Session 1

How does the low-frequency Equatorial Kelvin Wave activity, local ocean stratification, and coastal winds modulate the south-eastern interannual Atlantic variability?

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Abstract

The objective of this study is to describe the low-frequency modulation of the Equatorial Kelvin Wave (EKW) activity in the tropical Atlantic as well as the low-frequency modulation of the local stratification and coastal winds along the coast of south-western Africa. We aim at investigating the control of these forcings in modulating the oceanic interannual variability off the coasts of Angola/Namibia and the phenomenology of Benguela Niño/Niña events. The methodology is based on the development of a high resolution (1/12°) long-term (1958 - 2008) numerical simulation of the South-Atlantic Ocean using the Regional Ocean Modeling System (ROMS). The evaluation of the model performances show that the model is skilful in reproducing the mean state and the interannual variability. The evaluation of the equatorial forcing reveals a low-frequency modulation of the EKW activity with a significant reduction of the EKW energy from 1958 to 1990, then re-energized up to 2008. Variations are associated with change in EKW baroclinic mode contribution to interannual sea level anomalies: from 1958 the second baroclinic mode dominate, and is then balance by the third baroclinic mode after the late 1990's. Concomitantly, further analyses show a decrease of the wind stress forcing and a modulation of the magnitude of wind projection coefficients according to the oceanic baroclinic modes in the Guinea gulf with in particular a strong increase of the third EKW mode. Changes are associated with the increase (decrease) of the intensity (maximum depth) of the equatorial stratification. Our results suggest that the change in the remote equatorial forcing may play an important role in the modulation of the variability off the coasts of South-West Africa. These results will be confronted to the low frequency modulation of local wind variations and Coastal Trapped Waves (CTW) signature due to different stratification state along the south-eastern coast of Africa. Indeed, modulation of the coastal stratification will most likely impact the characteristics of CTW propagation and their efficiency to imprint the coastal interannual variability in the Benguela Upwelling System.

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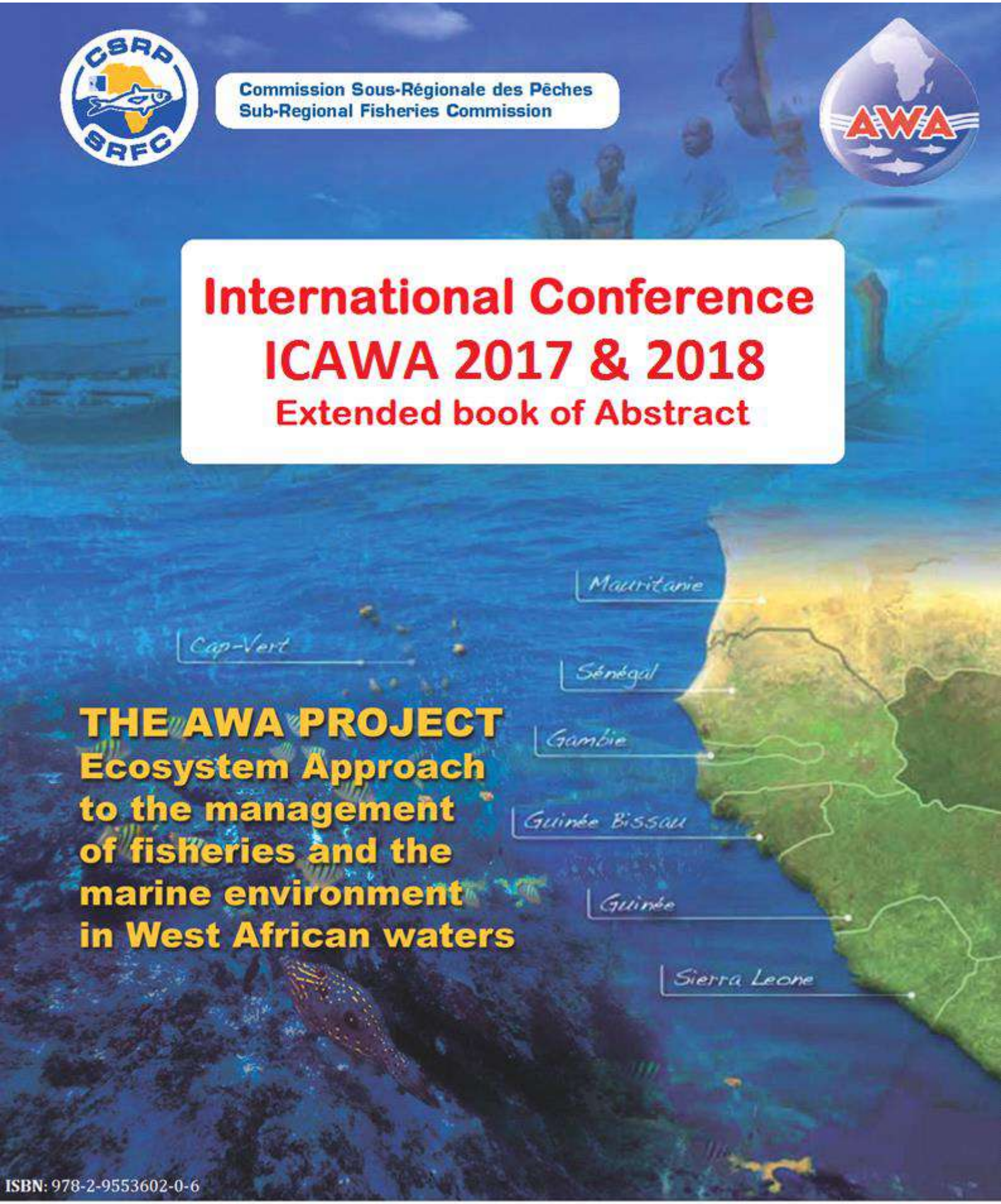
Extended book of Abstract



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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»

Oral presentation