

Do the size shifts of marine macroalgae match the warming trends in the Canary Islands?

M. Sansón, C. Sangil & S. Orellana & J. Afonso-Carrillo

Departamento de Biología Vegetal (Botánica), Universidad de La Laguna, 38071 La Laguna, Canary Islands

In recent decades, global climate change has caused profound biological changes across the planet. However, there is a great disparity in the strength of evidence among different ecosystems, relatively with few records of impacts of warming from the oceans. Shifts in marine communities have been detected along the Canary Islands, consistent with rapid warming over the past three decades. The aim of this study was to test whether the size shifts of engineering macroalgae selected match the warming trends documented from these subtropical coasts.

We measured a total of 2154 herbarium individuals of five habitat-forming species of macroalgae [*Fucus guiry* Zardi, Nicastro, Serrão et Pearson, *Gelidium canariense* (Grunow) Seoane-Camba ex Haroun, Gil-Rodríguez, Díaz de Castro et Prud'homme van Reine, *Gelidium arbusculum* Bory de Saint-Vincent ex Børgesen, *Pterocladia capillacea* (S.G. Gmelin) Santelices et Hommersand and *Cystoseira abies-marina* (S.G. Gmelin) C. Agardh] collected at different localities in the Canary Islands since 1960s and deposited at TFC and BCM. All these species dominate the seascape in sites with different environmental characteristics. *Fucus guiry* forms a belt in the upper eulittoral at semiexposed sites; the Gelidiales occur from the lower eulittoral to the upper sublittoral at exposed coasts; while *Cystoseira abies-marina* constitutes belts or larger beds from the limit of low tide to the shallow bottoms at semiexposed-exposed localities. The herbarium specimens examined, which have only been used until now as taxonomical references, have resulted in key historical archives to assess critical changes in morphological characteristics of species, as thallus average length, along long temporal series.

The resulting data show that there are significant correlations between the warming trends at the Canary Islands coasts and the shifts in size of these macroalgae species. Length of thallus of some species seems to correlate with anomalies of warming or cooling that have occurred in exceptional years.