

The biogeographical facets of marine ecosystem change: Kos, Aegean Sea

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Coastal marine ecosystems are changing world-wide under the action of global and local stressors; spread of alien species constitutes a further driver of change, especially in the Eastern Mediterranean, where Red Sea species come in through the Suez Canal. Studies are becoming available that measure rate and extent of ecological change, but almost no information exists about the biogeographical consequences of changing biodiversity patterns. We compared data collected in 2013 and in 1981 in the shallow coastal marine ecosystem of Kos, an island in the SE Aegean. In these 30+ years, both sea surface temperature and human pressure increased, causing heavy modification in the structure of benthic communities. A total of 120 conspicuous species were inventoried by time-based visual census, including 31 fishes, 57 invertebrates, 2 seagrasses and 30 algae. From a biogeographical standpoint, species were grouped in 7 chorological categories: 1) Boreo-Lusitanian; 2) Atlantico-Mediterranean; 3) Endemic; 4) Mauretanian; 5) Circum(sub)tropical; 6) Tropical Atlantic; 7) Indo-Pacific. The relative frequency of Boreo-Lusitanian and Atlantico-Mediterranean species decreased between 1981 and 2013, while that of Tropical Atlantic species increased; the most striking difference, however, was the massive appearance of Indo-Pacific immigrants. These results provide an unequivocal measure of the so-called "tropicalization" of the Mediterranean Sea. Among the Indo-Pacific newcomers, the two herbivorous fishes *Siganus luridus* and *S. rivulatus* were responsible of the near extirpation of the previously luxuriant algal cover, therefore acting in turn as major direct drivers of ecological change.