



Session 03

Study of the overall toxicity, water quality and microplastics of the peninsula of Cape Verde, Senegal

Amidou SONKO^{1,*}, Patrice BREHMER², Guillaume Constantin DE MAGNY³, Amy GASSAMA⁴, Cheikh DIOP⁵, Ibrahima CISSE⁶, Massal FALL⁷, Luc FINOT⁸, Maryvonne HENRY⁹, Yoba KANDE¹⁰, Mariline DIARA¹¹, and François GALGANI¹²

¹Université Cheikh Anta Diop de Dakar (UCAD), Faculté de Médecine Pharmacologie et Odontologie (FMPO) Dakar BP 5005 Dakar-Fann, Sénégal

²Institut de Recherche pour le Développement (IRD), UMR 195 Lemar, BP1386, Dakar, Sénégal

³Institut de Recherche pour le Développement (IRD), UMR MIVEGEC, Dakar, Sénégal et Institut Pasteur de Dakar (IPD), Avenue Pasteur – BP 220, Dakar, Sénégal

⁴Institut Pasteur de Dakar (IPD), Avenue Pasteur – BP 220, Dakar / University Cheikh Anta Diop of Dakar (UCAD), Ecole polytechnique (ESP) Dakar BP 5085, Sénégal

⁵Université Cheikh Anta Diop de Dakar (UCAD), Faculté de Médecine Pharmacologie et Odontologie (FMPO) Dakar BP 5005 Dakar-Fann, Sénégal

⁶Greenpeace, 2, Avenue Hassan II, 6eme Etage Dakar, Sénégal

⁷Institut Sénégalais de Recherches Agricoles (ISRA), Centre de Recherches Océanographiques de Dakar Thiaroye (CRODT), Centre de recherche PRH, Hann, Dakar, Sénégal

⁸Institut de Recherche pour le Développement (IRD), US191 IMAGO, Campus de Bel Air, Dakar, Senegal

⁹Ifremer, Issy les Molineaux, France

¹⁰Université Alioune Diop de Bambey (UADB), département mathématique, Bambey, Sénégal

¹¹Ministère de l'environnement et du développement durable (MEDD)/ Direction de l'Environnement et des Etablissements Classés (DEEC) 106, Rue Carnot – BP 6557, Dakar, Sénégal

¹²Ifremer, Zoning Industriel Furiani, 20600 Bastia, Corse, France

*Correspondance: Tél: (221) 33 832 89 95; Courriel: amidousonko664@yahoo.com (A. SONKO)

Reçu le 13/12/2016; publié le 15/03/2017

AWA © MS WP3_S3_34

Abstract

Currently only thirteen percent (13 %) of domestic wastewater produced daily in Dakar is being treated. Industrial and agricultural activities and domestic waste are the source of significant pollution of the marine and coastal environment in Senegal. Our work focuses on assessing the overall toxicity of sediments, the microbiological and chemical quality of water, and the quantification of microplastics around the Cape Verde Peninsula. Physicochemical measurements are carried out in situ and the sampling points correspond to effluent outlets, compared to two reference stations that are assumed to have little or no contamination. A total of 15 sites were collected: Cambéréne, Yoff Tonghor, Ngor, Almadies-Vivier, Ouakam, Magdalen Islands, Soumbédioune, Dakar Dantec, Hann1, Hann2, Port of Dakar, Lac rose, Guédiawaye, Mamelles and UCAD. High sediment toxicity [100% ADL (Larval Development Anomalies)] was demonstrated at sixty percent (60%) of the sites.



Twenty percent (20%) of sites have intermediate toxicity ranging from 30% to 60% ADL). Sites with the lowest toxicity (up to 30% ADL) accounted for only 20% and no ADL values were reported as nil. Mercury levels in sediments are very low, with a notable variation between sites in the north and those in the south of the peninsula. Coliforms (*Escherichia coli*) and enterococci are present in large quantities at most sites (64%). The presence of *Salmonella* is noted only in Cambéréne. The results of mass spectrometry analyzes also show overall high concentrations of heavy metals (Al, Cd, Cr, Co, Cu, Hg, Ni and Zn) with the exception of Fe and Mn, which are below the criteria for "Protection of acute and chronic aquatic life". Microplastic analysis revealed high mean values: 25,864 mpts / km² (42 g / km²) for microplastics (300 μm and 5 mm) and 37,441 MPTS / km² (97.33 g / km²) for macroplastics > 5 mm and < 200 mm). All the results obtained show, according to the pollutants, the importance of the sediment granulometry, the nature of the pollution, the size of the effluents, the anthropic contributions, the atmospheric falls like that of the behaviors of the populations. Our results are discussed with a view to environmental monitoring at the local, regional or national level. They will also allow this approach to be extended to other contaminants (hydrocarbons, metals, pesticides, megaplastics) as well as bio-trials in the various compartments of the marine and coastal environment (sediments, waters, fauna and flora). An in-depth statistical analysis will also allow optimization of ecotoxicological monitoring, sampling and analysis strategies.

Keywords: Global sediment toxicity, Microbiological parameters, Heavy metals, Microplastics, Dakar, Senegal, West Africa.



Commission Sous-Régionale des Pêches
Sub-Regional Fisheries Commission



International Conference ICAWA 2016

Extended book of Abstract

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

Cap-Vert

Mauritanie

Sénégal

Gambie

Guinée BISSAU

Guinée

Sierra Leone

ISBN: 978-2-9553602-0-5



Bundesministerium
für Bildung
und Forschung



Institut de Recherche
pour le Développement
FRANCE



Liberté • Égalité • Fraternité
RÉPUBLIQUE FRANÇAISE

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-UCAD).

WITH THE COLLABORATION OF:

Bamol Ali SOW , Alban LAZAR, Heino FOCK, Xavier CAPET, Aka Marcel KOUASSI, Idrissa Lamine BAMY, Osvaldina SILVA, Eric MACHU, Vamara KONE, Moustapha DEME, Didier JOUFFRE, Joern SCHIMDT, Modou THIAW, Suzanne TRAORE, Abdoulaye DIOP, Justine DOSSA, Didier JOUFFRE, Ibrahima DIALLO, Arnaud COMOLET, Zacharie SOHOU, Hamet DIADHOU, Célestin BLE, Rafael ALMAR, Moussa SALL, Abou BAMBA, Dano J.A. ROELVINK, Ibrahima LY, Marie BONNIN , Dienaba Beye TRAORE, Adama MBAYE, Hassane Dedah FALL, Mohamed M'barek O. SOUEILIM.

ISBN: 978-2-9553602-0-5

Sub Regional Fisheries Commission / Commission Sous Régionale des Pêches ©2017

COVER DESIGN: AWA (BMBF – IRD) project

LOGO AND FLYERS: Laurent CORSINI (IRD)

TRANSLATION: Amadou NDIONE (independent)

SPONSORS ICAWA 2016

