Session 01

Upwelling dynamics and cold-water filaments off the Senegal and Mauritania coasts

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Abstract

Lagrangian observations (surface drifters), satellite data (images of sea surface temperature) and ocean surface wind products are used to describe the upwellingdynamics off northwest Africa during 2009-2013, with particular focus to the region between Cap Blanc (Mauritania) and Cap Vert (Senegal). The upwellingseason generally starts in late November and persists until early July north of 19°N, whereas it starts in late December and prevails until May in the south; inJune the upwelling events south of Cap Blanc disappear and the residual cold water gradually mixes with the warm surface tropical Atlantic water. The most intense upwelling episodes, identified by a minimum in the Sea Surface Temperature values (lower than 20°C), are recorded between February and May with a mean duration of 5-10 days and coincide with maximum intensities ofupwelling favourable winds (Trade winds). Cold and nutrient-rich coastal nearsurface waters are upwelled and transported offshore (westward) by means of energetic filaments rooted at specific locations along the coasts of Mauritania and Senegal. Four recurrent upwelling filaments (temperatures lower than 20°C), with an offshore extension between 200 km and 400 km, are observed and characterised. These filaments persist for a few weeks, and they subsequently mix with the surrounding waters. The intensity of vertical velocities in the Ekman layer follow the evolution of the main upwelling events,showing large positive values distributed along the entire Senegal and Mauritania coasts in January-May; largest values correspond to the location of the main cold water filaments. Drifter observations confirm the prevalent westward flow in the regions of the upwelling filaments with mean speed of 15- 20 cm/s. The area off Cap-Vert is strongly influenced by the inter-annual variability of the upwelling seasons and by relaxation/intensification of Trade winds.

Keywords :Northwest Africa coasts; upwelling events; Sea Surface Temperature maps; drifter data; cold water filaments.

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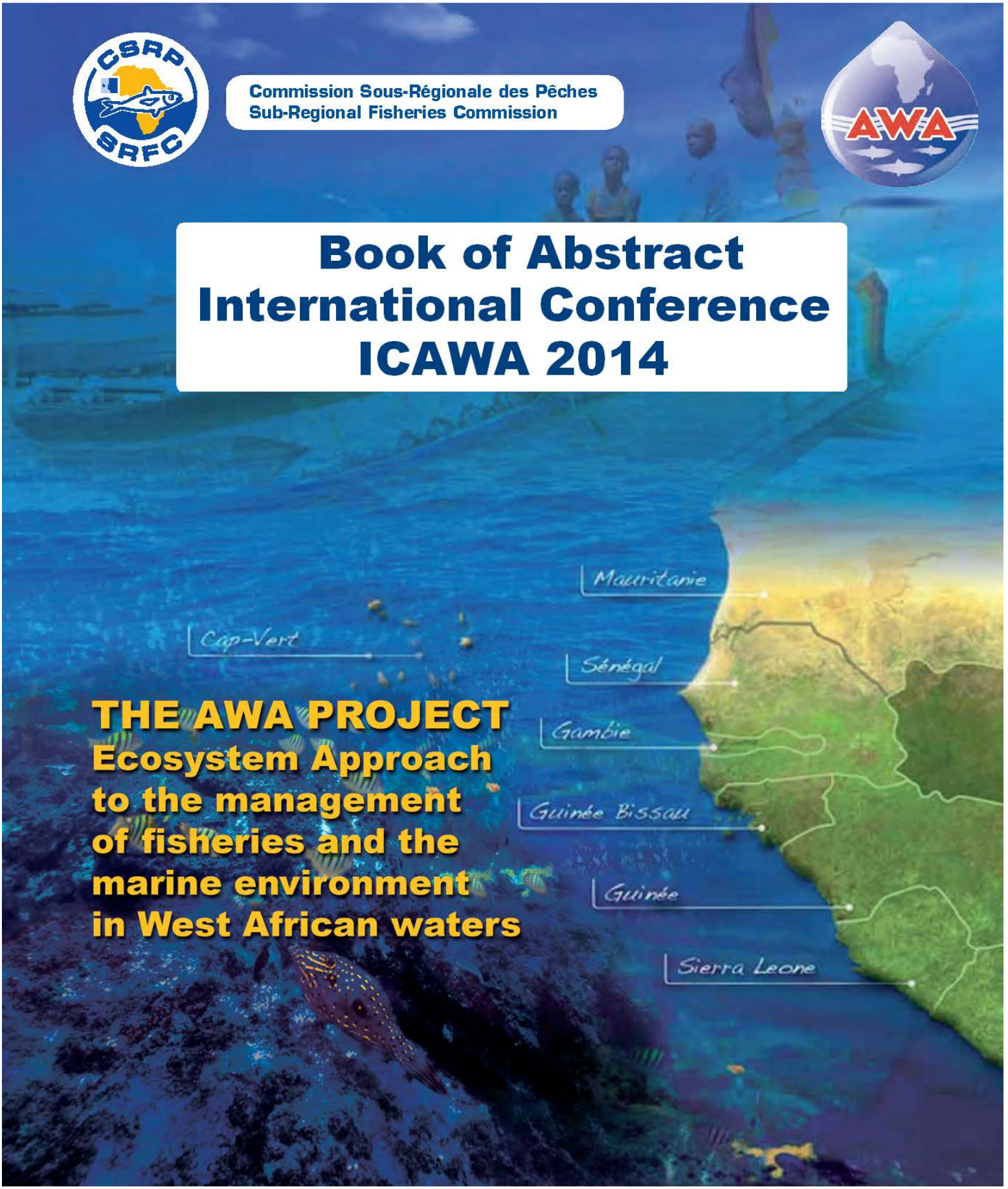

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