The impact of environmental variability on Atlantic mackerel Scomber scombrus larval abundance to the west of the British Isles

The value of the Continuous Plankton Recorder (CPR) fish larvae dataset, with its extensive spatiotemporal coverage, has recently been demonstrated with studies on long-term changes over decadal scales in the abundance and distribution of fish larvae in relation to physical and biological factors in the North Sea. We used a similar approach in the west and southwest area of the UK shelf and applied a principal component analysis (PCA) using 7 biotic and abiotic parameters, combined with Hierarchical Cluster Analysis (HCA), to investigate the impact of environmental changes in the west and southwest area of the UK shelf on mackerel larvae during the period 1960-2004. The analysis revealed 3 main periods of time (1960-1968; 1969-1994; 1995-2004) reflecting 3 different ecosystem states. The results suggest a transition from an ecosystem characterized by low temperature, high salinity, high abundances of zooplankton and the larger phytoplankton groups, to a system characterized by higher temperature, lower salinities, lower abundances of zooplankton and larger phytoplankton and higher abundances of the small phytoplankton species. Analysis revealed a very weak positive correlation between the Second principal component and mackerel larvae yearly abundance, attributed to the North Atlantic Oscillation (NAO). The results presented here are in broad accord with recent investigations that link climatic variability and dynamics of mackerel reproduction. However, the growing body of literature that documents statistical correlations between environment and mackerel needs to be supplemented by local process studies, to gain more insight and to be able to predict mackerel response to climate change scenarios. Utilising the strength of the CPR dataset, namely its unique temporal coverage, in an analysis where other data (such as egg surveys) are drawn in to compensate for the spatial issues could prove to be the way forward. Crown Copyright (C) 2015 Published by Elsevier Ltd.