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Long-term changes in a Ligurian infralittoral community (Mediterranean Sea): a warning signal?

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Abstract

Recently, the Mediterranean littoral benthic communities suffered significant changes in their structure and composition, due to several natural and anthropogenic stresses. Also the Ligurian Sea has witnessed in several episodes (surface water warming, benthic mucilage developments, etc.) linked to the climate change that have influenced the structure of the benthic communities. In order to evaluate possible changes inside the benthic upper infralittoral community (4-7 m depth) living along the southern cliff of the Portofino MPA, sets of macro-photographs, realized in 2002-2003 and repeated 10 years later (2013), were analysed. The community structure, diversity, and species abundance were studied in 9 stations placed in three different localities (Ca'dell'Oro Bay, Punta Chiappa Point and St Fruttuoso Bay) at different levels of protection, although considered potentially affected only by natural stressors and not by direct human impacts.

Over 10-years, a significant change in the macroalgal coverage and composition was observed in all considered stations and localities, with a reduction of the habitat complexity, being the frondose and habitat-forming macroalgae (Fucales, Dycytiales) significantly decreased. In contrast, as regards the sessile zoobenthos, there has been an increase of branched bryozoans and a drop in the presence of barnacles and mussels. A significant emergence of some alien species (*Asparagopsis armata*, *Caulerpa cylindracea* and *Paraleucilla magna*) linked to warmer waters was recorded too.

In conclusion, the benthic upper infralittoral community (4-7 m depth) of the Portofino MPA seems to have being influenced by several climatic large-scale events that occurred in recent years in the Ligurian Sea and the change of its structural composition could be considered as a warning signal.

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