Session 1

Mixed layer heat/salt budget and Equatorial Under-Current dynamics in the tropical Atlantic from a joint model-observations approach

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Abstract

Climatological mixed layer heat/salt budget terms derived from a NEMO 1/4° forced model simulation and from a PREFACE observation-based product are compared in the eastern tropical Atlantic. Mean spatial patterns of mixed layer depth, SST and SSS are in good agreement despite some local biases. For the annual mean heat balance, atmospheric fluxes are quite different along the coasts, while horizontal advection mostly differs around the equator, maybe due to the low resolution of the observations (2.5°) that cannot resolve small meridional scales. The seasonal heat balance is compared in boxes off Angola, in the northeast Gulf of Guinea and in the Atlantic cold tongue. Seasonal variations of heat fluxes are correlated except in the last box, while advection is everywhere poorly correlated. For the annual mean salt balance, model and observations show similar freshwater fluxes, with larger spatial contrasts in the model, while advection mostly differs around the ITCZ. In the Benguela region, model and observations roughly agree on freshwater fluxes and advection seasonal variations. Off Angola, SSS variations are uncorrelated. The observed product does not explicitly resolve vertical diffusion, an important process for the heat/salt balance in the Gulf of Guinea.

The seasonal characteristics of the simulated EUC transport are compared to observations based on cruises and moorings at 23°W. In the model, the EUC transport is slightly larger than observed on average, while its seasonal cycle is of comparable amplitude and shows a maximum around September and minimum in November, leading the observations by one month. The maximum velocity is also biased high but seasonal cycles are consistent and roughly phased with the transport seasonal cycle. The EUC core in the model is shallower than observed but with a similar seasonal cycle and coinciding maxima in depth and transport. Its latitudinal position is more south of the equator, with a seasonal cycle opposite in phase and larger than observed. A test simulation with interannual wind forcing but climatological fluxes forcing is compared to the reference simulation to identify the respective role of dynamic and thermodynamic forcing on the EUC characteristics, in particular its salinity maximum.

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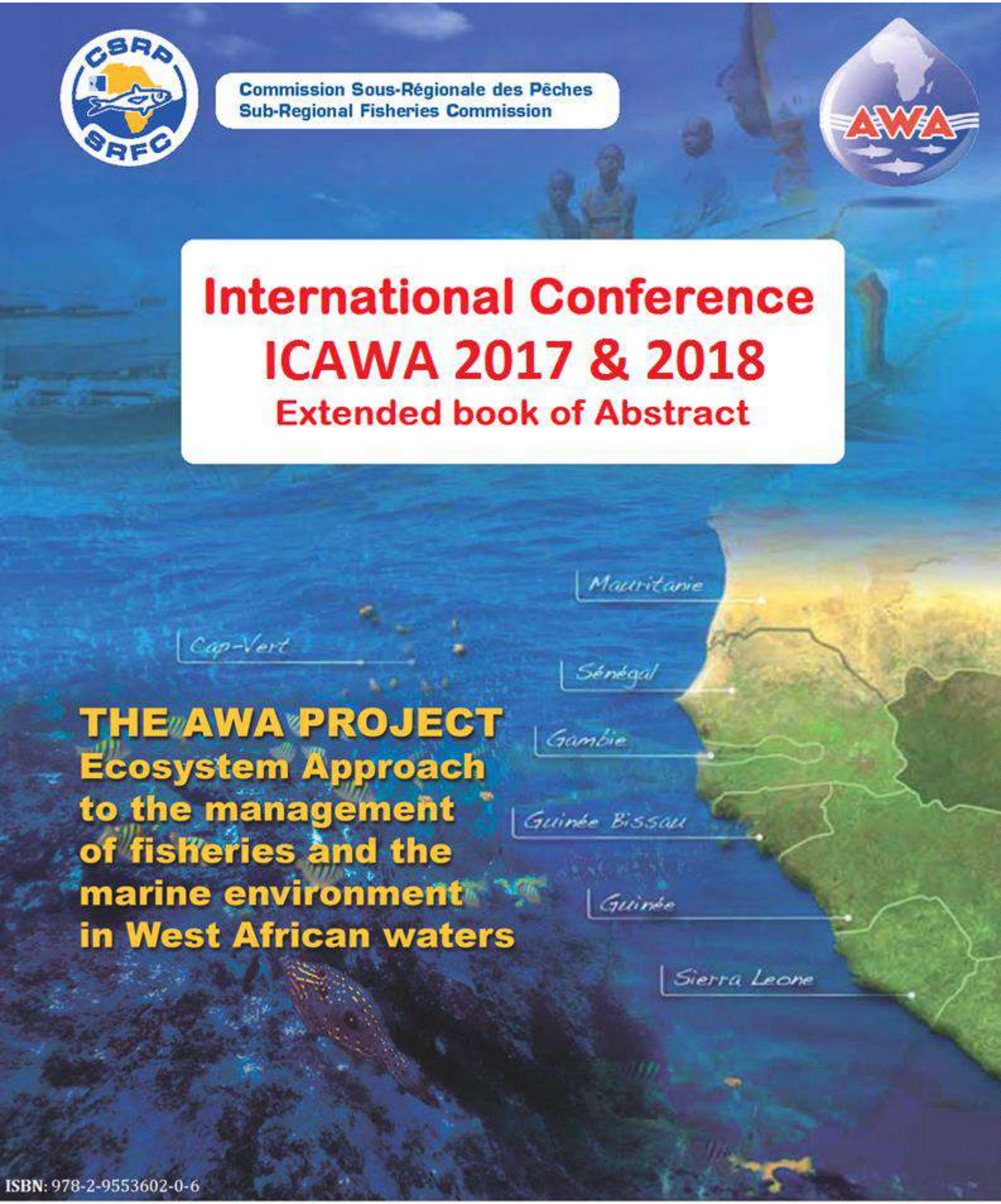
Extended book of Abstract



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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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Session 1: « Ocean modelling»

Poster presentation