Session 4

The effect of oceanographic factors on micronektonic acoustic density in the three African Atlantic large marine ecosystems

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Abstract

The interest of modelling the effect of oceanographic factors on micronektonic acoustic densities and its variability is relevant in the context of climate change to better understand the environmental processes controlling ecosystem productivity. Ultimately for the stakeholders, we plan to forecast changes induced by climate change effects and study inter annual variability. Satellite data have been processed using the same time steps as the time series of fisheries acoustic surveys carried out by the R/V Dr. Fridtjof Nansen along the Atlantic African coasts, overlapping three Large Marine Ecosystems. The observed split at Cape Blanc (21°N) separates the coastal upwelling into a strong and stable dynamic upwelling, and a highly seasonal one. Because of the highly non-linear nature of the relationships the BRT modelling accounts for a considerably higher part of the environmental variability, compared to classic multivariate approaches. Environmental data are extracted from daily series of AVHRR (SST), MODIS (SST and Chl-a) and others at spatial resolution between 4 and 25 km. Boosted Regression Tree classification is well suited to show the importance of the large scale environmental variability, despite a limited set of variables. It is interesting to note that the inter-annual variability is not significant in the model, showing that the underlying environmental forcing is associated with relatively stable processes. The structural variables, *i.e.,* bathymetry and distance to the coast, consistently explain a large part of the variability. SST has a minor influence in the north (consistently cold and windy) and a pronounced effect in the south where seasonality is high and variable. Especially in Senegal and Guinea, the detrimental effects of the coastal upwelling (mostly offshore drifts due to strong winds) are strongly attenuated by the wider continental shelf which favour retention processes. The next step will be to couple our

results with climate projections to forecast major changes in African coastal systems as the micronektonic compartment is essential at mid-trophic level in all marine ecosystems. Considering the oceanographic factors relative influence, and under the assumption of similar warming in the three Atlantic African LMEs, a stronger ecosystem perturbation is expected in BBCLME, then in the CCLME and particularly when comparing the southern part of the CCLME *vs* North part. In all LME *i.e.* including GCLME, the oceanographic factors relative influence get a significant role confirming the important changes expected due to climate change on the ecosystems and thus in the fisheries.

Keywords: modelling, micronektonic, acoustic densities, variability, climate change, environmental processes, ecosystem productivity, fisheries.

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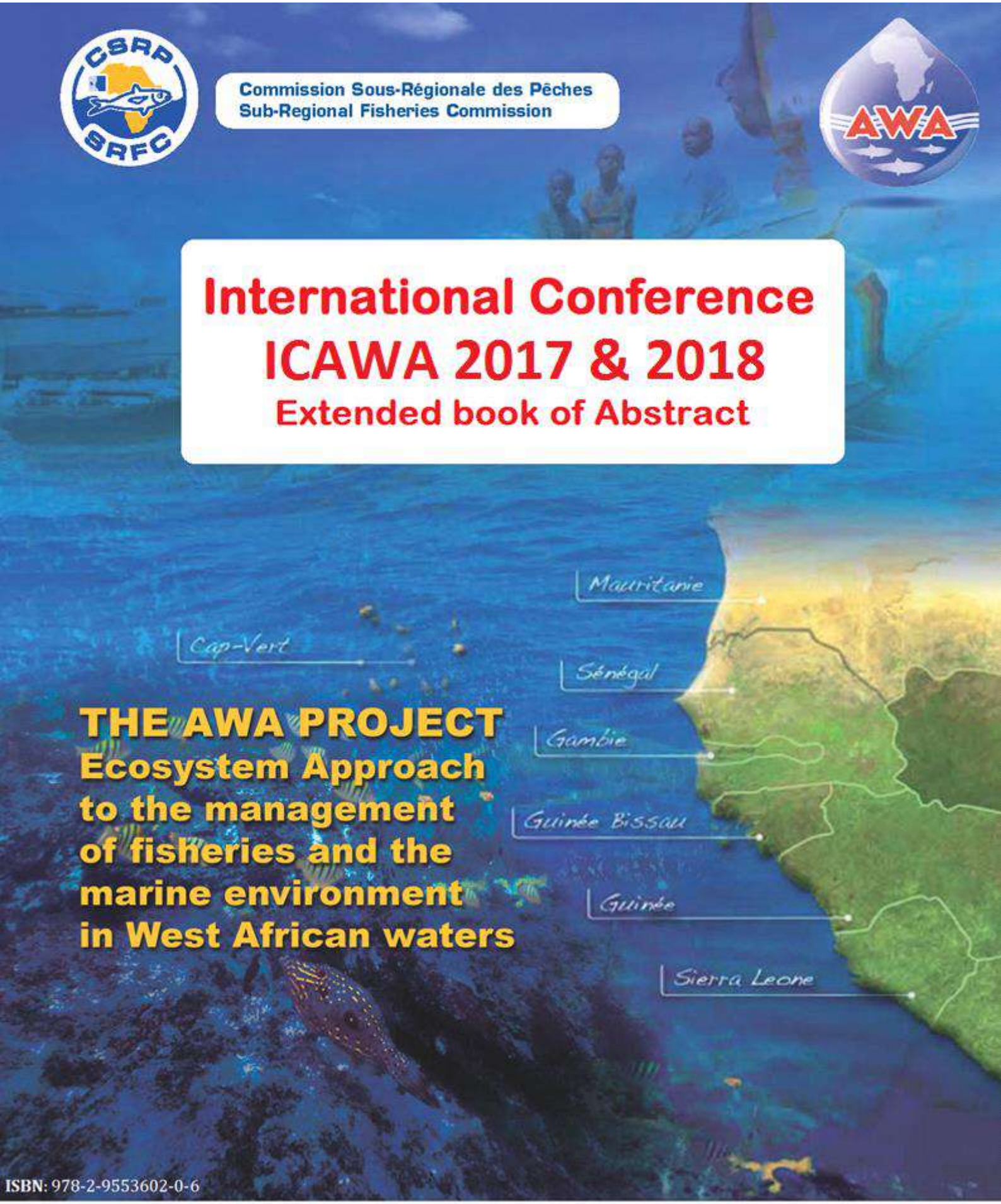
Extended book of Abstract



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The both last ICAWA edition, 2017 and 2018, was done as a joint event with other closely related meeting. In 2017 with the inauguration of the OSCM in Cabo Verde underlining AWA cooperation with INDP and UNICV as well as Geomar and collaborators. In 2018 ICAWA was join to Preface final meeting following the memorandum of understanding signed a couples of years before between the two consortium and which have led at the end to a common policy session followed by the redaction of a policy brief taking advantage of the results of the both projects. Some abstract aside ICAWA joint session are missing see the orgniser to get more information.

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These two edition of ICAWA were joint with OSCM inauguration and the final meeting of the European preface project, respectively in 2017 and 2018.

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Poster presentation