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Trends in pelagic fish stocks in the Canary upwelling system from acoustic surveys

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 CCLME REGION

Workshop on “The effects of climate change on the productivity in the CCLME”

18-20 September 2018

The impacts of climate change in different sectors are difficult to anticipate and incorporate into policy and management planning (Simpson et al., 2011; Cheung et al., 2013; Savo, et al. 2017), particularly in the developing countries, because of a lack of data, the uncertainty regarding future climate change scenarios and specially climate change impacts at the ecosystem level.



Small pelagic fish species are monitored through annual hydroacoustic surveys performed by the R/V Dr Fridtjof Nansen (DFN) from 1995.

In order to determine whether climate change is impacting this sub-region, we evaluated the DFN database (encompassing 170 000 km sampling transects and 2 263 fishing operations) to determine potential shifts in the latitudinal distribution of small pelagic fish and their relationships to changing environmental conditions.



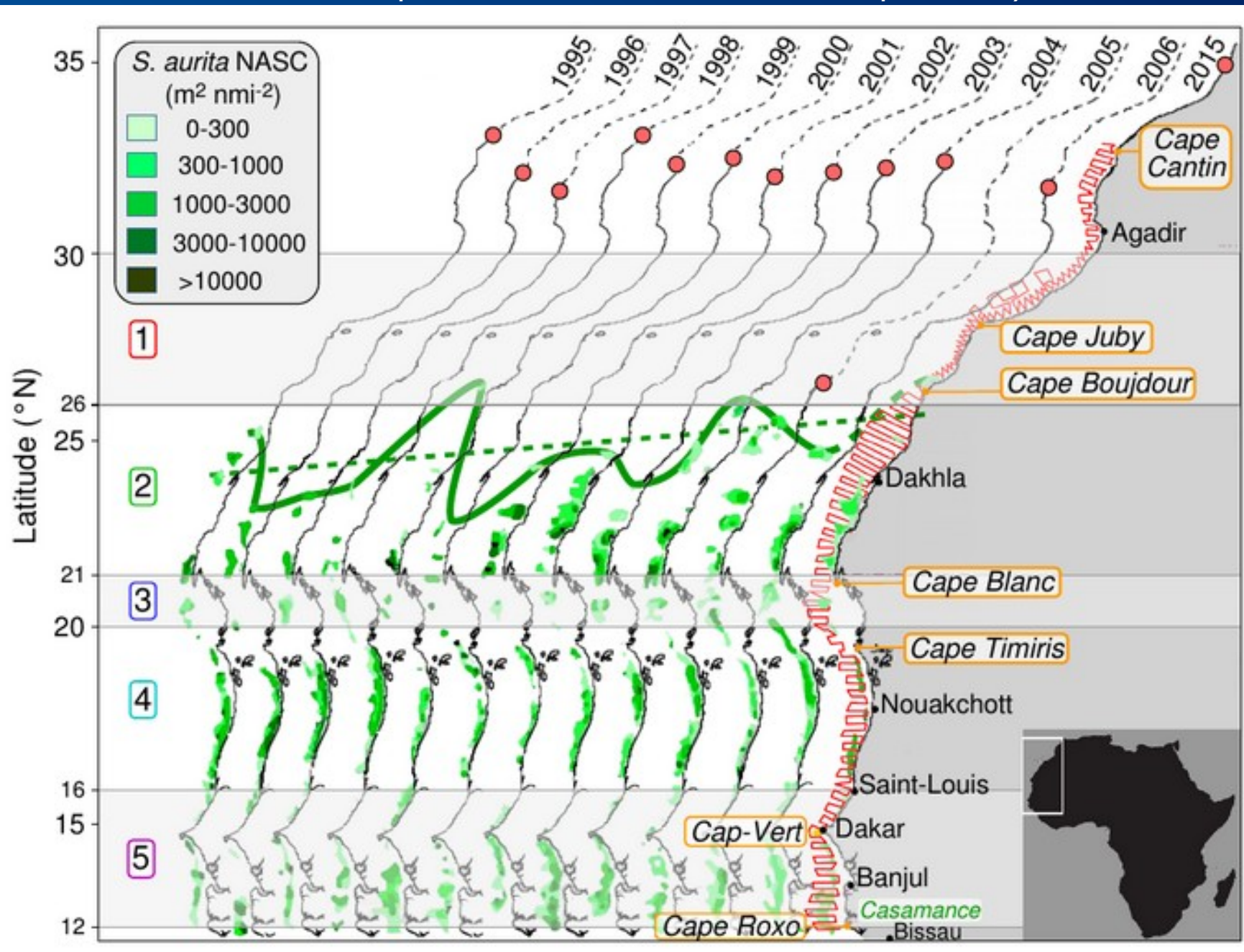
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Yearly acoustic data shows a high variability of the biomasses, specially in the northern part of the species distribution (here for *S. aurita*, the main species in term of economical importance)



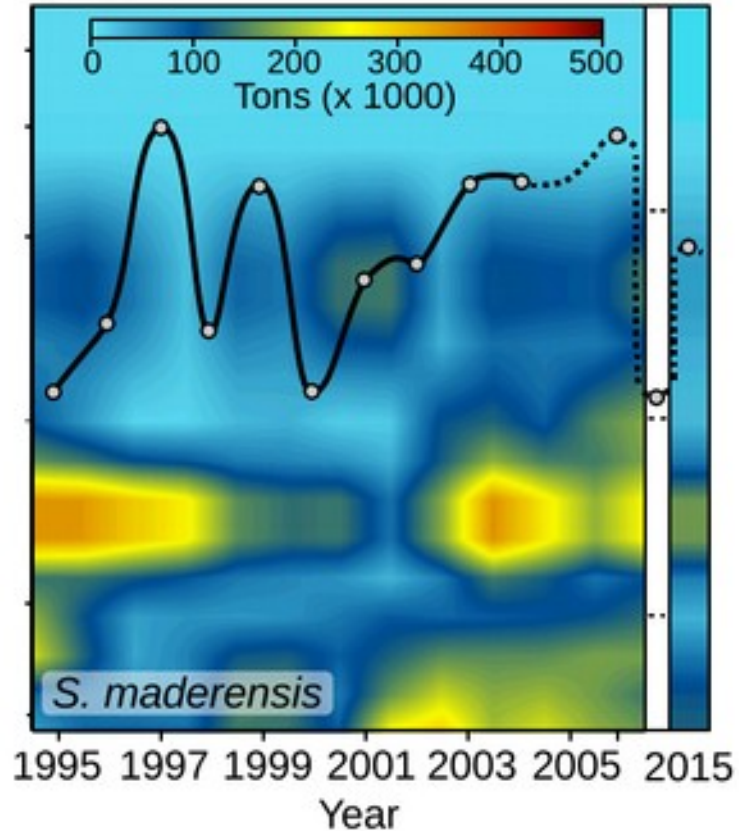
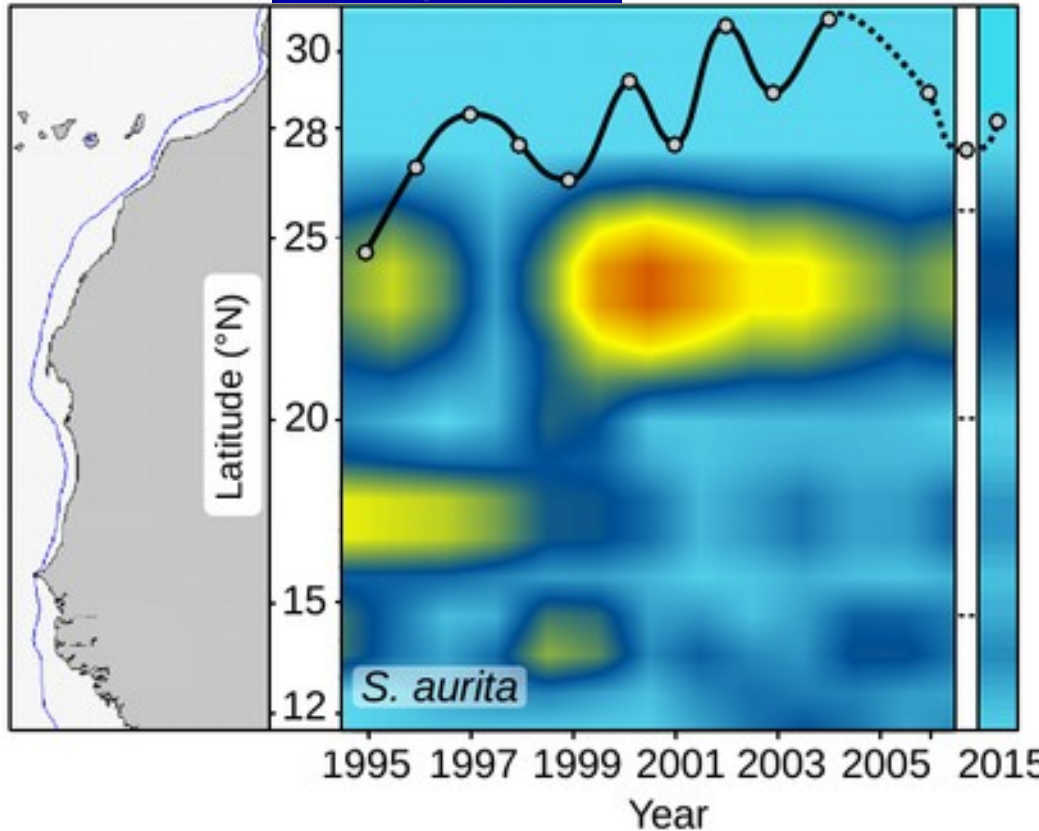
Changes for Sardinella species (acoustic data)



S. aurita



S. maderensis



The difference in phenological shift can be explained by the sensitivity to environmental change of *S. aurita* as this species get less phenotypic plasticity than *S. maderensis*.

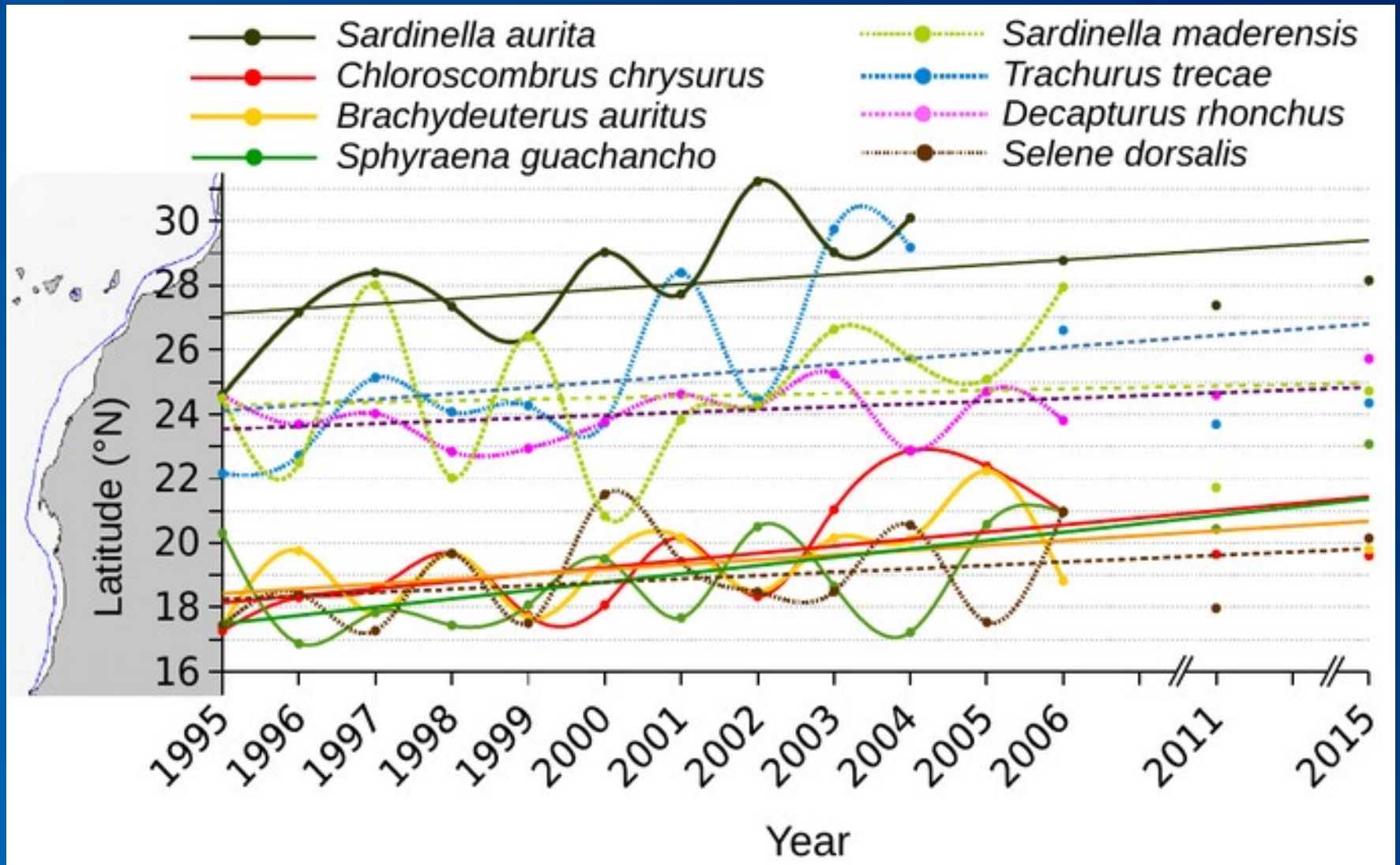


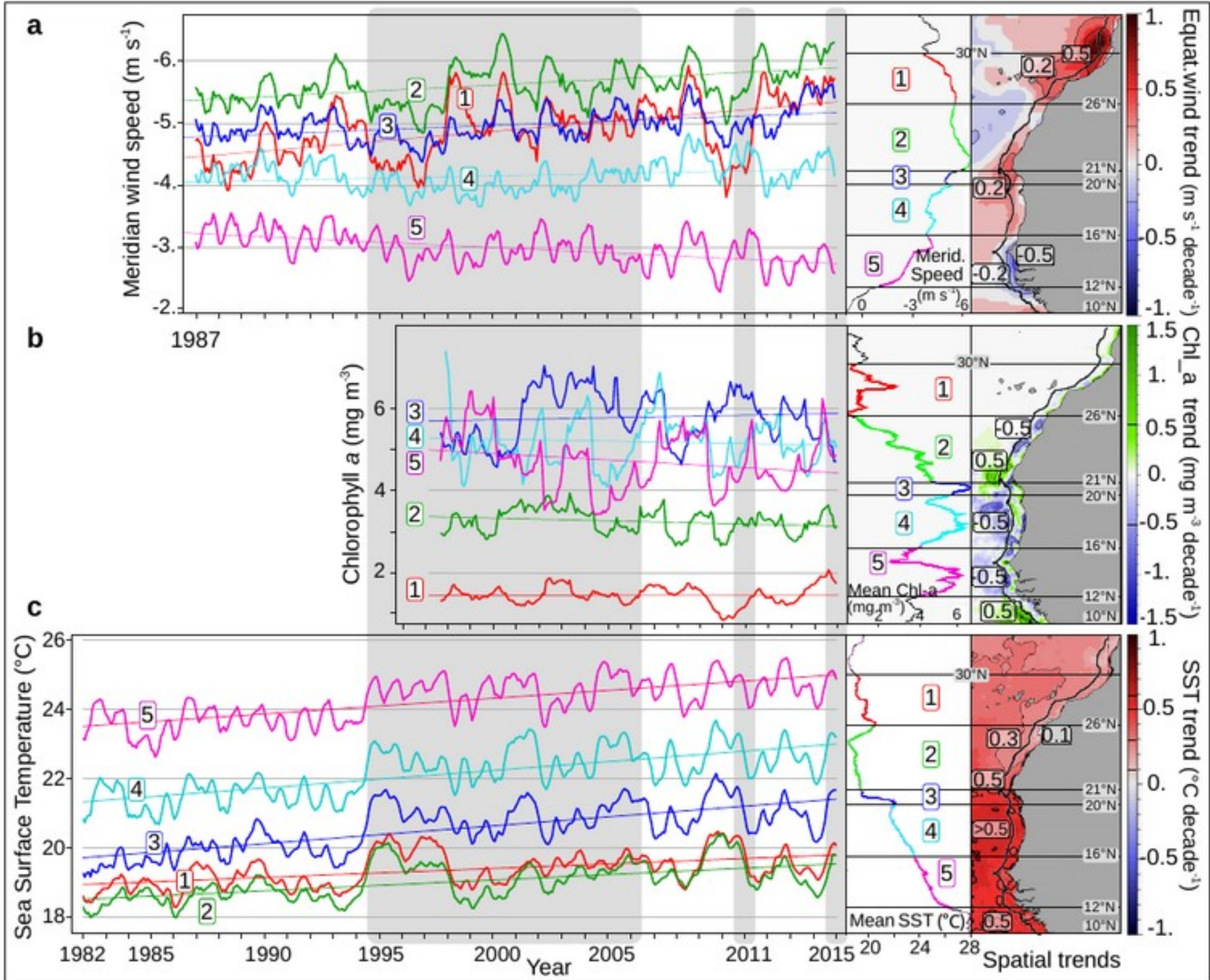
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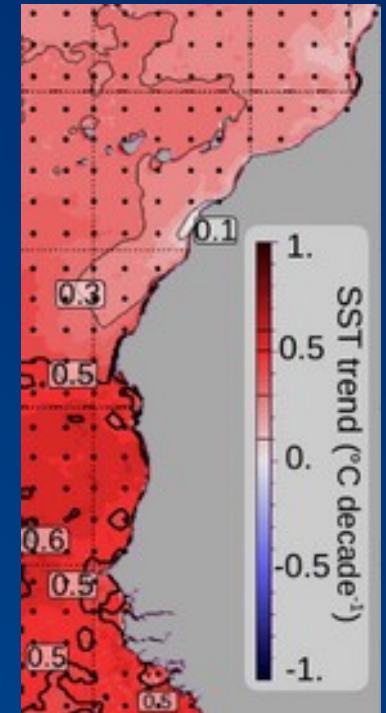
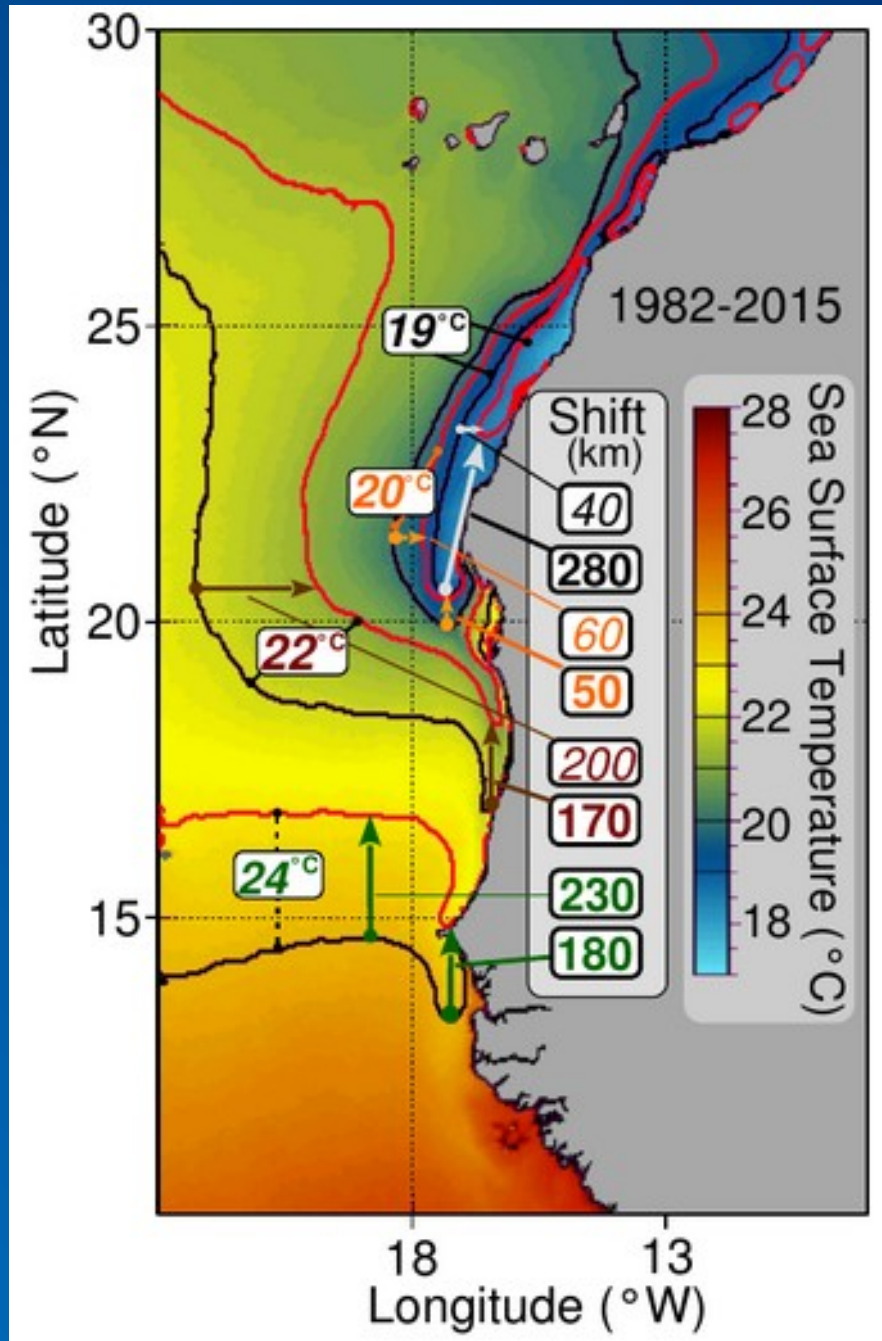
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Spatial shifts of isotherms (not reflected by SST increase only)



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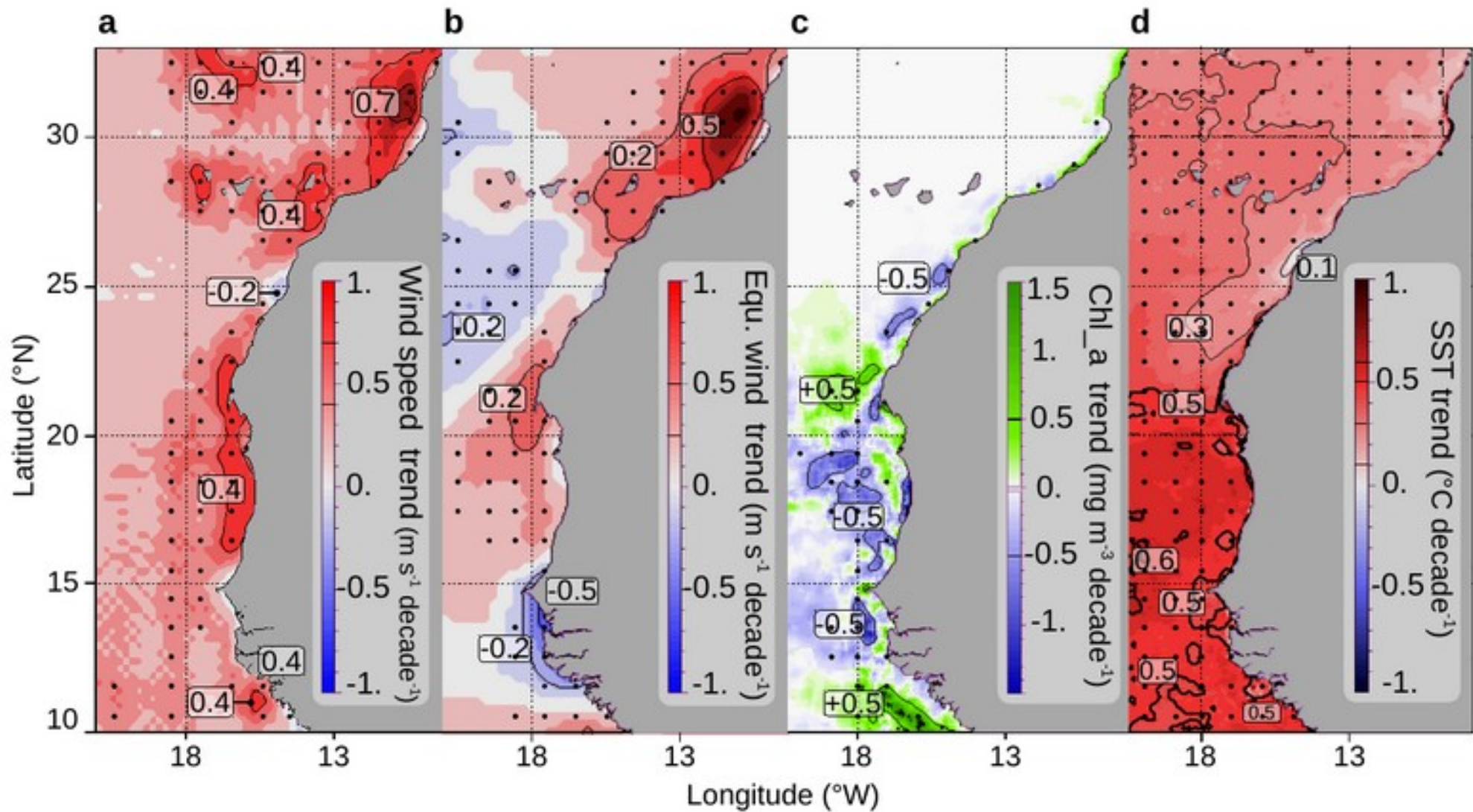


Wind speed

Meridian speed

Chlorophyll a

SST



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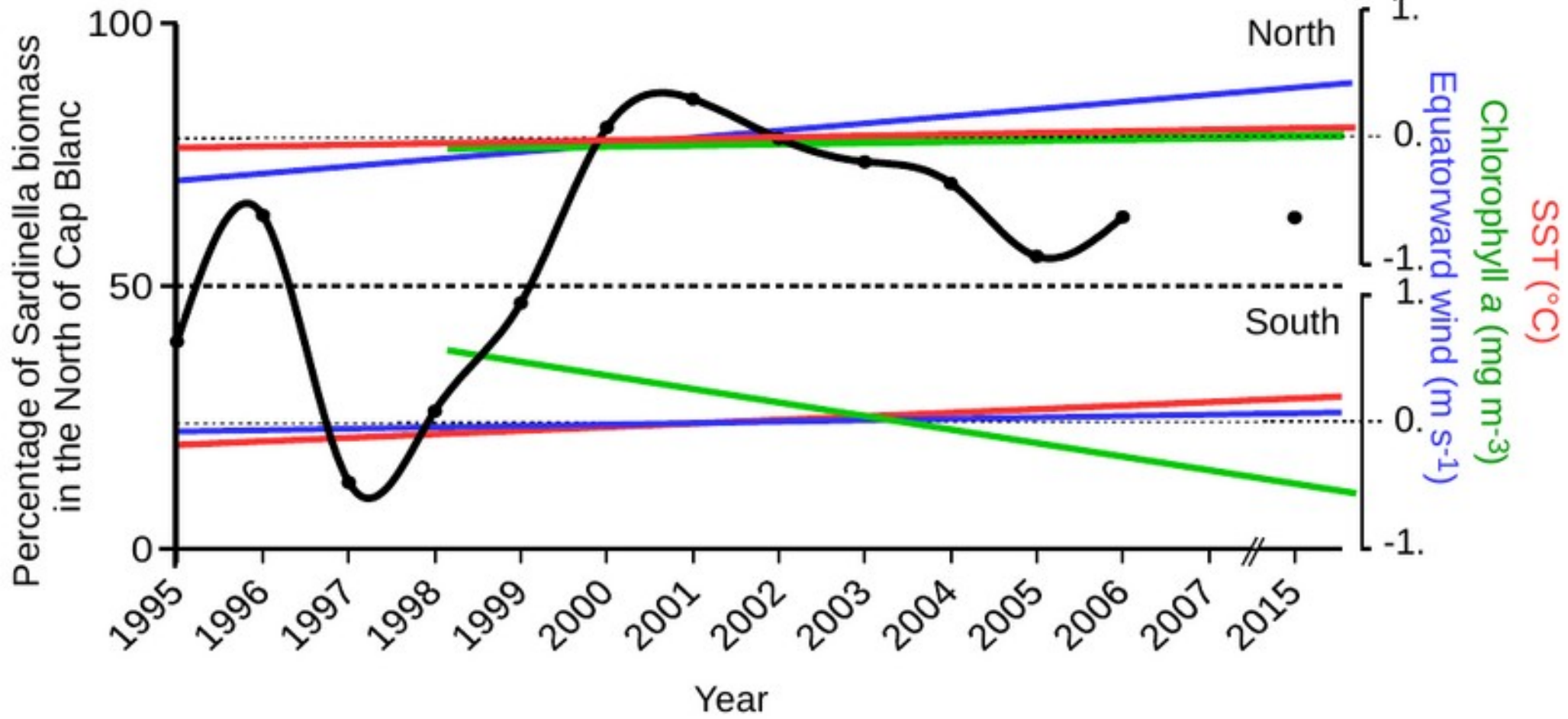
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Conclusions

- Among the 8 pelagic species selected, 6 show significant northward increase of their northern habitat boundary
- The « thermal habitat » acts as the major factor explaining the observed displacements (upwelling intensity / meridian wind is not the main driver)
- We still need longer time series to confirm such shifts and specially to lower the influence of the decadal variability
- Other EBUS should probably displays similar results of poleward displacements
- At least in the Canary System such displacements of important resources for the countries have important economical and social consequences



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