Session 03

Aerosol trace element (TE) inputs: a case study of the West African Eastern Boundary Upwelling System

Rachel Shelley[1,*], Géraldine Sarthou[1], Eric Machu[2], Georges Tymen[1], Christophe Messager[3], Thomas Gorgues[3], Hamet Diadhiou[4] and Patrice Brehmer[4,5]

[1]Institut Universitaire Européen de la Mer (IUEM), Laboratoire des Sciences de l'Environnement Marin, UMR195 (UBO, CNRS, IRD, Ifremer), Plouzané 29280, France
[2]Institut de Recherche pour le développement (IRD), UMR LOPS, Dakar, Sénégal
[3]Institut Français de Recherche pour l'Exploitation de la Mer (IFREMER), Centre de Brest Laboratoire d'Océanographie Physique et spatiales (LOPS), UMR 6523 LOPS (UBO, CNRS, IRD, Ifremer), Plouzané 29280, France
[4]Institut Sénégalais de Recherches Agricoles (ISRA), Centre de Recherches Océanographiques Dakar-Thiaroye, BP 2241 Dakar, Sénégal
[5]Institut de Recherche pour le Developpement (IRD), UMR 195 Lemar, BP 1386 Dakar, Senegal

*Correspondance: Tél: (+33) 2 98 49 86 60; Courriel: rachel.shelley@univ-brest.fr (R. SHELLEY)

Reçu le 05/11/2015; publié le 15/05/2016
AWA © MS WP3_S3_73

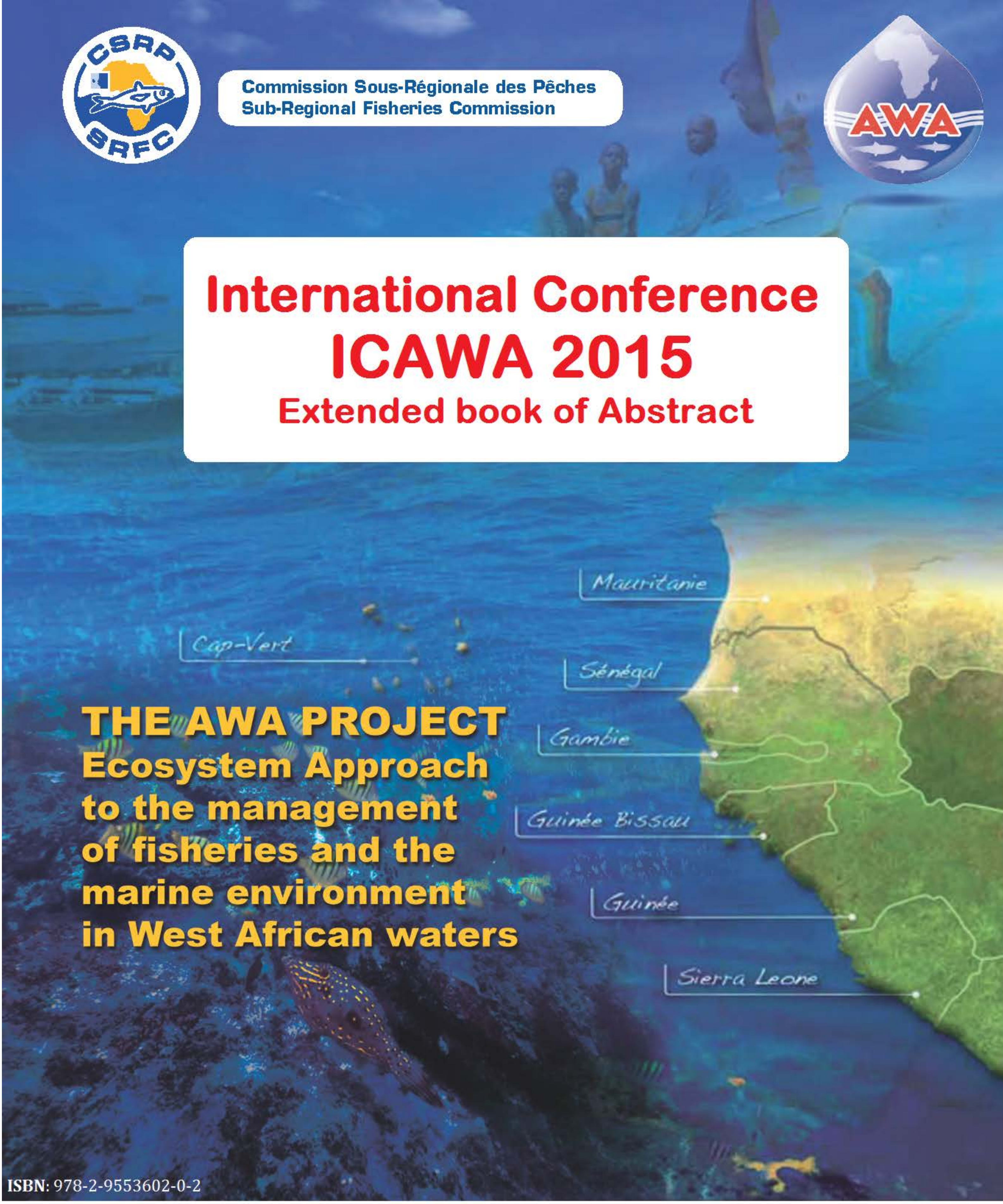
Abstract

Atmospheric deposition is a key source of iron (Fe) and other essential elements to the ocean. Due to its proximity to the Sahara/Sahel region, ~ 200 Tg/year of 'dust' is deposited to the North Atlantic Ocean. Fe is essential for photosynthesis, ~50% of which occurs in marine environments. Thus, Fe supply is linked to global carbon cycling. It has been proposed that the Eastern Boundary Upwelling System (EBUS) of the Canaries current large marine ecosystem is more efficient than its counterpart in the Pacific due to the greater availability of iron (Fe) in the Atlantic EBUS. However, despite Fe being a major element in crustal material (~3.5%), this metal is highly insoluble (here, <0.5% in ultra-pure water). Yet it is the dissolved fraction that is supposed to be the most bioavailable to primary producers. In contrast to Fe, cadmium (Cd), which is also essential for primary production, but toxic above a threshold, is very soluble (here, up to 60% in ultra-pure water). As industrial emissions are enriched in metals, such as Cd, compared to crustal abundance, increasing industrialisation is expected to increase the atmospheric load of such TEs. Here we present total and soluble aerosol TE data from samples collected off the coast of West Africa, on the AWA (RV Thalassa), UPSEN-2, and ECOAO (RV Antea) cruises. Our project will provide field data for constraining aerosol terms in models in order to investigate the impact of changes to the atmospheric supply of TEs under climate change scenarios.

Commission Sous-Régionale des Pêches
Sub-Regional Fisheries Commission

International Conference ICAWA 2015

Extended book of Abstract



THE AWA PROJECT
Ecosystem Approach to the management of fisheries and the marine environment in West African waters

ISBN: 978-2-9553602-0-2

Bundesministerium für Bildung und Forschung

Institut de recherche pour le développement

Liberté • Égalité • Fraternité
République Française
Ministère des Affaires étrangères et du Développement international
Ministère de l'Enseignement Supérieur et de la Recherche

Trilateral German-French-African research initiative

Edited by:
Patrice BREHMER (IRD, France; Dakar), Babacar BA (CSRP, Sub-Region; Banjul) & Gerd KRAUS (TI, Germany; Hamburg).

Technical support: Marie Madeleine GOMEZ (CSRP), Ndague DIOGOUL (IRD).

With the collaboration of:
Peter BRANDT, Bamol Ali SOW, Alban LAZAR, Xavier CAPET, Heino FOCK, Eric MACHU, Hamet Diaw DIADIHOU, Didier JOUFFRE, Ibrahima DIALLO, Joern SCHMIDT, Werner EKAU, Amadou GAYE, Mahfoudh ould TALEB SIDI, Modou THIAW, Cl Abdoulaye DIOP, Adama MBAYE, Dienaba Beye TRAORE, Moussa SALL, Mariline DIARA, Assane FALL, Ibrahima LY, Ivanice MONTEIRO, Vamara KONE, Aboubacar TOGUYENI, Marie BONNIN, Abdelmalek FARAJ.

ISBN: 978-2-9553602-0-2

Cover design: AWA (BMBF – IRD) project

Logo and flyers: Laurent CORSINI (IRD)

Translation: Amadou NDIONE (independent)

Sponsors ICAWA 2015: