Investigating the impact of ocean oxygen minima expansion on demersal communities in NW Africa

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Project Summary

Mauritania is one of the main fishing grounds worldwide and a key component of the Canary Current Large Marine Ecosystem (CCLME). This is a highly productive sea area covering more than 5400 km of coastline under the influence of the NW African upwelling, that provides vital food and economic resources to an estimated population of 64 millions people.

NW African shelf areas are particularly exposed to climate change, which is predicted to significantly alter seawater temperature and oxygen concentration. Long-term observations have already shown a vertical expansion of the Oxygen Minimum Zone (OMZ) in tropical North Atlantic waters. Projections anticipate that the OMZ will further expand and upwelling-driven hypoxia events will become more and more frequent, increasing the mortality of fish and other macro-organisms of high economical value.

This project aims to test such hypothesis, assessing the spatio-temporal variability of the OMZ and its impact on demersal ecosystem structure across the Mauritania shelf. In particular, we will investigate the extent to which the OMZ has expanded in this region in recent years. We will also investigate the extent to which this OMZ expansion extends to coastal waters, compresses the habitat of demersal fish stocks, and impact their composition and spawning biomass, while favouring other demersal organisms such as jellyfish. The spatio-temporal progression of the OMZ will be obtained by mapping the oxycline, i.e. the zone of transition between high and low oxygen waters, estimated from decadal observations of oxygen collected in situ across the shelf. These shelf data will be combined with oxygen records from other NW Africa demersal zones, offshore Argo floats and satellite data and used to investigate the links between upwelling of open-ocean OMZ waters and hypoxic areas on the NW Africa shelf.

The outcomes of this project will contribute to establish validated functional relationships, which are needed to develop predictive models of shelf hypoxia and ensure a sustainable management of the fishery in NW Africa.