Session 4

Complex small pelagic fish population patterns arising from individual behavioural responses to their environment

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Abstract

Small pelagic fish (SPF) species are heavily exploited in eastern boundary upwelling systems (EBUS) as their transformation products are increasingly used in the world food chain. Management relies on regular monitoring, but there is a lack of robust theories for the emergence of the populations' traits and their evolution in highly variable environments. This work aims to address existing knowledge gaps by combining physical and biogeochemical modelling with an individual life-cycle based model applied to round sardinella (Sardinella aurita) off northwest Africa, a key species for regional food security. Our approach focused on the processes responsible for seasonal migrations, spatio-temporal size-structure, and interannual biomass fluctuations. Emergence of preferred habitat resulted from interactions between natal homing behaviour and environmental variability that impacts early life stages. Exploration of the environment by the fishes was determined by swimming capabilities, mesoscale to regional habitat structure, and horizontal currents. Fish spatio-temporal abundance variability emerged from a complex combination of distinct life-history traits. An alongshore gradient in fish size distributions is reported and validated by in situ measurements. New insights into population structure are provided, within an area where the species is abundant year-round (Mauritania) and with latitudinal migrations of variable (300 to 1200 km) amplitude. Interannual biomass fluctuations were linked to modulations of fish recruitment over the Sahara Bank driven by variability in alongshore current intensity. The identified processes constitute an analytical

framework that can be implemented in other EBUS and used to explore impacts of regional climate change on SPF.

Keywords: pelagic fish, model, DEB, Icthyop, ROMS, Pisces, CCLME.

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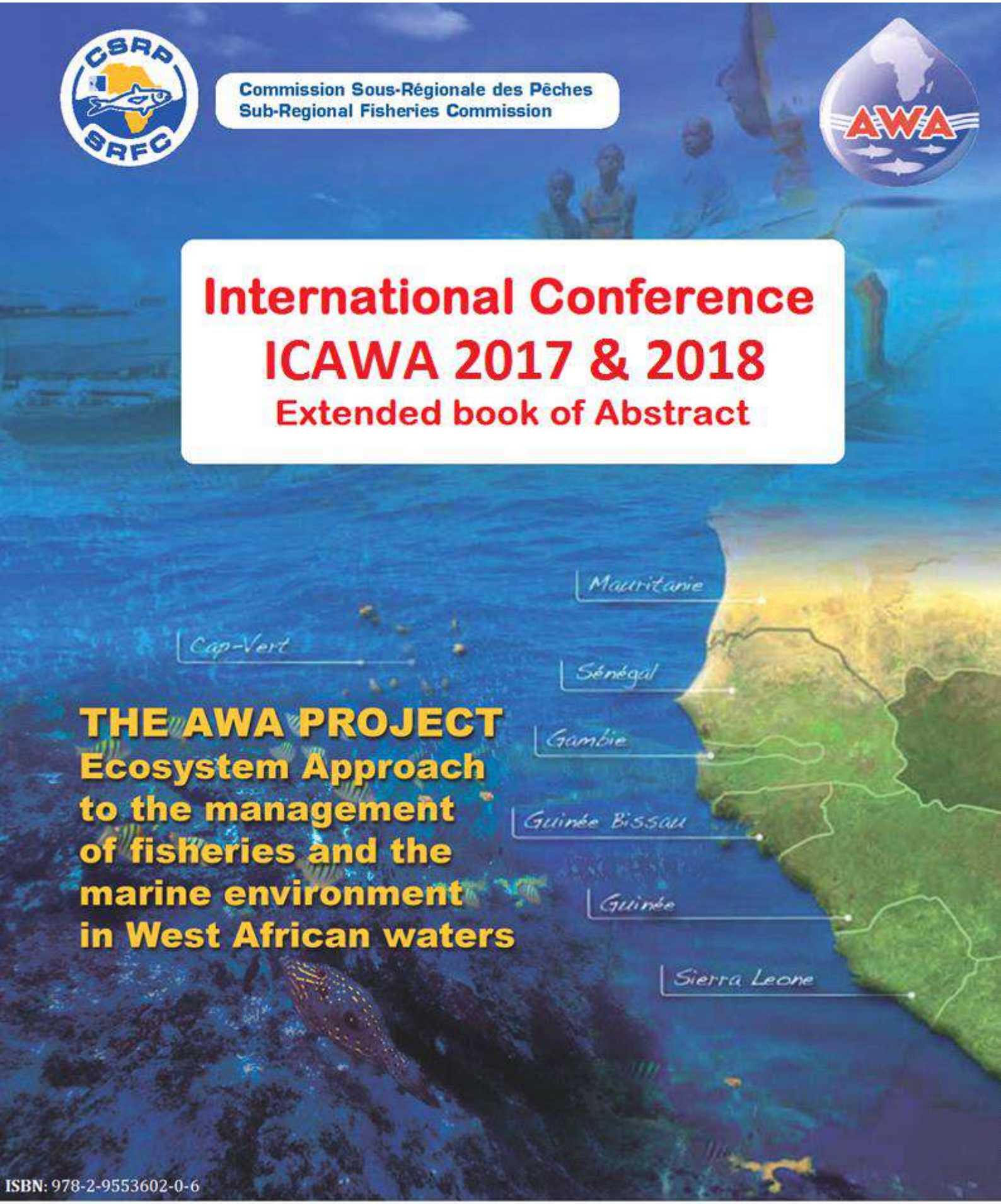
Extended book of Abstract



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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.

Sponsors ICAWA 2017 and IACAWA 2018

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Poster presentation