



A Conceptual Framework for Developing the Next Generation of Marine OBservatories (MOBs) for Science and Society

Alessandro Crise^{1*}, Maurizio Ribera d'Alcalà^{1,2}, Patrizio Mariani³, George Petihakis⁴, Julie Robidart⁵, Daniele Iudicone², Ralf Bachmayer⁶ and Francesca Malfatti¹

¹ Istituto Nazionale di Oceanografia e di Geofisica Sperimentale, Trieste, Italy, ² Stazione Zoologica Anton Dohrn Napoli, Naples, Italy, ³ National Institute of Aquatic Resources, Technical University of Denmark, Charlottenlund, Denmark, ⁴ Hellenic Centre for Marine Research, Institute of Marine Biological Resources and Inland Waters, Heraklion, Greece, ⁵ National Oceanography Centre, Southampton, United Kingdom, ⁶ MARUM, Center for Marine Environmental Sciences, University of Bremen, Bremen, Germany

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*Correspondence:

Alessandro Crise
acrise@inogs.it

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In the field of ocean observing, the term of “observatory” is often used without a unique meaning. A clear and unified definition of observatory is needed in order to facilitate the communication in a multidisciplinary community, to capitalize on future technological innovations and to support the observatory design based on societal needs. In this paper, we present a general framework to define the next generation Marine OBservatory (MOB), its capabilities and functionalities in an operational context. The MOB consists of four interconnected components or “gears” (observation infrastructure, cyberinfrastructure, support capacity, and knowledge generation engine) that are constantly and adaptively interacting with each other. Therefore, a MOB is a complex infrastructure focused on a specific geographic area with the primary scope to generate knowledge via data synthesis and thereby addressing scientific, societal, or economic challenges. Long-term sustainability is a key MOB feature that should be guaranteed through an appropriate governance. MOBs should be open to innovations and good practices to reduce operational costs and to allow their development in quality and quantity. A deeper biological understanding of the marine ecosystem should be reached with the proliferation of MOBs, thus contributing to effective conservation of ecosystems and management of human activities in the oceans. We provide an actionable model for the upgrade and development of sustained marine observatories producing knowledge to support science-based economic and societal decisions.

Keywords: Marine OBservatory, ocean observing, cyberinfrastructure, long-term sustainability, Essential Ocean Variables, Global Ocean Observing System

INTRODUCTION

Until now, due to the technological limitations, our observing capacity has been governed to a large extent by the principle we “observe what we can” rather than “we observe what we need.” As a result, the Global Ocean Observing System defined the Essential Ocean Variables (EOVs, Lindstrom et al., 2012) to prioritize parameters for new technological developments. The