Session 03

A biophysical model of *Sardinella aurita* early life history in the northern Gulf of Guinea

Vamara KONE[1,*], Christophe LETT[2,6], Pierrick PENVEN[3], Bernard BOURLES[4] and Sandrine DJAKOURE[5]

[1]Centre de Recherches Océanologiques (CRO), 29 Rue des Pêcheurs, BPV 18, Abidjan, Côte d'Ivoire.
[2]Sorbonne Universités, UPMC Univ. Paris 06, IRD, Unité de modélisation mathématique et informatique des systèmes complexes (UMMISCO), F-93143, Bondy, France.
[3]Laboratoire d'Océanographie Physique et Spatiale (UMR 6523 LOPS), Plouzané, France.
[4]Laboratoire d'Etudes en Géophysique et Océanographie Spatiales (UMR LEGOS), Toulouse, France.
[5]Laboratoire de Physique de l'Atmosphère et Mécanique des fluides (LAPA-MF), Université Félix Houphouet Boigny.
[6]Present address: UMR MARBEC, Station Ifremer de Sète, Avenue J. Monnet, 34203 Sète Cedex, France

*Correspondance: Tél: (225) 58 46 33 36, Courriel: kvamara@hotmail.com (V. KONE)

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Abstract

Sardinella aurita is the most abundant small pelagic fish in the northern Gulf of Guinea. Its reproduction and recruitment depend crucially on environmental conditions. We developed a biophysical model of S. aurita early life history by coupling offline an individual-based model with the regional oceanic modeling system (ROMS). We used this model to investigate the main factors driving variability in eggs and larval dispersal and survival in the northern Gulf of Guinea. Precisely, individuals were released from different spawning areas along the coast and tracked for a period of 28 days corresponding to their planktonic phase. Individuals that remained in the coastal recruitment areas at an age more than 7 days, at which they can supposedly actively retain themselves in a favorable area, were considered as recruited. Simulation results show the importance of the spawning areas around Cape Palmas and Cape Three Point where cyclonic eddies trap eggs and larvae along the coast, preventing their advection offshore by the Guinea current. The spawning period also plays a key role in the recruitment success, with highest coastal retention obtained during the major upwelling period (July to September). We find that, a second retention peak can occur during the minor upwelling period (February to March) when larval mortality due to temperature is included in the model. These results are in general agreement with knowledge of *S. aurita* reproduction in the northern Gulf of Guinea. The spawning depth also influences the recruitment success of *S. aurita* in the northern Gulf of Guinea. The retention increasing with the spawning depth.

Keywords: hydrodynamic model, individual-based model, *S. aurita* early life stage, recruitment, connectivity, upwelling, northern Gulf of Guinea.

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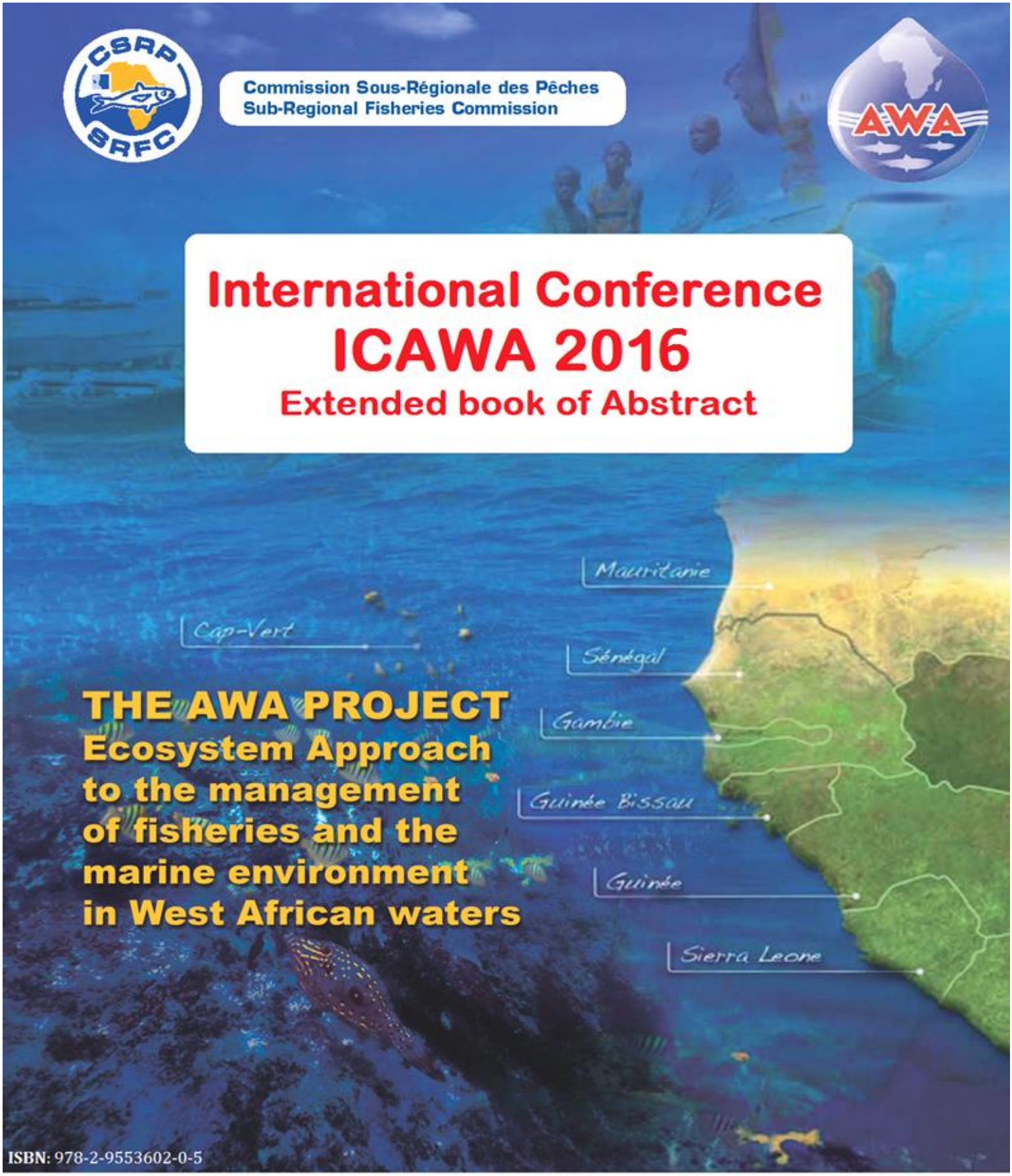

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