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Low-cost technological advances supporting the assessment of anthropogenic pressures on marine ecosystems

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The study of natural and non-natural changes of marine environment is based on direct observations which provide systematic informations on physical, chemical and biological state of marine ecosystems. Sea observations are key pieces of understanding changing environment, but their availability is often limited, particularly in extreme environments and concerning biological variables. The last years have seen a considerable improvement in the availability and accessibility of environmental observations data, however a big effort is still needed to extend the observing systems network through the development of new sensors and platforms. Due to the high costs of oceanographic measuring systems, the development of cheap, small and smart sensors could provide suitable solutions to improve marine ecosystem monitoring and consequently operational and forecasting oceanography. A low-cost instrument was developed to be easily integrated on different kind of measuring platforms (research vessels, moorings, unmanned vehicles) and tested during several surveys, in order to study the effects of anthropogenic pressures on marine environment. In particular this work shows the results of three surveys: MEDESS-4MS carried out in the Mediterranean sea to study the effects of oil spill on phytoplankton, an Arctic sea survey to analyse the impact of climate changes on the polar environment (UVASS project), a Tyrrhenian sea survey carried out in the framework of Italian Coastal Guard monitoring programs.