

Snapshot of macroalgae and fish assemblages in temperate reefs in the Southern European Atlantic ecoregion

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1. *In situ* measurements of abiotic data

1.1 Methods

Seawater temperature (°C) and relative light or illuminance (lux) at each location were measured using HOBO Pendant® Temperature/Light logger at 1 min intervals during the time the biological sampling took, being approximately 40 min [1]. The loggers were deployed above sea surface (0.5 m) and into to a vertical cable at two constant depths (-2 and -25 m). Illuminance reaching depths of 2 and 25 m was expressed as % of superficial illuminance, and temperature was given as a range from the shallow (2 m) to the deep (25 m) measurements.

Replicated (n = 6) water samples were collected approximately 1 m above the reef bottom, transported to the surface and immediately filtered and stored on ice until return to land. Samples were then frozen (-20 °C) until chemical analysis for NO₃⁻ and PO₄³⁻, which was performed through a colorimetric auto-analyser (Skalar® SAN Plus Segmented Flow Analyser). Nutrient concentrations (µmol L⁻¹) were given as range across the replicates.

1.2. Results

Seawater was slightly colder in Parcel than in Tarifa, with temperature values between 2 and 25 m depth ranging from 17.7 °C to 13.5 °C in Parcel (range 4.2 °C) and from 19.4 °C to 15.8 °C in Tarifa (range 3.6 °C) (**Figure S1a**). Water transparency was higher in Tarifa than in Parcel, with a percentage illuminance, in respect to the illuminance recorded above sea surface, between 50% at 2 m and 27% at 25 m in Tarifa and between 38% and 18% in Parcel (**Figure S1b**). The NO₃⁻ concentration was higher in Parcel (9.00 to 10.88 µmol L⁻¹) than in Tarifa (4.98 to 6.13 µmol L⁻¹), while PO₄³⁻ concentration was similar between locations (**Figure S1c, d**).

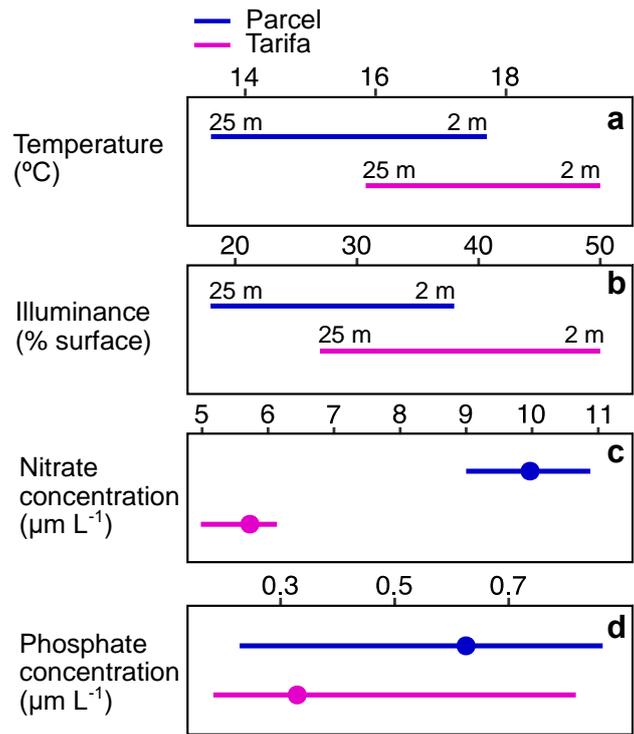


Figure S1. Abiotic characterization of Parcel and Tarifa at the moment of the sampling. Seawater temperature (a, range of means) and percentage illuminance (b, range of means) at 2 and 25 m depth (in respect of above seawater surface illuminance), and mean and range of nitrate (c) and phosphate (d) concentrations in the seawater above the reef bottom (~25 m).



Figure S2. Herbivory marks on the golden kelp *Laminaria ochroleuca* at the southernmost sampling site, Tarifa, South of Spain

References

1. Franco, J.N.; Wernberg, T.; Bertocci, I.; Jacinto, D.; Maranhão, P.; Pereira, T.; Martinez, B.; Arenas, F.; Sousa-Pinto, I.; Tuya, F. Modulation of different kelp life stages by herbivory: compensatory growth versus population decimation. *Mar. Biol.* **2017**, *164*.