



# **M**onitoring of **Mediterranean** **Coastal Areas**

**PROBLEMS AND MEASUREMENT TECHNIQUES**

EIGHTH INTERNATIONAL SYMPOSIUM  
Livorno (Italy) June 2020



edited by

Laura Bonora, Donatella Carboni,  
Matteo De Vincenzi



PROCEEDINGS REPORT

ISSN 2704-601X (PRINT) | ISSN 2704-5846 (ONLINE)



CNR - IBE  
Fondazione Clima e Sostenibilità

Museo di Storia Naturale  
del Mediterraneo Livorno

*Eighth International Symposium*

**MONITORING OF MEDITERRANEAN COASTAL AREAS:  
PROBLEMS AND MEASUREMENT TECHNIQUES**

*LIVORNO (ITALY) JUNE 2020*

*Patronized by*

**Università degli Studi di Firenze**

**Regione Toscana**

**Accademia dei Georgofili**

**Provincia di Livorno**



Eighth International Symposium  
“Monitoring of Mediterranean Coastal  
Areas. Problems and Measurement  
Techniques”

Livorno (Italy) June 2020

edited by  
Laura Bonora, Donatella Carboni,  
Matteo De Vincenzi

FIRENZE UNIVERSITY PRESS  
2020

Eighth International Symposium “Monitoring of Mediterranean Coastal Areas. Problems and Measurement Techniques” : Livorno (Italy) June 2020 / a cura di Laura Bonora, Donatella Carboni, Matteo De Vincenzi. – Firenze University Press, 2020.  
(Proceedings e report; 126)

<https://www.fupress.com/isbn/9788855181471>

ISSN 2704-601X (print)

ISSN 2704-5846 (online)

ISBN 978-88-5518-147-1 (PDF)

ISBN 978-88-5518-148-8 (XML)

DOI 10.36253/978-88-5518-147-1

Cover graphic design: Alberto Pizarro Fernández, Lettera Meccanica SRLs

Front cover: *Terrazza Mascagni Livorno* (Italy), photo by Gianni Fasano

Edited by: Laura Bonora, Donatella Carboni, Matteo De Vincenzi

Desktop publishing: Matteo De Vincenzi

Graphic Design: Gianni Fasano

*FUP Best Practice in Scholarly Publishing* (DOI [https://doi.org/10.36253/fup\\_best\\_practice](https://doi.org/10.36253/fup_best_practice))

All publications are submitted to an external refereeing process under the responsibility of the FUP Editorial Board and the Scientific Boards of the series. The works published are evaluated and approved by the Editorial Board of the publishing house, and must be compliant with the Peer review policy, the Open Access, Copyright and Licensing policy and the Publication Ethics and Complaint policy.

*Firenze University Press Editorial Board*

M. Garzaniti (Editor-in-Chief), M.E. Alberti, F. Arrigoni, M. Boddi, R. Casalbuoni, F. Ciampi, A. Dolfi, R. Ferrise, P. Guarnieri, A. Lambertini, R. Lanfredini, P. Lo Nostro, G. Mari, A. Mariani, P.M. Mariano, S. Marinai, R. Minuti, P. Nanni, A. Novelli, A. Orlandi, A. Perulli, G. Pratesi, O. Roselli.

📖 The online digital edition is published in Open Access on [www.fupress.com](http://www.fupress.com).

Content license: the present work is released under Creative Commons Attribution 4.0 International license (CC BY 4.0: <http://creativecommons.org/licenses/by/4.0/legalcode>). This license allows you to share any part of the work by any means and format, modify it for any purpose, including commercial, as long as appropriate credit is given to the author, any changes made to the work are indicated and a URL link is provided to the license.

Metadata license: all the metadata are released under the Public Domain Dedication license (CC0 1.0 Universal: <https://creativecommons.org/publicdomain/zero/1.0/legalcode>).

© 2020 Author(s)

Published by Firenze University Press

Firenze University Press

Università degli Studi di Firenze

via Cittadella, 7, 50144 Firenze, Italy

[www.fupress.com](http://www.fupress.com)

*This book is printed on acid-free paper*

*Printed in Italy*

## **ORGANIZING AUTHORITIES**

**National Research Council of Italy  
Institute of BioEconomy (CNR-IBE)**

**Clima e Sostenibilità Foundation (FCS)**

**Natural History Museum of the Mediterranean**





## SCIENTIFIC COMMITTEE

### Presidency

Donatella Carboni	<i>Department of Humanities and Social Sciences University of Sassari</i>
Fabrizio Benincasa	<i>National Research Council of Italy Institute of BioEconomy (CNR-IBE) Seat of Florence</i>
Simone Orlandini	<i>Department of Agriculture, Food, Environment and Forestry University of Florence Clima e Sostenibilità Foundation (FCS)</i>
Antonio Raschi	<i>National Research Council of Italy Institute of BioEconomy (CNR-IBE) Seat of Florence</i>
Laura Bonora (Scientific Secretariat)	<i>National Research Council of Italy Institute of BioEconomy (CNR-IBE) Seat of Florence</i>
Matteo De Vincenzi	<i>National Research Council of Italy Institute of BioEconomy (CNR-IBE) Seat of Florence</i>
<i>Coordinator of the Scientific Secretariat</i>	

### Session Underwater and Coastal Cultural Heritage

Marinella Pasquinucci	<i>University of Pisa</i>
Fabrizio Antonioli	<i>ENEA – Casaccia Laboratory for Climate Modeling and Impacts</i>
Giovanna Bianchi	<i>Department of History and Cultural Heritage University of Siena</i>
Giulio Ciampoltrini	<i>Superintendence for Archaeological Heritage of Tuscany</i>
Tessa Matteini	<i>Department of Architecture University of Florence</i>

### Session Coastline Geography and Coastal Landscapes: territorial dynamics and integrated protection

Gloria Pungetti	<i>Department of Humanities and Social Sciences University of Sassari</i>
Rossella Bardazzi	<i>Department of Economics and Management University of Florence</i>
Biagio Guccione	<i>Department of Architecture University of Florence</i>
Ilaria Lolli	<i>Department of Law University of Pisa</i>
Tessa Matteini	<i>Department of Architecture University of Florence</i>
Carlo Natali	<i>Department of Architecture University of Florence</i>
Claudio Saragosa	<i>Department of Architecture University of Florence</i>
Stefano Soriani	<i>Department of Economics University of Venice</i>
Alessio Valente	<i>Department of Science and Technology University of Sannio Benevento</i>

**Session Morphology and evolution of coastlines and seabeds**

Giovanni Sarti *Department of Earth Sciences University of Pisa*  
Duccio Bertoni *Department of Earth Sciences University of Pisa*  
Filippo Catani *Department of Earth Sciences University of Florence*  
Corinne Sabine Corbau *Department of Physics and Earth Science  
University of Ferrara*  
Giuliano Gabbani *Department of Earth Sciences University of Florence*  
Sandro Moretti *Department of Earth Sciences University of Florence*

**Session Flora and Fauna of the littoral system: dynamics and protection**

Davide Travaglini *Department of Agriculture, Food, Environment and Forestry  
University of Florence*  
Carla Cesaraccio *National Research Council of Italy  
Institute of BioEconomy (CNR-IBE) Seat of Sassari*  
Anna Roselli *Natural History Museum of the Mediterranean, Livorno*  
Federico Selvi *Department of Agriculture, Food, Environment and Forestry  
University of Florence*  
Roberto Tognetti *Department of Agricultural, Environmental and Food Sciences  
University of Molise*

**Session Coastal Environmental Engineering: pollution, energy production, monitoring and economic environmental assessment, regulatory context**

Marcantonio Catelani *Department of Information Engineering University of Florence*  
Rossella Bardazzi *Department of Economics and Management  
University of Florence*  
Carlo Carcasci *Department of Industrial Engineering University of Florence*  
Giuliano Gabbani *Department of Earth Sciences University of Florence*  
Ilaria Lolli *Department of Law University of Pisa*  
Giampaolo Manfrida *Department of Industrial Engineering University of Florence*

**Organizing Committee:**

Gianni Fasano CNR – IBE Seat of Florence (Coordinator of Committee)  
Alessandro Materassi CNR – IBE Seat of Florence  
Laura Pellegrino CNR – IBE Seat of Livorno  
Federica Zabini CNR – IBE Seat of Florence  
Francesca Chellini FCS Florence

**Organizing secretariat:**

CNR-IBE Area di Ricerca di Firenze  
Via Madonna del Piano 10,  
50019 Sesto Fiorentino (Florence - Italy)  
Phone +390555226557  
e-mail: [segr.org@ibe.cnr.it](mailto:segr.org@ibe.cnr.it)

**Scientific Secretariat:**

CNR-IBE Area di Ricerca di Firenze  
Via Madonna del Piano 10,  
50019 Sesto Fiorentino (Florence - Italy)  
Phone +390555226060-6030  
e-mail: [simposio@ibe.cnr.it](mailto:simposio@ibe.cnr.it)

## INDEX OF PAPERS

<i>Preface</i>	<i>XIII</i>
<i>Introduction</i>	<i>XV</i>
F. Benincasa, M. De Vincenzi, G. Fasano <i>Alexander von Humboldt, da 250 anni il teorizzatore dello studio interdisciplinare dell'ambiente</i>	XVII
<b>Session: Underwater and Coastal Cultural Heritage</b>	<b>1</b>
<b>Chairman: Marinella Pasquinucci</b>	
G. Cera <i>Understanding the settlement dynamics of the Ionian coastal area of Salento (Puglia, Southern Italy): the contribution of the new archeological data from the fortified Messapian centre at Li Schiavoni</i>	7
V. Coletta, F. Prestileo, P. Allasia, A. Bonazza, A. Ciarravano, S. Federico, D. Notti, R. C. Torcasio, M. Crespi, S. Dietrich <i>Pyrgi: analysis of possible climatic effects on a coastal archaeological site</i>	17
L. Corniello, A. Burda, A. Trematerra, D. Carleo, A. De Cicco, M. Gargiulo, F. Guerriero, G.P. Lento <i>The Monastic heritage in the Saronic Gulf (Greece). Architectural and environmental survey of the architecture and coastline.</i>	28
M. C. de Francesco, M. Zappalorto, D. de Francesco, M. Mangifesta, A. Faraone, M. Paluzzi, C. Minciarelli, G. Tatasciore, A. R. Natale <i>Archeological findings of ancient harbor in the pilot site of Interreg Adrion APPRODI project in Ortona (Ch, Abruzzo), central Adriatic Sea</i>	38
F. Fabrizio <i>Il parco archeologico di Saturo (Leporano-TA) millenni di storia, decenni di incuria</i>	47
I. Ferrari, A. Quarta <i>San Cataldo (Lecce, Italy): the historical evolution of the coastal landscape</i>	58
M. Fontana <i>Another Sicily, tuna-fishing structures and landscape: a diachronic and contemporary photographic journey along the Sicilian Western coast</i>	69
G. Grigatti, P.P. Peruccio <i>Il design sistemico per la valorizzazione del patrimonio faristico italiano</i>	79
A. Ivona <i>Coastal heritage and territorial signs</i>	85

R. Martín, V. Yepes, A. Grindlay	95
<i>Discovering the marina's cultural heritage and cultural landscape</i>	
L. Montioni, A. Del Corona, I. Palano, F. Pichi, M. Scamporrino	105
<i>Evaluation and monitoring of the Livorno's Fossi System</i>	
A. Pellegrini, A. Asta	117
<i>Evolution of the coastal landscape in eastern Veneto: new data from preventive archaeology</i>	
P. Tartara	127
<i>Along the Ceretan coast and forward on</i>	
S. L. Trigona	137
<i>Archeologia subacquea in Liguria un progetto integrato per la tutela e la valorizzazione</i>	
<b>Session: Coastline Geography and Coastal Landscapes: territorial dynamics and integrated protection</b>	<b>147</b>
<b>Chairman: G. Pungetti</b>	
S. Altavilla, A. Caligiore, J. Ceccarelli, G. Corrente, F. Galeano, G. Pappacena, M. Pisconti, A. Petrillo, F. Rottino, P. Puri, G. Scatigna, F. Simione, T. Sinesi, G. Spaccavento, C. Ubaldi	155
<i>Environmental training of the Italian Coast Guard between tradition and innovation</i>	
T. Bisiani, M. Savron	164
<i>New scenarios for a development between infrastructures and innovation</i>	
A. Casu, J. Zaccagna	174
<i>New features of the rivershore: climate change and new relations between town and water</i>	
A. Cazzani, S. Barontini	183
<i>Lake Garda lemon houses: a Mediterranean landscape in an internal lake</i>	
C. Corbau, M. Contini, V. Gazale, A.L. Lazarou, U. Simeoni, D. Carboni	194
<i>Distribuzione del marine litter nelle spiagge della Sardegna: il caso di Cala dei Ponzesi e di Cala Spalmatore nell'isola dell'Asinara</i>	
D. De Marchi, M. Lalli, A. Mancini	214
<i>Monitoring online perception of environmental issues on coasts of Sicily</i>	
F. Epifani, F. Pollice,	219
<i>Stabilimenti balneari come presidi ambientali. Verso la multifunzionalità dei servizi di balneazione. Alcune riflessioni a partire dal progetto Interreg RE.CO.RD.</i>	
M. A. Esposito, F. Bosi	229
<i>LaCoast Atlas: a consistent database to support sustainable coastal zone management</i>	
A. Ghersi	242
<i>CAPO MELE: a story-telling experimental beach in Laigueglia (SV)</i>	

G. N. M. Giudici, F. Jannuzzi, S. Patrizio, F. Pisani Massamormile	250
<i>The coastal lakes of Campi Flegrei: between biodiversity and anthropization</i>	
I. Lolli	259
<i>The management of dredged materials: the «long and winding road» from waste to resource</i>	
G. Mazzeo	270
<i>Domitian coast. Rehabilitation' outlooks of the Northern coast of Campania</i>	
I. Palano A. Del Corona, L. Montioni, F. Pichi, M. Scamporrino	280
<i>Strategic Planning Document of Port Authority System, a new city-ports agreement: the case of Northern Tyrrhenian Sea AdSP</i>	
A. M. Pidalà	289
<i>Le coste dei Nebrodi tra mosaico paesaggistico, beni culturali e criticità complesse. Visioni e scenari strategici progettuali nel paradigma della sostenibilità</i>	
M. Russo	299
<i>Salerno: il porto e le metamorfosi del waterfront</i>	
J. Salaün, S. Pioch, J. C. Dauvin	309
<i>Artificial reef along the French Mediterranean coastline: toward innovative integrated biodiversity management</i>	
C. Saragosa, M. Chiti	316
<i>Spatial configurations and flows in the morphogenetic processes of settlements. A planning experience on the Tuscan coast</i>	
M. Scamporrino	326
<i>View Management in city-port landscapes. Livorno applicative experience</i>	
G. Tagarelli, N. Cantasano, T. Caloiero, G. Pellicone	338
<i>Integrated Coastal Zone Management of Natura 2000 and cultural heritage sites in calabrian coastal landscape (southern Italy)</i>	
A. Venudo, V. Rodani, V. Devescovi	348
<i>Lagoon scenarios for the Bassa Friulana plain: a flooding archipelago</i>	
F. Zullo, L. Fiorini, A. Marucci, B. Romano	363
<i>Analysis of the theoretical settlement scenario implemented by the municipal plans. The case study of the Romagna coast municipalities</i>	
<b>Session: Morphology and evolution of coastlines and seabeds</b>	<b>375</b>
<b>Chairman: G. Sarti</b>	
R. Bedini, P. Colantoni, C. Pergent-Martini	379
<i>Coastal erosion in the Gulf of Follonica and Baratti and coastal defense methods</i>	

O. Bulkan, B. Yalamaz, M.Namık Çağatay	385
<i>A sedimentological pattern of a coastal transitional environment: from the Eastern Mediterranean Sea shoreline through the Lake Bafa</i>	
A. Di Leo, S. Giandomenico, L. Spada, N. Cardellicchio, F. P. Buonocunto, E. Esposito, L. Ferraro, L. Giordano, A. Milia, C. Violante	392
<i>The offshore environmental impact by Sarno River in Naples Bay (South-west Italy)</i>	
M. Di Natale, S. Di Ronza, C. Eramo	402
<i>Water circulation in coastal marine areas - case studies</i>	
P. Gomes da Silva, A.L. Beck, J. Martinez Sanchez, R. Medina Santamaria, M. Jones, A. Taji	412
<i>Advances on coastal erosion assessment from satellite Earth Observations: exploring the use of Sentinel products along with very high resolution sensors</i>	
I. Kadri, F. Atroune	422
<i>Diachronic evolution of the coastline of Bordj El Kiffane (Algiers, Algeria) in absence and presence of coastal protection structures</i>	
I. López, J. I. Pagán, A. J. Tenza-Abril, L. Aragonés, L. Bañón	432
<i>Relationship between shoreline evolution and sediment wear</i>	
J. I. Pagán, I. López, L. Aragonés, A. J. Tenza-Abril	441
<i>Experiences with beach nourishments on the coast of Alicante, Spain</i>	
G. Piccioli-Resta, S. Fai, A. Picciolo	451
<i>Drone Remote Sensing for coastal habitats protection</i>	
K. Pikelj, N. Furčić	462
<i>Impact of cliff erosion on marine sediment composition - indication of local coastline evolution (Vrgada Island, Croatia)</i>	
<b>Session:</b>	<b>Flora and Fauna of the littoral system: dynamics and protection</b>
	<b>469</b>
<b>Chairman:</b>	<b>D. Travaglini</b>
B. Akçali, E. Taşkin, G. Kaman, A. Evcen, H. Çalık, O. Akyol	475
<i>Posidonia oceanica monitoring system on the coast of Aegean Sea of Turkey</i>	
L. Beccarisi, C. G. Giannuzzi, G. D'Andria, M. Greco	483
<i>Habitat and flora monitoring in the Regional Nature Reserve of "Palude del Conte e Duna Costiera di Porto Cesareo" (Puglia, Italy)</i>	
R. Bedini, M. Bedini, E. Salvadori	492
<i>A new transplanting method of Posidonia Oceanica (Linnaeus) Delile, 1813 plants</i>	
A. F. Bellia, J. Evans, S. Lanfranco	501
<i>A Drone's Eye View: a Preliminary Assessment of the Efficiency of Drones in Mapping Shallow-Water Benthic Assemblages</i>	

G. Bellissimo, B. Sirchia, V. Ruvolo	510
<i>Monitoring of Posidonia oceanica meadows in the Sicilian coasts under the Water Framework Directive (WFD)</i>	
G. Bellissimo, B. Sirchia, V. Ruvolo	519
<i>Assessment of the ecological status of Sicilian coastal waters according to a macroalgae based index (CARLIT)</i>	
M. C. de Francesco, I. Chiuchiarelli, L. Frate, M. L. Carranza, T. Pagliani, A. Stanisci	529
<i>Towards new marine-coastal NATURA 2000 SITES in the central Adriatic Sea</i>	
H. Humeniuk, O. Voloshyn, V. Voloshyn	540
<i>Seasonal dynamics of cadmium and plumbum in the Turia and Pripjat rivers</i>	
H. Idmoussi, L. Somoue, K. Hilmi, O. Ettahiri, T. Baibai, A. Makaoui, A. Errhif	547
<i>Phytoplankton assemblage Characterization along the Mediterranean coast of Morocco during autumn</i>	
C. Ippoliti, S. Tora, C. Giansante, R. Salini, F. Filipponi, E. Scamosci, M. Petrini, N. Di Deo, A. Conte	557
<i>Sentinel-2 e campionamenti in situ per il monitoraggio delle acque marine dell'Abruzzo: primi risultati</i>	
M. Morel, B. Lapierre, A. Goossens, E. Dieudonné, P. Lenfant, L. Vasseur, V. Hartmann, M. Verdoit-Jarraya	569
<i>Métiers, effort and catches of a Mediterranean small-scale coastal fishery: the case of the Gulf of Lion marine natural Park</i>	
F. V. Romano, V. Scalcione, P. D'Antonio, C. D'Antonio, E. Lacetra	580
<i>Precision agriculture and conservation of coastal landscapes</i>	
C. Ruge, G. Ciccarese, A. Longo, S. Petrachi, M. M. Niceta Potì	586
<i>Interventi di tutela e valorizzazione della biodiversità del SIC "Torre dell'Orso"-IT 9150004</i>	
D. Sgambati, É. Moura, A. E. Said, L. Rueda, E. Hoarau, L. Pribelja, D. Kļaviņš, A. Fagnano, A. De Angelis, A. Miccio	597
<i>Monitoraggio, conservazione e informazione nella baia di Ieranto: un modello circolare per la gestione delle Aree Marine Protette</i>	
M. Simeone, M. Solano, P. Masucci, S. Mecca, E. Barra	610
<i>5 anni di monitoraggio, controllo e prevenzione della pesca illegale nel Parco Sommerso di Gaiola (golfo di Napoli)</i>	
R. Stocco, L. Pirrera, E. Cellini	620
<i>L'applicazione di tecniche innovative nel monitoraggio costiero degli habitat prioritari</i>	
E. Taşkin, İ. Tan, O. Minareci, E. Minareci, H. Atabay, Ç. Polat Beken	632
<i>The pressures and the ecological quality status of the Marmara Sea (Turkey) by using marine macroalgae and angiosperms</i>	



<b>Session:</b>	<b>Coastal Environmental Engineering: pollution, energy production, monitoring and economic environmental assessment, regulatory context</b>	<b>639</b>
<b>Chairman:</b>	<b>M. Catelani</b>	
A. Bono, M. Marini	<i>Renewable power sources in coastal areas. A viability assessment in the scope of needs and regulation</i>	645
A. Cioffi, F. Cuculo, L. Di Nucci, G. Orlando	<i>The economic-environmental impact analysis in the choice of the management of the dredging materials of a port basin in relation to the classification and the quality: the experience of the port of Termoli (2018)</i>	656
D. Colarossi, P. Principi	<i>Feasibility study of a cold ironing system and district heating in port area</i>	666
M. De Vincenzi, G. Fasano	<i>Monitoring coastal areas: a brief history of measuring instruments for solar radiation</i>	676
A. Di Cicco, R. Gupana, A. Damm, S. Colella, F. Angelini, L. Fiorani, F. Artuso, V. E. Brando, A. Lai, A. Genangeli, F. Miglietta, R. Santoleri	<i>“FLEX 2018” cruise: an opportunity to assess phytoplankton chlorophyll fluorescence retrieval at different observative scales</i>	688
J. Droit	<i>Careening areas in marinas, anchorages, and private shipyards. Status of implementation of the MSFD measure</i>	698
F. Figueredo, F. Girolametti, S. Illuminati, C. Truzzi, A. Annibaldi, S. Susmel	<i>Electrochemical phosphate detection in oligotrophic seawater with a stand-alone plastic electrode</i>	705
N. Ghirardi, M. Bresciani, G. Luciani, G. Fornaro, V. Zamparelli, F. De Santi, G. De Carolis, C. Giardino	<i>Mapping of the risk of coastal erosion for two case studies: Pianosa island (Tuscany) and Piscinas (Sardinia)</i>	713
P. Ventura, M. Palmarocchi	<i>New coastal protection and sea energy production</i>	723
	<i>Index of Authors</i>	737

# NEW SCENARIOS FOR A DEVELOPMENT BETWEEN INFRASTRUCTURES AND INNOVATION

Thomas Bisiani<sup>1</sup>, Matteo Savron<sup>2</sup>

<sup>1</sup>Università degli Studi di Trieste, piazzale Europa 1 - 34127 Trieste (Italy),  
e-mail: [tbisiani@units.it](mailto:tbisiani@units.it), <sup>2</sup>[matteo.savron@studenti.units.it](mailto:matteo.savron@studenti.units.it)

**Abstract** – Both infrastructure and research, development and innovation, make communications and exchanges between distant places possible. As a consequence, geographic positions and administrative borders of countries are less and less significant compared to the polarity of the individual cities [23].

Europe tries to keep up with this global vision, European cities with the biggest growth rates are already “designing the revolution”. Stockholm, Copenhagen and Hamburg have developed strategic holistic plans where man and its needs are put at the forefront.



Figure 1 - Framing at the continental scale, pointing out the European macro systems Blue Banana and Arco Latino (Latin Arch) and the intermodal node of Trieste (in yellow), meeting point of the sea routes and the European corridors<sup>1</sup>.

The growth trend also involves mid-sized cities. Some researches indicate that 77 % of the European cities with a population of more than 300 million have

<sup>1</sup> Source: Fraziano G., et al. (2015) – *Le regole del gioco. Scenari architettonici e infrastrutturali per l'aeroporto FVG*, EUT Edizioni Università di Trieste, Trieste, pp. 168-169.

Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., p. 65



1. SAIPEM – leader in the energy and infrastructure sector, has based in Trieste its center for submarine robotics, where OIE’s (Offset Installation Equipment) operative base had been established. It deals with the most recent and highest technology in the world to avoid environmental disasters from underwater oil spills.
2. Java Biocolloid – Indonesian company among the main manufacturers of red algae extracts for the food and pharmaceutical industries that has established in Trieste its European headquarter. This location favors distribution to Europe, the Middle East and the USA and offers development and innovation opportunities through the scientific organizations of the territory.
3. The Coltan – The so called “blue gold” is a superconductor with great ability to store electric charges. In March 2019 a 5 tons container has been confiscated in the port of Trieste for having violated the norms regarding radioactive materials. The Coltan needed to be processed and transformed in Trieste for the production and export of microchips [16].

This last example also confirms the existence of a model that rewards the infrastructural allocation and the commitment of innovation. It also brings out criticalities linked to dubious operations and the exploitation of rare lands and resources of the planet [3].

On these terms this research wants to underline regenerating scenarios of the port areas within Trieste seen as an incubator of innovations. The objective is to define a landscape of activities of great added value, able to affect the quality of life and employment opportunities, exploiting the new central port position [5] [6].



Figure 3 - Goods and passengers interchange nodes of the FVG, particularly the ports of Trieste and Monfalcone, the Fernetto Freight Village and the Trieste Airport (in yellow)<sup>3</sup>.

<sup>3</sup> Source: Fraziano G., et al. (2015) – *Le regole del gioco. Scenari architettonici e infrastrutturali per l'aeroporto FVG*, EUT Edizioni Università d Trieste, Trieste, p. 213.

## Designing with scenarios

From a methodological point of view this research presents itself as a natural continuation of the previous analysis [20] carried out within the supervision of the University of Trieste in order to define the guidelines for the realization of the intermodal hub of the Trieste Airport.

In both cases three development scenarios have been identified, one alternative to the other in order to evaluate advantages and disadvantages and define their suitability by comparing them to the contextual conditions. This approach enables to modulate for at least three degrees – one per scenario – some of the strategic aspects which, in the case of Trieste Airport, the level of infrastructure service and in the circumstance of this specific case study, the intended use of the identified development area.

This research, requires a further preliminary action, carried out through a series of interviews aimed at stakeholders and public figures that have allowed to identify a collection of four strategic development areas. The cross referencing of the data collected during the consultations has allowed the recognition of the area of the Industrial canal among others. Previously the lot was occupied by the former tobacco manufacturer, the former Giuliane Steelworks along with the currently disused logistic area located at the head of the canal and of the existing docs, where the main interests of the participants involved converged.

The consideration that such area possesses all the characteristics to reach high infrastructural development potentials within a fairly reduced time period, being already the interest of private industrial investments of innovative character, supports the choice made.



Figure 4 - Individuation of the four development areas (in yellow) and of the two macro systems of the infrastructural services (in cyan) and of innovation (in magenta), comprised of highly innovative activities<sup>4</sup>.

---

<sup>4</sup> Source: Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., pp. 19, 23

The area occupies a strategic position since it is located at the center of the so called “logistics’ triangle”, defined by the centers of the new port, the new logistic platform of the dock eight (VIII), Trieste’s new Freight Village and of the former Aquila area, in the future a new multipurpose terminal recently acquired by a Hungarian developer.

In this regard, it is significant to underline that the position Trieste grants, on the one hand, reduced travel time of ships coming from the Suez Canal and a point of confluence for the eastern routes, and on the other, quick railway connections to the main European destinations.

The presence of a railway terminal within the currently discussed lot is of particular interest, it would offer added value to the development potentials, allowing a direct relation to the continental railway network.

Finally, a plan to insert the docks first and subsequently the surrounding industrial area within the margins of the FTZ (Foreign-trade zone) is already in place.

In response to the individualization of the area, three alternative scenarios have consequentially been recognized and are able to meet the expectations of the actors interested in the development of the area: the cold chain logistics center, the industrial hub and the data center.

### **The cold chain logistics center**

The conversion of the intended use of the lot as a logistic area [18] includes the construction of two large warehouses designed for the storage of goods [14]. The parallel and perimetral position of the two buildings is dictated by the necessity to have wide maneuver areas for the loading and unloading activities of the goods. Moreover, an important multi-modal exchange is established. At the head of the area are located the docks equipped with the ship owner’s spaces, at the center with the trucks connecting it to the main arteries of the city and at the other end with the railway terminal.

As a whole, they guarantee a perfect reliability and operativity of the system, as well as a minimal impact on the maintenance of the ideal environmental conditions along the cold chain for the optimal conservation of the goods [23].

### **The industrial Hub**

With its objective being aiming at the valorization of the development activities linked to the projects Sistema Argo and Freeway Trieste along with the exploitation of the presence on the territory of the Area Science Park, the third park in Italy for the birth and development of startups, the scenario promotes an Innovation Factory intended for the development of innovative products [10] [11] [12]. In order to allow the designer with original ideas to shift from concept to production, the Hub would provide in one location the technology, the competence in the field and the infrastructure; a working space, a research center, that offers expertise in the field of technology transfers, knowledge and strategic management of the R&D (research and development).

## Data center

In the current geopolitical context [4], ports have established increasing importance as strategic factors of a state that is projected from the sea to the rest of the world. This scenario proposes the realization of a data center [15] in service to the logistics of transportation in support to the continuously growing infrastructural and technological development. In order to increasingly digitalize the ports activities and to maintain the terminal at a high level of international competitiveness the data center would include areas that are both inside and outside the administrative area of *the Autorità del Sistema Portuale del Mare Adriatico Orientale*. The data center represents the core of this strategy since it guarantees the 24/7 operations of all processes, communications and services in support of the logistic activities [9].



Figure 5 - The three alternative development scenarios individuated for the area of the industrial canal with the identification of the heavy infrastructures connected to the case study<sup>5</sup>.

---

<sup>5</sup> Source: Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., pp. 67, 71, 75

The identification of an additional privileged scenario to this process has followed. It was obtained by developing an intermediate vision between two of the three scenarios previously mentioned, the industrial hub and the cold chain logistics center [1].

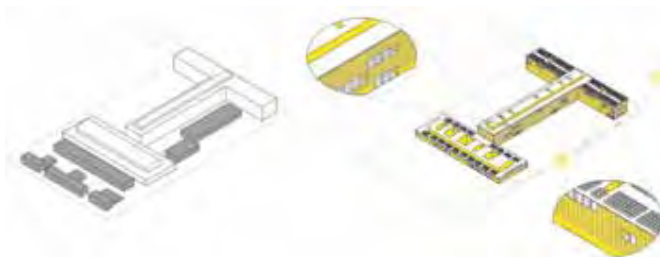


Figure 6 - Conceptual diagrams of the project development scenarios that verify the mixed scenario of the industrial hub and the cold chain logistics center. On the left, the planned demolitions (in grey) and on the right, the study of the facade enclosing and of the shading<sup>6</sup>.

### The BIM project as a verification tool

The definition of the ideal scenario was followed by a verifying action through the development of an architectural project using BIM methodology [17]. This practice strengthens the choice to operate through scenarios as it allows to have, at the end of the process, a dynamic simulation. It can be reused in order to verify alternative hypothesis maximizing the modeling effort, that can efficiently be reused, allowing for easy comparisons and analysis.

Therefore, all the opportunities of simulations that offer BIM methodology need to be underlined. This technology offers different functions from those relating to physical performance (comfort levels, structural behavior, energy consumption, etc...), to those relating to expenses and execution costs, allowing in this respect for increasingly more objective and in depth analysis [13].



Figure 7 - Extracts of the section and floor plan of the project development with BIM simulation technology<sup>7</sup>.

<sup>6</sup> Source: Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., p. 85

<sup>7</sup> Source: Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., p. 114



## A flexible methodology

The composite use of design by scenarios and BIM modeling [2] allows the management of the project, extended to the different scales. As a consequence, it is able to answer to different initial hypothesis and eventual contextual maintenance instead of having to deal with revisions that are normally necessary in order to modify and optimize the project as a subsequent validation of the preliminary proposals.



Figure 8 - General vision of the architectural intervention and of the arrangement of the external spaces and connections with the surrounding infrastructural systems<sup>8</sup>.

## Conclusions

Simulation methods for both scenarios and project design, combined, demonstrate the ability to develop living solutions on various scales. This approach seems enriched by the possibility to apply interpolations of different solutions in both the scale of the scenario and of the design verification by exploiting the dynamism of the parametric modeling.

In this case however, it is not limited to these generic methodological conclusions.

It starts to outline specific emerging typological and architectural issues linked to the evolution of new landscapes of infrastructure and innovation. The analysis of the scenarios and of the activities compatible with the interests of the promoters of the development interventions, as a result, recognizes a series of activities and locations where mankind seems to progressively be emarginated or absent.

A new landscape made up of our machines, where infrastructure and storage spaces both physical and digital, minimize the presence of the human user, becoming occasional and an accessory.

---

<sup>8</sup> Source: Savron M. (2020) – *Trieste: nuovi scenari per uno sviluppo tra infrastruttura e innovazione*, dissertation Università degli Studi di Trieste, 2018-2019, rapporteur Bisiani T., co-rapporteur Meninno C., p. 124

In any case it is about spaces that, even if uninhabited, are strategic, essential, in order to guarantee the functioning of the cities we live in.

These are spaces that define the very identity of the contemporary western culture, but we'll never be able to access them.

A system, in many cases that hasn't been thought out for us, but whose shape, maternity and function has been configured in order to answer to the logics of a new artificial living, where we are nothing but intrusions in an architecture that is completely indifferent to our presence and as of this moment seems to have left us behind.

## Conclusions

- [1] A+t research group (2011) – *This is Hybrid. An analysis of mixed-use buildings by a+t*, a+t architecture publishers, Victoria-Gasteiz
- [2] Alesi U., et al. (edited by) (2014) – *Il BIM per i cost manager: requisiti del modello BIM. Linee guida RICS a livello globale*, RICS, London
- [3] Antonelli P., Tannir A. (edited by) (2019) – *Broken Nature. XXII Triennale di Milano*, La Triennale di Milano, Electa, Milano
- [4] Belanger P., Arroyo A. (2016) – *Ecologies of power*, The MIT Press, Cambridge
- [5] Burdett R., Sudjic D. (2011) – *Living in the endless city*, Phaidon Press, London
- [6] Burdett R., Rode P. (2018) – *Shaping city*, Phaidon Press, London
- [7] Cappochin G., et al. (edited by) (2014) – *Eco Districts. Strategies and techniques for urban regeneration in Europe*, 6th Barbara Cappochin International Architecture Biennial, Marsilio Editori, Venezia
- [8] Cappochin G., et al. (edited by) (2017) – *European Green Capitals. Esperienze di rigenerazione urbana sostenibile*, 7th Barbara Cappochin International Architecture Biennial, LetteraVentidue Edizioni, Siracusa
- [9] Carpo M. (2017) – *The second digital turn: design beyond intelligence*, MIT Press, Cambridge
- [10] Carta M. (2007) – *Creative city. Dynamics, innovation, actions*, Listlab, Trento
- [11] Carta M. (2016) – *Re\_cyclical urbanism. Visioni, paradigmi e progetti per la metamorfosi cellulare*, Listlab, Trento
- [12] Carta M. (2017) – *Augmented city. A paradigm shift*, Listlab, Trento
- [13] Ciribini A., (2017) – *BIM e digitalizzazione dell'ambiente costruito*, Grafill, Palermo
- [14] Corbellini G. (2000) – *Grande e veloce. Strumenti compositivi nei contesti contemporanei*, Officina Edizioni, Roma
- [15] Cotton B., Oliver R. (1994) – *The Cyberspace Lexicon. An illustrated dictionary of terms from multimedia to virtual reality*, Phaidon Press, London
- [16] Crawford K., Joler V. (2018) – *Anatomy of an AI System: the Amazon Echo as an anatomical map of human labor, data and planetary resources*, AI Now Institute and Share Lab, New York
- [17] Eastman C., et al. (2011) – *BIM handbook. A guide for Building Information Modelling*, John Wiley & Sons Inc., Hoboken
- [18] Ferlenga A., Biraghi M., Albrecht B. (edited by) (2012) – *L'architettura del mondo. Infrastrutture, mobilità, nuovi paesaggi*, Editrice compositori, Bologna
- [19] Fraziano G., et al. (2014) – *Trieste, la misura del possibile*, Fresco Editore, Trieste

- [20] Fraziano G., et al. (2015) – *Le regole del gioco. Scenari architettonici e infrastrutturali per l'aeroporto FVG*, EUT Edizioni Università d Trieste, Trieste
- [21] Gandelsonas M. (1999) – *X-Urbanism: architecture and the American city*, Princeton Architectural Press, New York
- [22] Gramazio F., Kohler M., Willmann J. (edited by) (2014) – *The Robotic Touch. How robots change architecture*, Park Books, Zurich
- [23] Khanna P. (2016) – *Connectography. Mapping the future of global civilization*, Random House, New York
- [24] Khanna P. (2017) – *La rinascita delle città-Stato: come governare il mondo al tempo della devolution*, Fazi Editore, Roma (*Technocracy in America: Rise of the Info-State*)

## INDEX OF AUTHORS

Akçali B.	475	Çalık H.	475
Akyol O.	475	Caloiero T.	338
Allasia P.	17	Cantasano N.	338
Altavilla S.	155	Carboni D.	194
Angelini F.	688	Cardellicchio N.	392
Annibaldi A.	705	Carleo D.	28
Aragonés L.	432, 441	Carranza M.L.	529
Artuso F.	688	Casu A.	174
Asta A.	117	Cazzani A.	183
Atabay H.	632	Ceccarelli J.	155
Atroune F.	422	Cellini E.	620
Baibai T.	547	Cera G.	7
Bañón L.	432	Chiti M.	316
Barontini S.	183	Chiuchiarelli I.	529
Barra E.	610	Ciarravano A.	17
Beccarisi L.	483	Ciccarese G.	586
Beck A.L.	412	Cioffi A.	656
Bedini M.	492	Colantoni P.	379
Bedini R.	379, 492	Colarossi D.	666
Bellia A.F.	501	Colella S.	688
Bellissimo G.	510, 519	Coletta V.	17
Benincasa F.	XVII	Conte A.	557
Bisiani T.	164	Contini M.	194
Bonazza A.	17	Corbau C.	194
Bono A.	645	Corniello L.	28
Bosi F.	229	Corrente G.	155
Brando V.E.	688	Crespi M.	17
Bresciani M.	713	Cuculo F.	656
Bulkan O.	385	D'Andria G.	483
Buonocunto F.P.	392	D'Antonio C.	580
Burda A.	28	D'Antonio P.	580
Caligiore A.	155	Damm A.	688

Dauvin J.C.	309	Filipponi F.	557
De Angelis A.	597	Fiorani L.	688
De Carolis G.	713	Fiorini L.	363
De Cicco A.	28	Fontana M.	69
de Francesco D.	38	Fornaro G.	713
de Francesco M.C.	38, 529	Frate L.	529
De Marchi D.	214	Furčić N.	462
De Santi F.	713	Galeano F.	155
De Vincenzi M.	XVII, 676	Gargiulo M.	28
Del Corona A.	105, 280	Gazale V.	194
Devescovi V.	348	Genangeli A.	688
Di Cicco A.	688	Gherzi A.	242
Di Deo N.	557	Ghirardi N.	713
Di Leo A.	392	Giandomenico S.	392
Di Natale M.	402	Giannuzzi C.G.	483
Di Nucci L.	656	Giansante C.	557
Di Ronza S.	402	Giardino C.	713
Dietrich S.	17	Giordano L.	392
Dieudonné E.	569	Girolametti G.	705
Droit J.	698	Giudici G.N.M.	250
Epifani F.	219	Gomes da Silva P.	412
Eramo C.	402	Goossens A.	569
Errhif A.	547	Greco M.	483
Esposito E.	392	Grigatti G.	79
Esposito M.A.	229	Grindlay A.	95
Ettahiri O.	547	Guerrero F.	28
Evans J.	501	Gupana R.	688
Evcen A.	475	Hartmann V.	569
Fabrizio F.	47	Hilmi K.	547
Fagnano A.	597	Hoarau E.	597
Fai S.	451	Humeniuk H.	540
Faraone A.	38	Idmoussi H.	547
Fasano G.	XVII, 676	Illuminati S.	705
Federico S.	17	Ippoliti C.	557
Ferrari I.	58	Ivona A.	85
Ferraro L.	392	Jannuzzi F.	250
Figueredo F.	705	Jones M.	412

Kadri I.	422	Niceta Poti M.M.	586
Kaman G.	475	Notti D.	17
Kļaviņš D.	597	Orlando G.	656
Lacetra E.	580	Pagán J.I.	432, 441
Lai A.	688	Pagliani T.	529
Lalli M.	214	Palano I.	105, 280
Lanfranco S.	501	Palmarocchi M.	723
Lapierre B.	569	Paluzzi M.	38
Lazarou A.L.	194	Pappacena G.	155
Lenfant P.	569	Patrizio S.	250
Lento G.P.	28	Pellegrini A.	117
Lolli I.	259	Pellicone G.	338
Longo A.	586	Pergent-Martini C.	379
López I.	432, 441	Peruccio P.P.	79
Luciani G.	713	Petrachi S.	586
Makaoui A.	547	Petrillo A.	155
Mancini A.	214	Petrini M.	557
Mangifesta M.	38	Piccioli-Resta G.	451
Marini M.	645	Picciolo A.	451
Martín R.	95	Pichi F.	105, 280
Martinez Sanchez J.	412	Pidalà A.M.	289
Marucci A.	363	Pikelj K.	462
Masucci P.	610	Pioch S.	309
Mazzeo G.	270	Pirrerà L.	620
Mecca S.	610	Pisani Massamormile F.	250
Medina Santamaria R.	412	Pisconti M.	155
Miccio A.	597	Polat Beken Ç.	632
Miglietta F.	688	Pollice F.	219
Milia A.	392	Prestileo F.	17
Minareci E.	632	Pribelja L.	597
Minareci O.	632	Principi P.	666
Minciarelli C.	38	Puri P.	155
Montioni L.	105, 280	Quarta A.	58
Morel M.	569	Rodani V.	348
Moura É	597	Romano B.	363
Namık Çağatay M.	385	Romano F.V.	580
Natale A.R.	38	Rottino F.	155

Rueda L.	597	Susmel S.	705
Rugge C.	586	Tagarelli G.	338
Russo M.	299	Taji A.	412
Ruvolo V.	510, 519	Tan I.	632
Said A.E.	597	Tartara P.	127
Salaün J.	309	Taşkın E.	475, 632
Salini R.	557	Tatasciore G.	38
Salvadori E.	492	Tenza-Abril A.J.	432, 441
Santoleri R.	688	Tora S.	557
Saragosa C.	316	Torcasio R.C.	17
Savron M.	164	Trematerra A.	28
Scalcione V.	580	Trigona S.L.	137
Scamosci E.	557	Truzzi C.	705
Scamporrino M.	105, 280, 326	Ubaldi C.	155
Scatigna G.	155	Vasseur L.	569
Sgambati D.	597	Ventura P.	723
Simeone M.	610	Venudo A.	348
Simeoni U.	194	Verdoit-Jarraya M.	569
Simione F.	155	Violante C.	392
Sinesi T.	155	Voloshyn O.	540
Sirchia B.	510, 519	Voloshyn V.	540
Solano M.	610	Yalamaz N.	385
Somoue L.	547	Yepes V.	95
Spaccavento G.	155	Zaccagna J.	174
Spada L.	392	Zamparelli V.	713
Stanisci A.	529	Zappalorto M.	38
Stocco R.	620	Zullo F.	363

The 8th International Symposium *Monitoring of Mediterranean Coastal Areas. Problems and Measurements Techniques* was organized by CNR-IBE in collaboration with FCS Foundation, and Natural History Museum of the Mediterranean and under the patronage of *University of Florence, Accademia dei Geografi, Tuscany Region and Livorno Province*. It is the occasion in which scholars can illustrate and exchange their activities and innovative proposals, with common aims to promote actions to preserve coastal marine environment. Considering Symposium interdisciplinary nature, the Scientific Committee, underlining this holistic view of Nature, decided to celebrate Alexander von Humboldt; a nature scholar that proposed the organic and inorganic nature's aspects as a single system. It represents a sign of continuity considering that in-presence Symposium could not be carried out due to the COVID-19 pandemic restrictions. Subjects are related to coastal topics: morphology; flora and fauna; energy production; management and integrated protection; geography and landscape, cultural heritage and environmental assets, legal and economic aspects



## PATRONAGE BY



UNIVERSITÀ  
DEGLI STUDI  
FIRENZE



ACCADEMIA DEI GEOGRAFILI



ISSN 2704-601X (print)  
ISSN 2704-5846 (online)  
ISBN 978-88-5518-147-1 (PDF)  
ISBN 978-88-5518-148-8 (XML)  
DOI 10.36253/978-88-5518-147-1