INTERACTION OF MARINE HEATWAVES AND GRAZING OVER TWO CANOPY-MACROALGAE

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INTRODUCTION

- Marine forests are complex assemblages of brown-canopy macroalgae species characterized by high productivity and provide multiple ecosystem services.
- These species are in regression due to numerous impacts acting at local, regional and global scales (e.g., overgrazing, marine heatwaves (MHWs), rising temperatures, etc.).
- The south coast of Madeira Island is dominated by bare rock, sediments and high density of sea urchins.
- One of the most common macroalgae in these degraded systems is the red algae Asparagopsis taxiformis, competing with the marine forests former Cystoseira foeniculacea.

RESULTS

MHWs historical analysis

METHODS

- We analysed 37-year high-resolution sea surface temperature data on the occurrence of MHWs in Macaronesia, finding an increase in the frequency of moderate and extreme events in the last 20 years.
- We performed a mesocosm experiment to understand A. taxiformis and C. foeniculacea respond to grazing by the sea-urchin Paracentrotus lividus, under the simulation of moderate and extreme MHWs.

Fig 1 | Slope of the count of MHW events detected in Macaronesia per year (1982-2020) over time as shadows of red

Fig 2 | Biomass as dry wt (g) per studied species. Mean ± SE of 6 replicates is reported for each treatment per species.

Fig 3 | Mean NPP and DR per studied species. Mean ± SE of 6 replicates is reported for each treatment per species.

Fig 4 | Conceptual model of C. foeniculacea and A. taxiformis interaction under the influence of MHW intensity with the interaction of a grazer. A. taxiformis is outcompeted by the MHW. A grazing interaction, the recovery, a species of C. foeniculacea is threatened by temperatures due to the presence of the grazer (P).