

Appendix 1

Background material on temperature projections

The physical model used to calculate present and future surface water temperature is the Proudman Oceanographic Laboratory Coastal Ocean Modelling System (POLCOMS, (Holt and James 2001), which is a baroclinic three dimensional model with the ability to run in regions which include both the deep ocean and the continental shelf using 40 sigma layers. The model was provided by PML, UK (Kay et al. 2018) and has been validated for surface values in the Mediterranean (Ramírez-Romero et al. 2020). Within the frame and efforts of an EU project (CERES, <https://ceresproject.eu/>), projections for the RCPs were made using data from the global climate model MPI-ESM-LR (<http://www.mpimet.mpg.de/en/science/models/mpi-esm.html>) and downscaled to regional climate model. Model data from surface temperatures for present runs (average 2006-2016) was corrected for bias for each week (typically 0.3-1°C) using satellite data for the same period (CMEMS, scaled to model resolution), by differentiation of average temperatures (modelled – observed). This was conducted averaging a grid of approx. 200km (bounded by 40.5N - 2E, 38.75N, 4.25E) km around the Balearic Islands, which was taken as representative of the thermal conditions for the spawning area. The projection of warming in the different RCPs was averaged for the decade 2041-2060 (referred to as 2050).

Literature cited

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- Ramírez-Romero, E., G. Jordà, A. Amores, S. Kay, M. Segura-Noguera, D. Macías, F. Maynou, A. Sabatés, and I. Catalán. 2020. Assessment of the Skill of Coupled Physical-Biogeochemical Models in the NW Mediterranean. *Frontiers in Marine Science* **7**.