**Supplementary appendixes**

**Appendix 1. Details on the thermotolerance curve**

The thermotolerance response curve built to discriminate between MHW-impacted and non-impacted sites was based on the thermotolerance features of *Paramuricea clavata* and *Corallium rubrum*; the dominant species in the here monitored assemblages and among the most sensitive coralligenous species to marine heatwaves according to previous experimental (e.g., Torrents et al. 2008; Crisci et al. 2011; 2017), and field studies (Cerrano et al. 2000; Garrabou et al. 2001; 2009).

In particular, thermotolerance data for these two species were obtained from two previous ex-situ experiments conducted in controlled conditions at the mesocosms facilities of the Institut de Ciències del Mar (ICM-CSIC, Barcelona; Crisci et al. 2011; 2017) and the Centre Scientifique de Monaco (CSM, Monaco; Torrents et al. 2008). Similar experimental design was applied in both experiments, which consisted, after an acclimatization phase, in testing the effect of constant (elevated T) on various colonies (N=3 to 10) from different populations (N = 2 to 8). The biological response considered was the first sign of tissue necrosis, which occurred after 2 to 84 days of exposure depending on treatments.

For *P. clavata,* the experiments covered a T° range between 23-28 °C on 3 replicates of 10 colonies from 2-8 populations (depending on the treatment), what facilitated the construction of a robust thermotolerance response curve along the exposure/duration dimension, based on the average result of all populations and replicates tested (up to 240 colonies) in each treatment. Conversely, the thermotolerance information from the *C. rubrum* experiments was more limited, covering the response of 3-6 colonies of at least 2 populations at only two different temperatures; 25 ºC and 27 ºC. Although this information was not enough to build a *C. rubrum* specific thermotolerance response curve such as the one obtained from *P. clavata*, it evidenced the great similarities in the thermotolerance of these two vulnerable species, indicating that the thermal response curve of P*. clavata* is a good proxy for *C. rubrum* as well(as can be observed in Fig. S3, where the 2 mean data points obtained from the *C. rubrum* experiments fit well to the nonlinear 5th degree polynomial response curve of *P.clavata*).

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**Appendix S2. Methodology followed to assess the trait values of the functional traits used in the study and derived from Teixidó et al. 2018.**

The coarsely categorized traits values of the 111 taxa found in this study were coded based on the expertise of team members (e.g. J. Garrabou, C. Linares, D. Gómez for invertebrates and P. López-Sendino for algae) and other experts on Mediterranean benthic taxonomy (e.g. M. Zabala, J.M Gili, A. Santín), according to the information available on descriptions, drawings and photographs from taxonomic monographs (e.g., Zabala and Maluquer, 1988), identification guides (e.g., Weinberg 1996; Rodriguez-Prieto et al. 2013), online databases (e.g., http://www.algaebase.org/, http://doris.ffessm.fr/ or <http://corspecies.medrecover.org/>, <https://coraltraits.org>) and previous scientific publications (e.g., Gili & Coma, 1998; Teixidó et al. 2011; 2018). When information of a given trait was not directly available for a given taxa, (e.g. taxa that could not be identified to the species level in the field or via photographs or identified taxa but with missing information for a given trait in the above mentioned resources), team experts coded their trait values according to; i) the trait value of the most similar and taxonomically related species with direct information available on the above mentioned sources and, ii) the more commonly observed values for that trait and taxa in the field by the team experts. The detailed sources used to assess the nominal/ranked categories of traits are shown below in Table S5.

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