PREFACE HIGHLIGHTS

In PREFACE, three different ecosystem levels have been analysed: top predators (tuna), small pelagic fish, and micronekton, a key component of ocean food webs.

The analysis of YFT (Yellowfin tuna , *Thunnus albacares*) catches in Cape Verde revealed the importance of climatic factors and fish stock to model local catch dynamics.

There is a **strong effect of subtropical wind stirring with a subsequent cooling of the sea surface layer that leads to an increase in abundance**. This is evidenced by negative correlations to North Tropical Atlantic sea surface temperature and the North Atlantic Oscillation, which is the dominant mode of large-scale atmospheric variability.

A YFT catch model using anomaly corrected climate projection data reveals that improved governance is essential to cope with negative impacts of climate change.

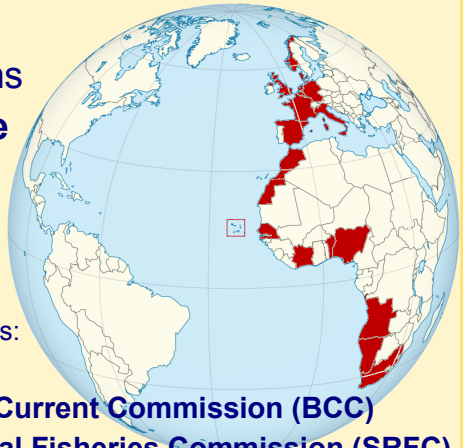
In terms of prey fish dynamics, the first long-term and large-scale comparison of mesopelagic fish data in terms of biomass size spectra reveals **significant changes in terms of trophic efficiency in oceanic food webs**[1].

Together, this highlights the impact of climate on local fisheries with **important implications for fisheries economics**.

[1] Fock HO and Czudaj S. 2018. Size structure changes of mesopelagic fishes and community biomass size spectra along a transect from the Equator to the Bay of Biscay collected in 1966-1979 and 2014-2015. ICES Journal of Marine Science. DOI: 10.1093/icesjms/fsy068

WHO WE ARE

28 institutions from **Europe** and **Africa**



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The Benguela Current Commission (BCC)
The Subregional Fisheries Commission (SRFC)

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Enhancing PREdiction oF Tropical Atlantic ClimatE and its Impacts

PREFACE

SEVENTH FRAMEWORK PROGRAMME

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CLIMATE CHANGE IMPACTS

The tropical Atlantic climate recently experienced shifts of great socio-economic importance. The oceanic changes were largest in the eastern boundary upwelling systems, globally important regions for marine productivity. African countries bordering the Atlantic depend upon their ocean for societal development and fisheries. They face important adaptation challenges associated with global warming.

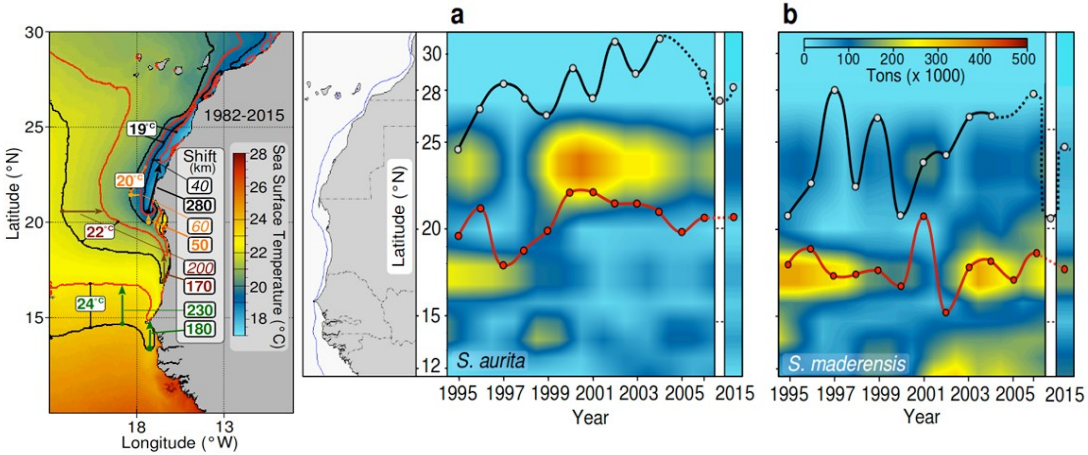
PREFACE has contributed to disentangle environmental and anthropogenic pressures on pelagic fish stocks in the tropical Atlantic. In particular, we have increased understanding of the interrelation among marine ecosystems, climate variability and change, and fisheries, through exploratory analysis of historical and newly collected data.

More than two decades of historical data allowed long-term changes and short-term variations to be studied. These include fish monitoring survey data acquired within the FAO Nansen Programme. PREFACE cruises contributed to close data gaps and collect unique data, which included tuna tagging. All these data were collected taking advantage of both local and European expertise, contributing to the training of many scientists and the constitution of a new task force in marine observations for fisheries management.

HIGHLIGHTS-continued

Intense warming causes a spatial shift of small pelagic fish: early warning for food security in North-West Africa.

Along the coast of North-West Africa, fish supply is important at both socio-economic and cultural levels. Reports by fishers emphasise changes in the distribution of fish species important for food security. Northward shifts in the distribution of sardinella and other species have been attributed to a warming trend and the redistribution of upwelling intensity and productivity. Such changes are an important policy consideration for food security management in several West African countries.



The increase of sea temperature in the north (around 230 km in 20 year for the 24°c isotherm) seems linked to the northern shift of a key species (*Sardinella aurita*) for food security in West Africa, whereas the spatial distribution of another fish species of the same family (*Sardinella maderensis*) is not impacted (Source: Sarré et al., 2018; AWA-PREFACE projects).

Global warming and environmental variability in the three Large Marine Ecosystems (LME)

The analysis of micronekton revealed that the three LMEs are highly variable systems, with the Canary Current LME (CCLME) and the Benguela Current LME (BGLME) being particularly impacted by global warming, especially in their lower latitudes. From 1995 to 2015 there was a significant deepening of the micronekton distribution and an increase of the diel vertical migration amplitude in the CCLME. The interannual variability is not significant, showing that the underlying environmental forcing is associated with relatively stable processes. Sea surface temperature was shown to have a minor influence in the north CCLME, but a pronounced effect in the south CCLME. Considering the relative importance of oceanographic factors, stronger ecosystem perturbations are expected in the BCLME than in the CCLME. Overall, oceanographic factors were found to have a significant influence in all LMEs. **Therefore, global warming is expected to cause important changes in the three LMEs and thus in the fisheries sector.**

Matecho: an open-source tool for processing fisheries acoustics data : PREFACE and AWA scientists developed Matecho, an automated processing method to extract information and perform echointegration and fish shoal extraction from various scientific echo sounder sources, providing digital acoustic data on fisheries ecosystem. The open-source initiative helps foster collaboration and technological transfer for researchers and provides end-users with a user-friendly, free executable program. *Perrot et al 2018: https://doi.org/10.1007/s40857-018-0135-x*