{rokbox title=|Predictions and projections along the 21st century of the recruitment and overall stock of European hake (Merluccius merluccius) in the FAO-GFCM geographical sub-area GSA 6 (Northern Spain), under the five fishing management strategies considered (see Material and methods and Figure 2 for more details) and the Regional Climatic Models under two climatic scenarios (RCP 4.5 and RCP 8.5) :: Image: Authors|
thumb=|images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-long-term-predictions-guijarro-2025-thumb-et-al.jpg|}images/stories/ieo/imagenespublicaciones/centro-oceanografico-baleares-ieo-csic-long-term-predictions-guijarro-2025-et-al.jpg{/rokbox}

Cristina González-Andrés, **Beatriz Guijarro**, Eduardo Ramírez-Romero, **Enric Massutí**, 2025.
Long term predictions on the population dynamics of two contrasting demersal fishing resources in the western Mediterranean
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Abstract: In the context of global change, studying the synergic effects of climate and marine resources is key to understanding and predicting their impact on exploited stocks and improving adaptive fisheries management. In the western Mediterranean, European hake (*Merluccius merluccius*) and deep-water rose shrimp (*Parapenaeus longirostris*) are two key demersal species with distinct ecological preferences. This study models long-term projection of their population dynamics at two geographical subareas (GSAs) established by the General Fisheries Commission for the Mediterranean (FAO-GFCM), Balearic Islands (GSA 5) and Northern Spain (GSA 6), under different management strategies and climatic scenarios. The methodological approach followed three steps. First, recruitment and spawning stock biomass temporal series of these stocks were obtained from fisheries assessment models, developed within the framework of the FAO-GFCM. Then the influence of parental stock and environmental drivers on their recruitment was modelled. In GSA 5, European hake recruitment was mainly driven by winter sea surface temperature, while in GSA 6, additional factors included chlorophyll-a and mean salinity. For deep-water rose shrimp, bottom temperature was the key driver in both GSAs. Lastly, we projected the population dynamics of the stocks along the whole 21st century by combining five potential fishing management strategies, including those currently applied in the investigated area (European Union Multiannual Plan) and the models of main explanatory drivers developed concurrently with an ensemble of four Regional Climate Models under two climatic scenarios (RCP4.5 and RCP8.5) adopted by the Intergovernmental Panel on Climate Change, which describe medium and extreme heating. From the combination of these management strategies and climatic scenarios, projections of the population parameters of European hake and deep-water rose

shrimp and its catches were carried out up to 2100. The projections revealed a decline in European hake recruitment, population, and catches across all climate scenarios, regardless of fishery management strategies. In contrast, deep-water rose shrimp showed an overall improvement in population parameters and catches under all conditions. Our results may enhance scientific advice for implementing an adaptive fisheries management and highlight the need of integrating climatic effects in the assessment and management processes to enhance stock sustainability under global change.

Keywords:demersal stocks,population dynamics,projections,climate change,fisheries management,western Mediterranean.