



## **Multipurpose cost-effective technologies supporting integrated marine ecosystem monitoring**

Viviana Piermattei (1,2), Marco Marcelli (1,2), Alice Madonia (1,2), Andrea Terribili (1), Riccardo Valentini (1,2)

(1) University of Tuscia, DEB, Department of ecological and biological sciences, Civitavecchia, Italy  
(marcomarcell@unitus.it), (2) Centro Euro-Mediterraneo sui Cambiamenti Climatici (CMCC), Lecce, Italy

Marine coastal ecosystems monitoring is nowadays a main concern in the worldwide scientific community and requires a multidisciplinary and integrated approach. A significant effort has been invested in modelling marine coastal dynamics and processes and in the development of new technologies oriented to remote sensing data validation, in order to increase large data sets required for integrated approaches. Extended marine monitoring would require a reduction in the cost of platforms and instruments, but this often prejudices measurement accuracy and consequently data quality. Thus, selecting an instrument depends on factors such as research and monitoring objectives, local characteristics and installation type.

The scientific community is promoting inexpensive, flexible and accurate instruments based on low-price components to enhance the observing systems potentiality. The development of sensors for autonomous applications, miniaturization of components and reduction of energy consumption are essential to provide long-term observations. The availability of new low-cost communication systems (eg. LoRaWAN) and sensors together with the increasing amount of data from heterogeneous sources (eg. citizen science) represents a key issue forward the application of the "Internet of Things" paradigm to the sea. In this context a significant effort has been invested to develop a smart system which integrates a customizable acquisition/transmission system (MTCcloud) and cost-effective sensors for marine environmental research. This work shows the preliminary results of the developed technology and its first applications.