Session 02

Acoustic study of water masses over Senegalese continental shelf: effect of environmental variable on the structure of zooplankton layers

Ndague DIOGOUL[1,2,4,*], Patrice BREHMER[2,4], Yannick PERROT[3], Abou THIAM[1], Oumar SADIO[2], and Abdoulaye SARRE[4]

[1]Université Cheikh Anta Diop de Dakar (UCAD), Institut des Sciences de l'Environnement (ISE), B.P. 5005 Dakar, Sénégal
[2]Institut de Recherche pour le Développement (IRD), UMR 195 Laboratoire des sciences de l'Environnement Marin (LEMAR), BP 1386 Dakar, Sénégal
[3]Institut de Recherche pour le Développement (IRD), UMR 195 Laboratoire des sciences de l'Environnement Marin (LEMAR), Brest, France
[4]Institut Sénégalais de Recherche Agricole (ISRA), Centre de Recherche Océanographique de Dakar Thiaroye (CRODT), BP 2221 Dakar, Sénégal

*Correspondance: Tél: (221) 776233520; Courriel: diogoulndague@yahoo.fr (N. DIOGOUL)

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Abstract

The macrozooplankton organisms aggregate at specific depths and occur as scattering layer on echosounder records. They constitute an important component in the marine food web in direct contact with primary producers. We review phytoplankton and zooplankton literature in Senegal, and then characterized the Senegalese water masses of the "Petite côte" on physicochemical and biological criteria using an *in situ* data set collected during an acoustics survey (ECOAO) led onboard FRV Antea in 2013. Then we described at fine scale spatial and temporal variation of macrozooplankton layers in relation with their environment. Two areas with different characteristics have been discriminated: the upwelling's cell area and the upwelling's offshore area more stratified, warm and sharply separated from the other area by a strong thermal boundary. The spatio-temporal variation of scattering layer's thickness of macrozooplankton is strongly influenced by depth and time of the day. The scattering layer's thickness increases with depth along a coast-high sea gradient, but no variation is reported along longitudinal plane *i.e*. North-South. In both areas nocturnal layers are thicker and deeper than diurnal ones. The hydrological structure of the water column also influence the macrozooplankton scattering layer. The scattering layer requires "stable" physical conditions which support vertical stratification. In the upwelling's area cell, the parameters correlated to scattering layer thickness during night time are chlorophyll 'a' and dissolved oxygen. In the upwelling's offshore area, temperature, water density and

chlorophyll '*a*' concentration have a significant effect on the scattering layer's thickness during the daytime. However, during the nighttime, chlorophyll 'a' has no significant effect on the scattering layer's thickness. This absence of correlation between chlorophyll 'a' and scattering layer thickness could be explained by an inverse diel vertical migration of a macrozooplankton group. On this basis we assume that trophic relationship between phytoplankton and macrozooplankton operate during the day at the surface.

Keywords: Trophic behavior, Plankton, Scattering layer, Echo-sounder, Macrozooplankton, Upwelling.

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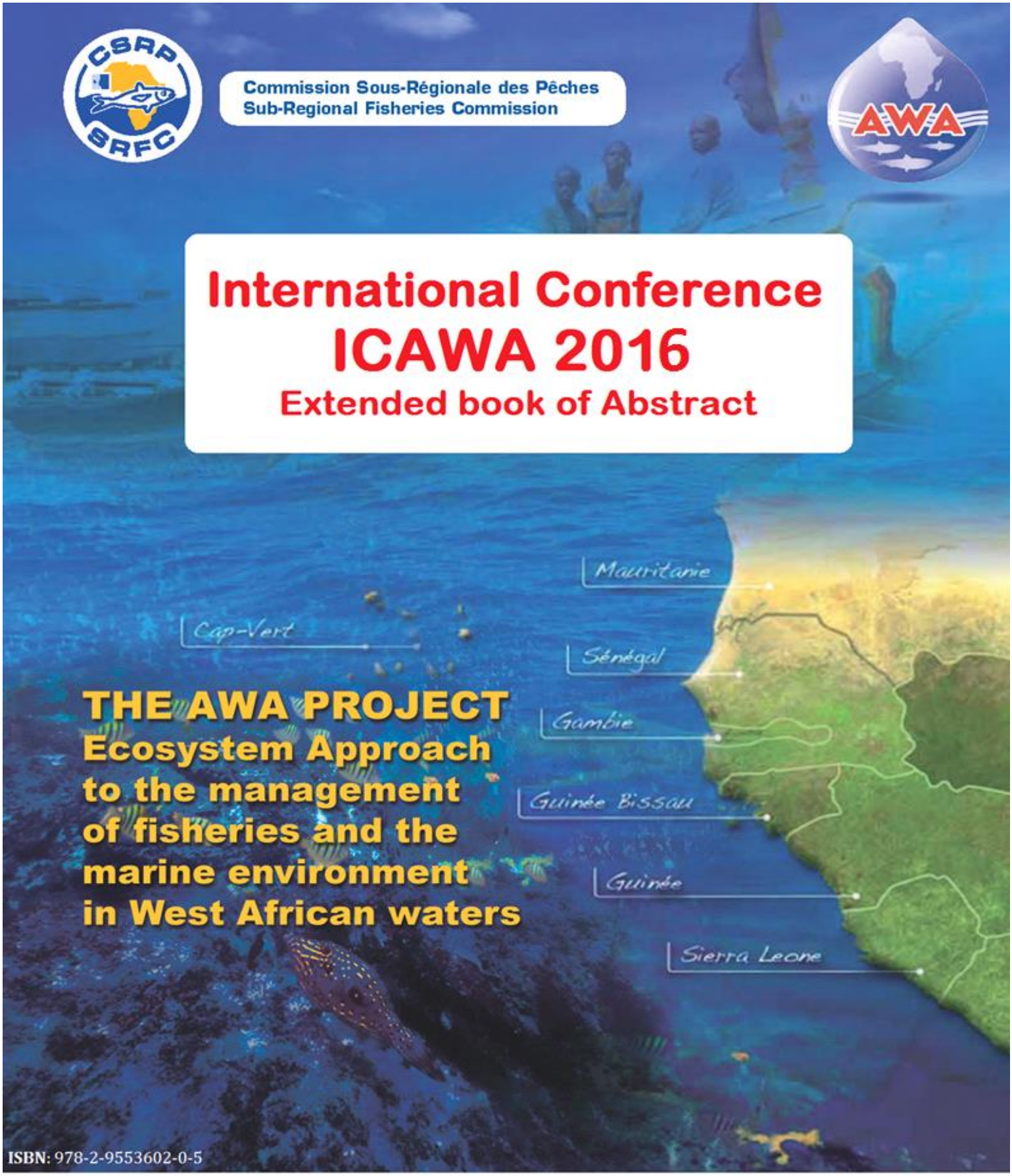

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WITH THE COLLABORATION OF:
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