Euro ISRS symposium 2010: Reefs in a changing environment

Title: **Decadal evolution of a temperate reef ecosystem under the influence of climate change.**

Track name: Oral presentation

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Abstract content (max 3500 characters):

Decadal evolution of a temperate reef ecosystem under the influence of climate change.

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Marine coastal ecosystems are among the most vulnerable to global change. A way to evaluate their long term variation is to monitor sites which had been studied in the past, but data sets encompassing time scales longer than a few decades are scarce, especially for temperate reef ecosystems. Nevertheless it might be possible to reconstruct the ecological history of an individual 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 temperate reef ecosystem located in the NW Mediterranean Sea (44°13’ N, 9°63’ 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 reef to be analysed. What emerges from our study is that two major factors influenced the recent evolution of the ecosystem: 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 corals and the invasions by tropical alien species (such as the seaweed Caulerpa racemosa). Both changes are related to the increase of sea water temperature: downward lifting of the summer thermocline massively killed gorgonian corals, while warmer conditions favoured spreading and establishment of tropical aliens to the detriment of native species, already stressed by increased turbidity and sedimentation.

Research done within the frame of the project 'The impacts of biological invasions and climate change on the biodiversity of the Mediterranean Sea' (Italy–Israel co-operation) funded by the Italian Ministry of the Environment.

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Topic: Temperate, deep and cold water reefs

Keywords: temperate reef, long-term change, UW photography, Mediterranean Sea