT Service Infrastructure able to support tourist navigation providing innovative "intelligent" automation functions and developing ad-hoc services.
The code for HFR data processing is shared on GitHub (https://github.com/LorenzoCorgnati/HFR_Node__Centralized_Processing) and the operational releases are traceable via DOI (https://zenodo.org/record/2639559#.XQu0qyaxVKg).

WP6.10 : VIRTUAL ACCESS ACTIVITY
VIRTUAL ACCESS TO HF RADAR PRODUCTS FROM EUSKOOS

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This virtual access concerns data from the Basque HF Radar system, composed by two CODAR Seasonde antennas (transmit frequency 4.525 MHz). It offers many benefits such as: the improvement of the knowledge about surface currents and their forcing physical processes, applications in marine safety, search and rescue, pollution response, validation and calibration of both hydrodynamic and pollutant drift forecasting models, etc.
www.euskoos.eus/en is the new portal of the Basque coastal operational oceanography system operated by AZTI and Euskalmet. Through the JERICO-NEXT Virtual Access work-package, AZTI worked on the delivery of quality-controlled HF Radar data products and development of advanced products. Existing European ocean data infrastructure (EMODnet Physics, CMEMS, SDN) and recommendations for standardization (EuroGOOS HFR Task Team) have been considered to put in place the data processing and flow, as well as the visualization and downloading capabilities.
In this communication, the overall EusKOOS coastal observing system is introduced, then the different provided datasets from the Basque HF Radar system are presented together with the main recent uses in the different targeted fields of application.

WP6.11 : VIRTUAL ACCESS ACTIVITY
SPIARCBASE SOFTWARE

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Sediment Profile Images (SPIs) are commonly used to map physical, biological and chemical/nutrient gradients in benthic habitats. SpiArcBase is a software that has been developed for the analysis of Sediment Profile Images (SPIs). It has been conceived to improve the objectivity of extracted information (especially the apparent Redox Potential Discontinuity (aRPD)). The software presents a graphical user interface designed to enhance the interpretation of features observed on SPIs in an objective manner and to facilitate image management and structures visualization via a database. The software also allows for the storage of generated data and the automatic computation of a benthic habitat quality index. The facilities provided within JERICONext include access to the software through free downloading and assistance in its utilization. Within jerico-Next, a new version of the software has also been developed in order to assess maerl beds structure and vitality using sediment profile images.

WP6.12 : VIRTUAL ACCESS ACTIVITY
CORIOLIS-CÔTIER AND CORIOLIS DATA CENTRE

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Coriolis-côtier (Coastal-Coriolis) manages high frequency (HF) coastal networks aiming to observe the coastal environment from the coast to the open ocean including the continental shelf and slope in limited regions (e.g. Bay of Biscay, English Channel, Northwestern Mediterranean Sea).
Coriolis-côtier is the coastal network of Coriolis, the French global operational oceanography program for the in-situ observations. The seven institutes involved in operational oceanography are CNES, CNRS, Ifremer, IPEV, IRD, Météo-France and Shom. The Coriolis data management service collects, performs quality control and distributes marine in situ observations from French, European and international operational networks (such as Argo, OceanSITES, GTSPP, Gosud, JERICO-NEXT) and data centres (such as SeaDataNet data centres, US-NODC).

WP3 - TECHNO

WP3.1
AUTOMATED CHARACTERIZATION OF PHYTOPLANKTON COMMUNITY INTO FUNCTIONAL GROUPS BASED ON FLOW CYTOMETRY

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Already for ages the shallow and highly dynamic North Sea represents an area of human activities. However now we are on the edge of a new era, whereby the anthropogenic pressure
will increase extremely due to the increased transportation, major demands for new energy-generating parks and novel marine food farms.
Assessing the impact on the ecological status and carrying capacity in such a highly dynamic system urges for on-line in-situ high frequency monitoring of phytoplankton dynamics. Operating Ferrybox inline with flow cytometry for phytoplankton composition and Fast Repetition Rate fluorometry for phytoplankton activity and production will provide these information.
Full automation of the single cell analysis with the CytoSense flow cytometer into functional groups is demonstrated here as one of the essential steps into the total automation of monitoring the phytoplankton dynamics. Together with real time sharing the information via an open access website may lead to new monitoring strategies, like preprogrammed operation in buoys or ships of opportunity and at unmanned field stations.
These stand-alone automated tools will give water monitoring authorities better opportunities in terms of the quantity and quality of data and cost effectiveness to assess the impact of anthropogenic pressure.

WP3.2
UNDERWATER SURFACE PLASMON RESONANCE IMAGING SENSOR FOR THE DETECTION OF MARINE BIOTOXINS

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Toxic species of the genus Pseudo-nitzschia are particularly dangerous as they produce domoic acid (DA), a neurotoxin that can bioaccumulate and rapidly transvector throughout the food chain via phytoplankton feeder organisms. The production of toxins within and among toxigenic phytoplankton species depends on environmental parameters such as temperature, salinity, nutrients and trace elements concentrations. Cell number cannot be easily related to toxicity.

Systems able to detect the toxin at the early stage of the bloom would be of great interest. For the last decades, biosensors have demonstrated their ability to detect several kinds of molecule at very low concentration[1]. Recently, an underwater biosensor of DA was reported[2]. It was based on an optical technique called Surface Plasmon Resonance (SPR) and used monoclonal antibodies. This system enabled us to detect DA at concentration of the order of 0.1 ppb during laboratory and shipboard experiments. These first results were very promising.

However, the detection of very low concentration of DA requires several controls as well as replicates. In addition, special techniques such as SPR imaging now enable researchers to detect many compounds at the same time[3] and open very nice prospects. The aim of this presentation will be first to expose the new SPRI biosensor as well as first results that we obtained during laboratory experiment and mesocosme facility deployment.

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1. *J. Dostálek, J. Ladd, S. Jiang and J. Homola, in SPR biosensors for detection of Biological and Chemical Analytes, eds, J. Homola and O. S. Wolfbeis (Springer Verlag, Heidelberg, 2006).*
2. *Colas F, Crassous M-P, Laurent S, Litaker RW, Rinnert E, Le Gall E, et al. A surface plasmon resonance system for the underwater detection of domoic acid: Domoic Acid Detection Using SPR. Limnology and Oceanography: Methods. 2016. 14(7):456–65.*
3. *Sereda A, Moreau J, Roulade M, Oliver A, Canva M, Maillart E. Compact 5-LEDs illumination system for multi-spectral surface plasmon resonance sensing. Sensors and Actuators B: Chemical. 2015. 209:208–11.*

WP3.3
COMBINATION OF “MACHINE LEARNING” METHODOLOGIES AND AUTOMATED DATA ACQUISITION SYSTEMS FOR PHYTOPLANKTON DETECTION AND CLASSIFICATION

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In recent years, improvements in automated data acquisition techniques have been carried out in order to sample, characterize and quantify phytoplankton communities during oceanographic campaigns or in the frame of monitoring networks (at low or high frequency). However, these acquisition and digitization techniques, including those concerning «imaging-in-flow» and «flow cytometry» systems, still generate an important quantity of data which cannot be processed manually. Indeed, a full manual quantification of the particles based on a simple visual inspection can be time-consuming, tedious and consequently lead to erroneous or missing identifications. For this purpose, different dedicated R-packages were and are still being developed to allow greater automation in data analysis and classification while permitting a limited user-interaction during the process. The common methodology consists in combining few expert knowledge and some “machine learning” algorithms at different levels: to classify particles into different groups based on the definition of a specific training set, but also to partially validate the “most suspect” predictions which can represent a consequent fraction of the global error. Moreover, in order to orientate the automated classification and consequently to reduce the global error rate, some interactive tools were developed to adapt the training set to the phytoplankton communities generally encountered in the studied area (“active learning”), or to constraint the algorithms to merge or separate some groups (“constrained clustering”).

These different semi-automated analytical tools were applied on different *in vivo* image and signal datasets acquired with the FlowCAM and CytoSense devices respectively, during several cruises in the English Channel, in order to evaluate their operational ability to automatically monitor the diversity of samples. Spatial distributions of the target groups, based on their abundance, were computed and could allow to highlight different sub-regions in the English Channel during the studied periods.