



All at Sea?

Synergies between past & present coastal processes & ecology

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Abstracts

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Decadal evolution of a present-day rocky reef ecosystem under the influence of climate change.

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Marine coastal ecosystems are among the most vulnerable to global change. The best way to evaluate their decadal-scale variation is to monitor locations where long-time series are available. Yet, data sets encompassing time scales longer than a few years are scarce, especially for temperate rocky reef benthic communities. Nevertheless it might be possible to reconstruct the ecological history of an individual rocky reef revisiting a site where previous information is available, in the bibliography or in the archives of research institutes. We attempted to assess a 50 years time-scale change of a rocky reef benthic community located in the NW Mediterranean Sea (44°8' N, 9°38' E), comparing biotic cover data collected in 1961, 1990, 1996 and 2008 through underwater photography at about 20 to 45 m depth. These quantitative data have been supplemented with qualitative information, gathered from the analysis of several descriptive studies carried out in the last century since 1937. Merging qualitative information and quantitative data allowed a conspicuous, although discontinuous, amount of information on the recent history of this temperate rocky reef to be analysed. What emerges from our study is that two major factors influenced the recent evolution of the benthic community: the increase in water column turbidity and sedimentation rate, and the rise in surface-water temperature. Major alterations in species composition and abundance occurred before the 1990s, due to the reduction in water transparency that made photophilic species disappear and allowed deep-water species settling and growing at comparatively shallow depths. However, interpretation of results must be cautious, since quantitative data may differ because of change in photographic techniques, inhomogeneous taxonomic resolution, and lack of replication in old surveys. The most evident recent changes are the reduction of gorgonian abundance and the invasions by tropical alien species (such as the seaweed *Caulerpa racemosa*). Both changes might be related to the increase of sea water temperature: downward lifting of the summer thermocline massively killed gorgonians, while new environmental conditions favoured spreading and establishment of tropical aliens to the detriment of native species, already stressed by increased turbidity and sedimentation.

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