OPERA
OCEAN PREDICTION ENHANCEMENT IN REGIONS OF AFRICA

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Ocean Prediction UN DECADE COLLABORATIVE CENTRE

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

MERCATOR OCEAN INTERNATIONAL

Institution

Institut Sénégalais de Recherches Agricoles (ISRA)

Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT)

Ministry in charge (if applicable) : Ministère de l'Agriculture et de l'Elevage du Sénégal (MASAE)

Website: www.isra.sn

Country: Sénégal

Institutions involved: CRODT, ANACIM, HASSMAR, UCAD, UAM

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Description of systems

Name of the system:

Marine and Coastal Ecosystem Dynamics (CRODT & Universities) ;
Marine Weather (ANACIM) ;
Safety and Marine Pollution (HASSMAR)

Type of system:

Natural and Water Resources Service
Marine and Coastal Service
Water and environment monitoring Service
Marine ressources and fisheries Service
Meteorological marine service
Civil aviation *service*
Marine Shipping *service*
Early warning *service*
Small-scale and industrial fishing *service*
Sport fishing *service*
Maritime safety/security
Marine environmental
Protection events at sea (*Oil spill service)*

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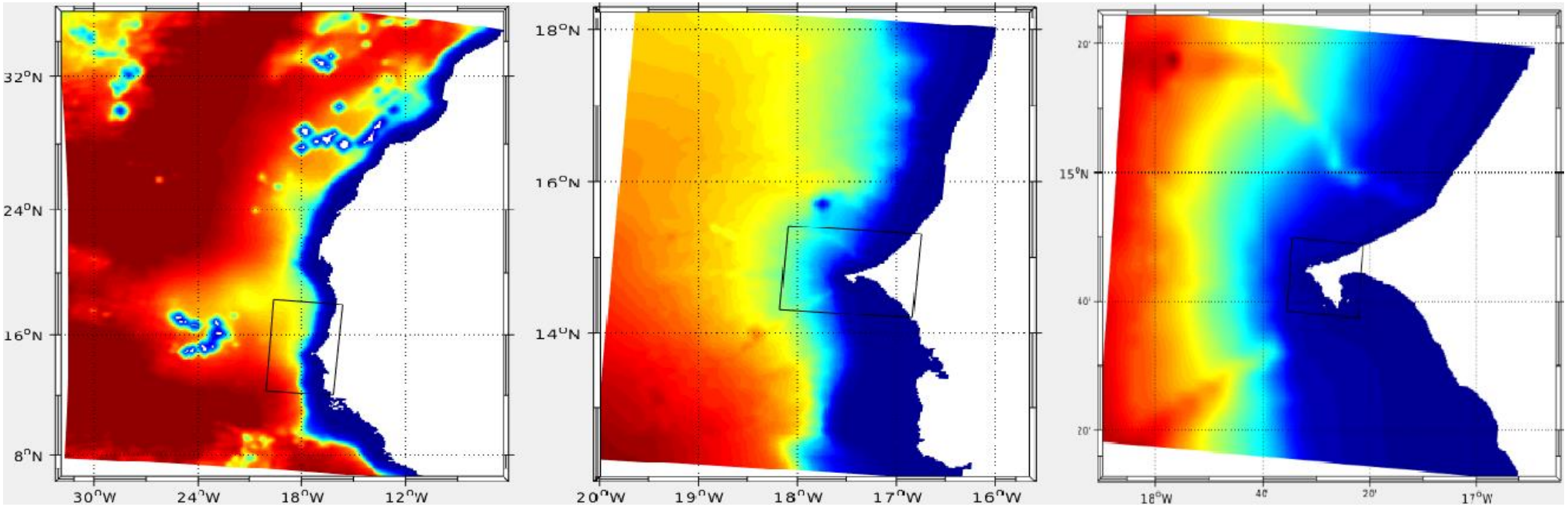
Technical description

CROCO Coastal and Regional Ocean Community model
https://www.croco-ocean.org/)



High-frequency atmospheric forcing for winds (ASCAT), heat flux (TROPFLUX and COADS)

Tidal forcing (10 main constituents - TPXO 6.0, USA)

Ocean boundary forcing (GLORYS12V1 (https://doi.org/10.48670/moi-00021), SODA)

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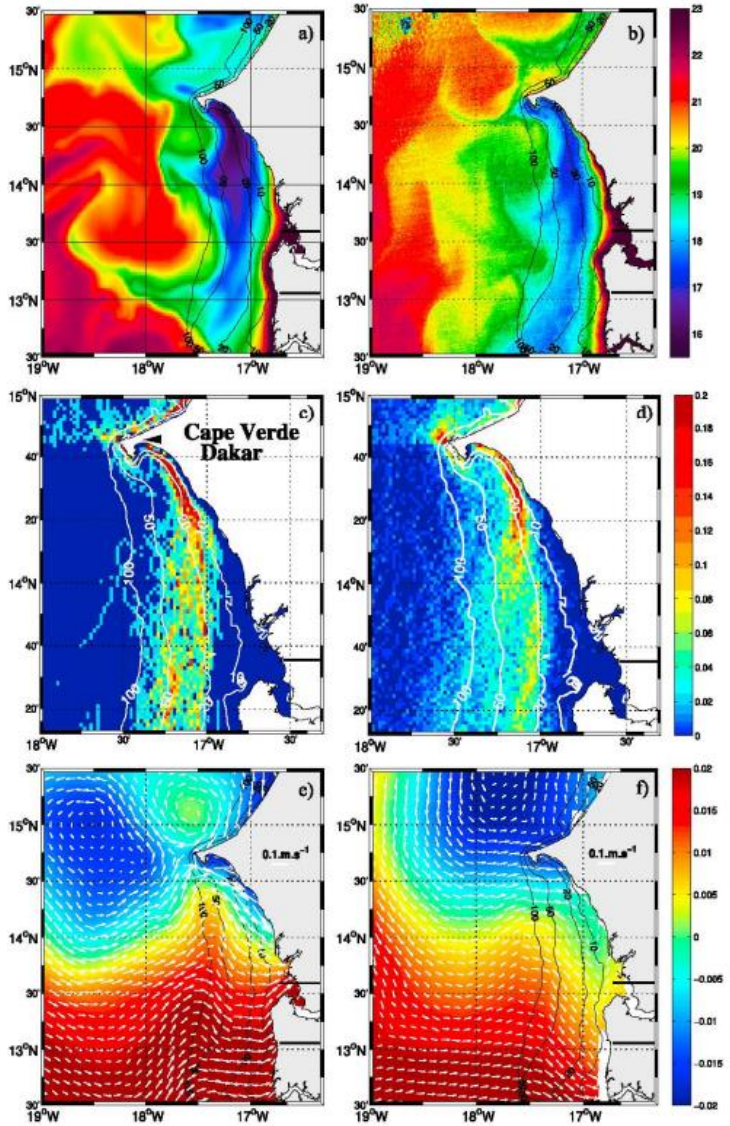
Description of system results

Data Collected with in situ observations

- *SST from MODIS (Aqua and Terra)*
- *SSH from AVISO*
- *Currents (in situ and*
- *MELAX buoy)*



Ndoye et al , 2017

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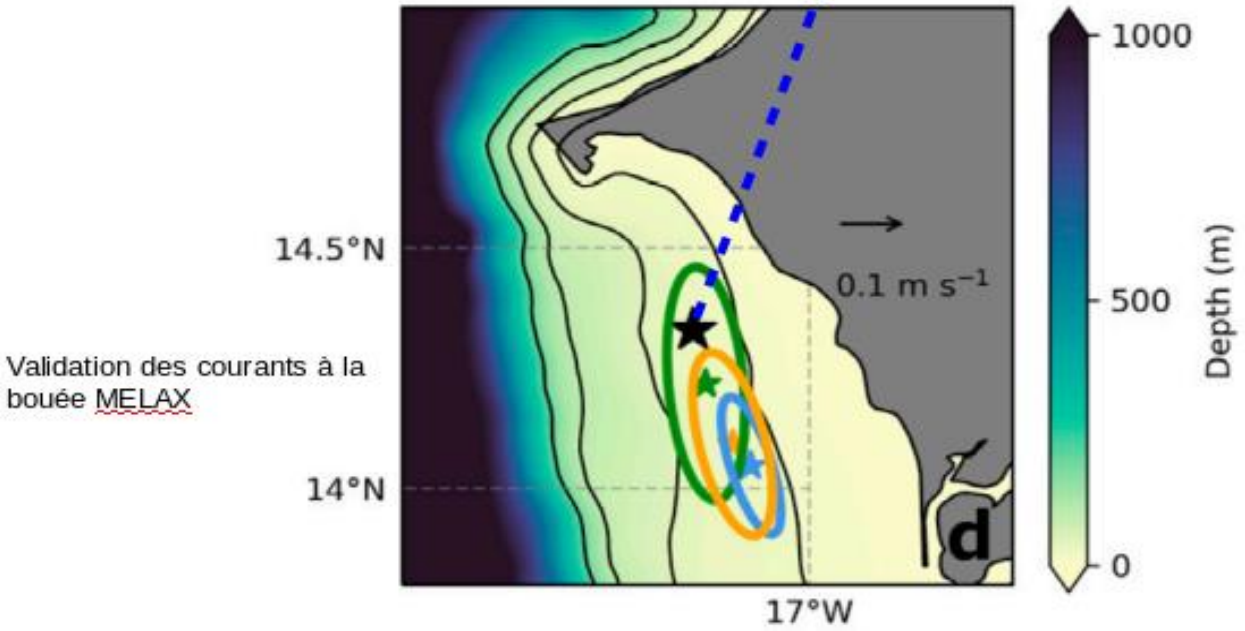
Description of system validation

Model validation

- *SST from MODIS (Aqua and Terra)*
- *SSH from AVISO*
- *Currents (in situ and*
- *MELAX buoy)*



Validation des courants à la bouée MELAX

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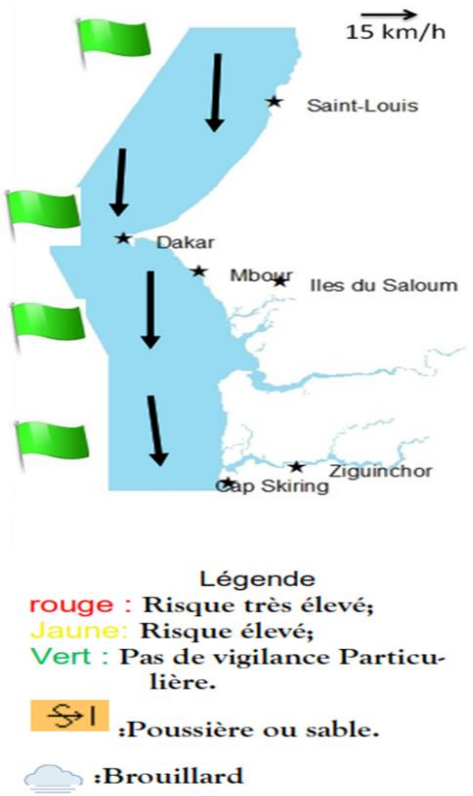
Applications

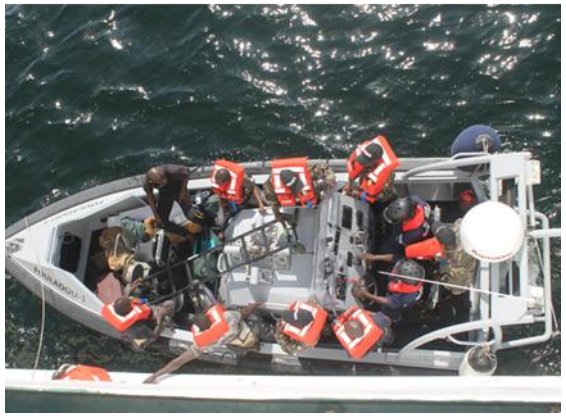
Application areas:

- Environmental management
- marine resources management
- Fisheries management
- Civil aviation
- Navigation, Marine Shipping
- Early warning
- Maritime safety/security
- Marine environmental Protectio
- Events at sea

Main users:

- Fisheries managers
- Meteorological services
- Local communities
- civilian service
- Scientific community





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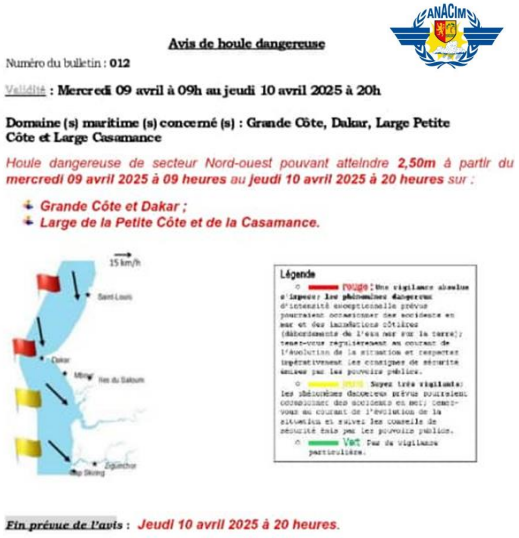
Specific examples of application



Avis de houle dangereuse

Numéro du bulletin : 012

Validité : Mercredi 09 avril à 09h au jeudi 10 avril 2025 à 20h

Domaine (s) maritime (s) concerné (s) : Grande Côte, Dakar, Large Petite Côte et Large Casamance

*Houle dangereuse de secteur Nord-ouest pouvant atteindre **2,50m** à partir du **mercredi 09 avril 2025 à 09 heures** au **jeudi 10 avril 2025 à 20 heures** sur :*

- *Grande Côte et Dakar ;*
- *Large de la Petite Côte et de la Casamance.*

15 km/h

Saint-Louis

Dakar

Mbour

Iles du Saloum

Ziguinchor

Cap Skiring

Légende

rouge : Une vigilance absolue s'impose: les phénomènes dangereux d'intensité exceptionnelle prévus pourraient occasionner des accidents en mer et des inondations côtières (débordements de l'eau mer sur la terre); tenez-vous régulièrement au courant de l'évolution de la situation et respectez impérativement les consignes de sécurité émises par les pouvoirs publics.

Super très vigilants: les phénomènes dangereux prévus pourraient occasionner des accidents en mer; tenez-vous au courant de l'évolution de la situation et suivez les conseils de sécurité émis par les pouvoirs publics.

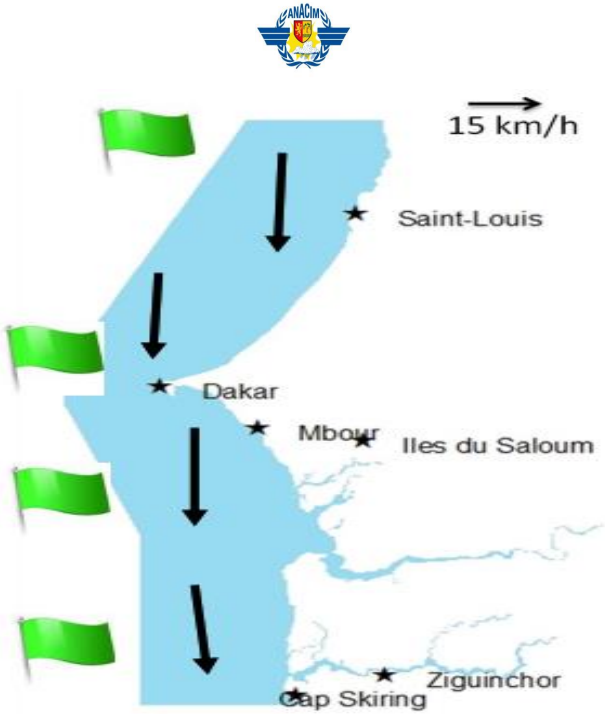
Vert Pas de vigilance particulières.

***Fin prévue de l'avis** : Jeudi 10 avril 2025 à 20 heures.*

AGENCE NATIONALE DE L'AVIATION CIVILE ET DE LA METEOROLOGIE DU SENEGAL
AEROPORT L.S.S
BP 8257 DAKAR YOFF, TEL 00221 33 869 68 68 FAX: 00221 33 820 12 27

Fishing weather forecast

(Coastal Warning Map)



Légende
rouge : Risque très élevé;
Jaune: Risque élevé;
Vert : Pas de vigilance Particulière.
:Poussière ou sable.
:Brouillard

- *Swell Alert message to fishermen via whatsApp to reduce loss of life at sea-*

- **Climate Change and Sardinella Migration (CRODT)**
  : https://www.nature.com/articles/s41598-024-61734-8

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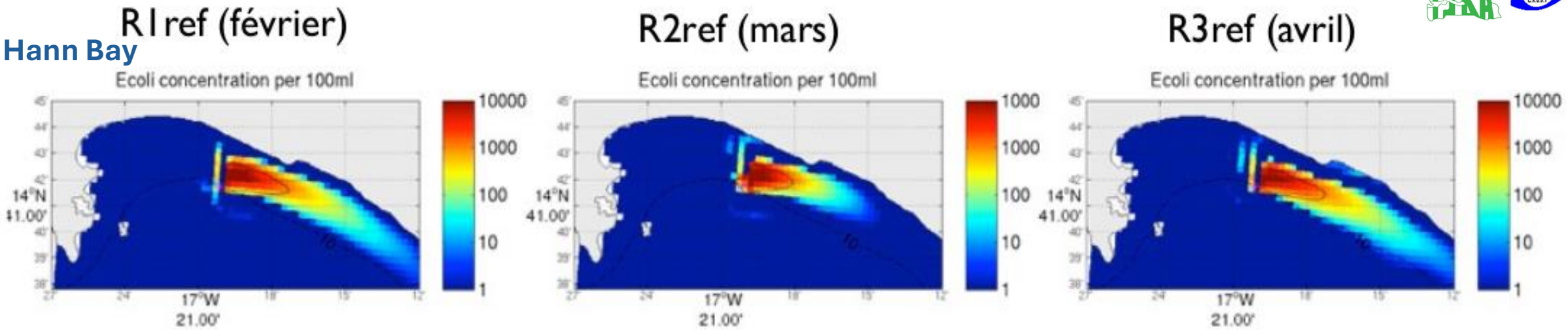
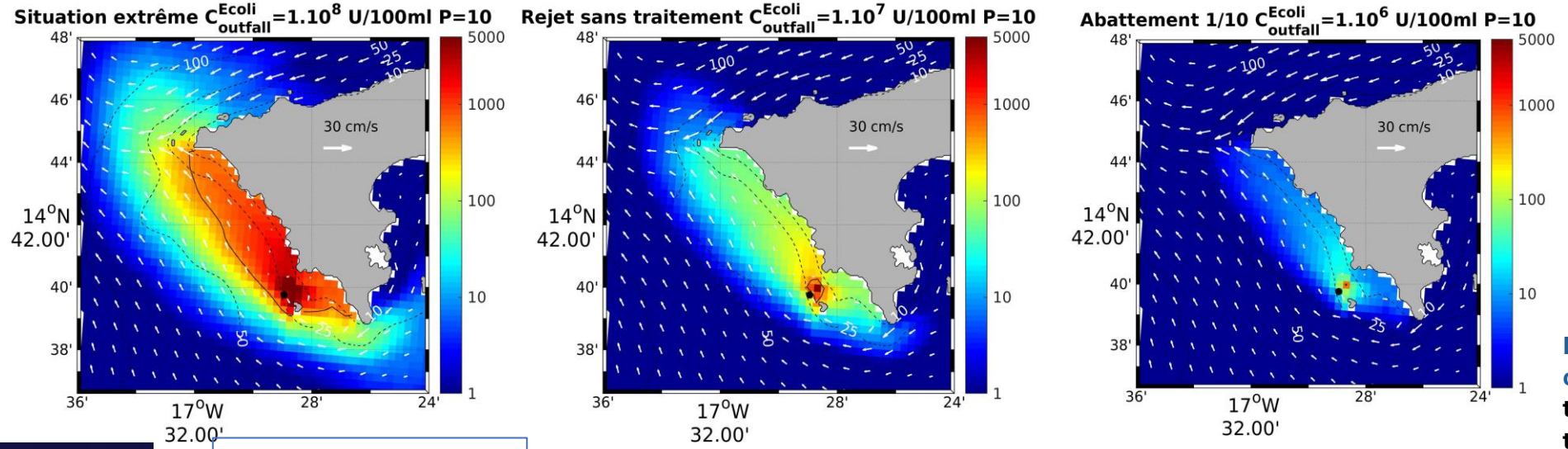
Examples of marine pollution applications

Hann Bay





Soumbedioune Bay

Depollution of Hann Bay, the model simulated the effect of distance from sewage channel to coastline

Depollution of Soumbédioune bay, the model simulated the effect of wastewater discharge with or without treatment

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National and international links

- **Relevant national partners:**

  ANACIM : *Marine Weather forcasting ;*

  HASSMAR : *Safety and Marine Pollution forcasting*

  Universities : *Marine and Coastal Ecosystem Dynamics (Providing of basic knowledge in support of environmental management and forcasting)*

- **Regional/continental partnerships:**

  - *Countries with GMES Consortium*
  - *IRD :* ***with in situ observations using the Melax buoy***

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Institut de Recherche pour le Développement FRANCE

GMES AND AFRICA

UNIVERSITE AMADOU MAHTAR MBOW DE DAKAR

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Future Plans

Describe what you would need for this system to be more useful for you or your users

- Ocean forecasting services exist in various institutes in our country, but they operate in isolation from each other. This is why the challenge today is to have the human, material and financial resources to federate the systems and pool synergies through a structuring project to respond to the common ocean forecasting issue.
- There is also a need to strengthen data collection facilities (equipments)
- Develop national platform to facilitate data sharing
- This would make our national ocean forecasting system more robust, to better meet the needs of our communities.

Limitations/challenges:

- *Dedicated equipments are outdated*
- *The absence of a structuring project that federates dedicated institutions*
- *Limited resolution of tools*
- *Limited or inadequate infrastructure for ocean forecasting*

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