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Research Article

Hydrosedimentary Dynamics and Environmental Changes in the Comoé Estuary (Côte d'Ivoire) Following the Permanent Opening of Its Mouth

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Abstract

The Comoé Estuary, located in Grand-Bassam, Côte d'Ivoire, is a coastal ecosystem of major ecological and socio-economic importance. Since the permanent opening of its mouth in September 2023, the estuary has experienced hydrological and environmental disturbances whose magnitude remains poorly documented. This study adopts an integrated approach combining morphobathymetric characterization and the analysis of the spatial distribution of water physicochemical parameters. A sonar survey conducted on January 3, 2026, yielded 44,097 bathymetric sounding points. Five physicochemical parameters were measured *in situ* at 95 stations on February 28, 2026. Results reveal a heterogeneous estuarine bed, with depths ranging from 0 to 17 m (mean: 4 m), and two types of morphological profiles. V-shaped profiles indicate dominant erosion, whereas intermediate profiles reflect an unstable balance between erosion and sedimentation. These findings point to a mixed and unstable depositional environment characterized by continental inputs and marginal marine conditions. From a physicochemical perspective, pH values (7.13-8.38) indicate a generally alkaline environment. Conductivity (17.43-55.20 µS/cm) and salinity (0.968-3.59‰) reflect a strong marine influence downstream, while dissolved oxygen concentrations (0.10-0.30 mg/L) reveal a state of severe hypoxia, representing the most critical ecological constraint of the system. Pearson correlation analysis confirms a very strong relationship between conductivity and salinity ($r = 0.998$), as well as strong negative correlations between temperature and mineralization-related parameters. These correlations indicate that water has become a vector of persistent pollution that weakens the ecosystem and threatens the food security and health of local populations. The environment is progressively losing its capacity for regeneration, and the impacts may be transmitted across generations.

Keywords

Estuary, Comoé, Bathymetry, Morphology, Physicochemical Parameters, Grand-Bassam, Côte d'Ivoire

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1. Introduction

Estuaries are transitional zones between continental and marine environments, where intense physicochemical and hydrodynamic processes govern both morphology and ecological functioning [1]. According to Pritchard [2], an estuary is a semi-enclosed body of water that has a free connection with the open sea and within which seawater is measurably diluted by freshwater inflows from land. These environments constitute natural areas of considerable economic value, particularly for artisanal fisheries, tourism, and sand extraction. However, their ecological balance is increasingly threatened by climate change and growing anthropogenic pressures.

The Comoé River estuary at Grand-Bassam, located at the eastern end of the Ebrié Lagoon, is one of the most complex estuarine systems along the Ivorian coast. Following the opening of the Vridi Canal in 1951, a water deficit developed at its natural mouth, considerably reducing river discharge in favor of longshore drift and channel siltation [3]. However, the permanent opening of the estuary mouth in September 2023 reactivated hydrodynamic exchanges between the estuary and the ocean, potentially leading to significant changes in hydro-sedimentary dynamics and physicochemical conditions.

Several studies have documented the hydrological and sedimentological characteristics of this estuary. However, these investigations were conducted before 2023 and therefore no longer reflect the current state of the system. Furthermore, no study has yet proposed an integrated approach simultaneously combining high-resolution morphobathymetric characterization and spatial analysis of physicochemical parameters within this post-opening context.

Within this framework, the present study aims to characterize the morphobathymetric and physicochemical aspects of the Comoé Estuary at Grand-Bassam and to determine their hydrosedimentary and environmental implications.

2. Materials and Methodes

2.1. Presentation of Study Area

The Comoé Estuary is located in Grand-Bassam, southeastern Côte d'Ivoire, at the eastern extremity of the Ebrié Lagoon (*Figure 1*). It receives inflows from the Comoé River, which is 1,160 km long and drains a watershed of approximately 78,000 km^2 distributed among Côte d'Ivoire (74.7%), Burkina Faso (21.6%), Ghana (2.7%), and Mali (1%) [4]. Geographically, the estuary is situated between 5°12′ and 5°14′ North latitude and 3°43′ and 3°44′ West longitude.

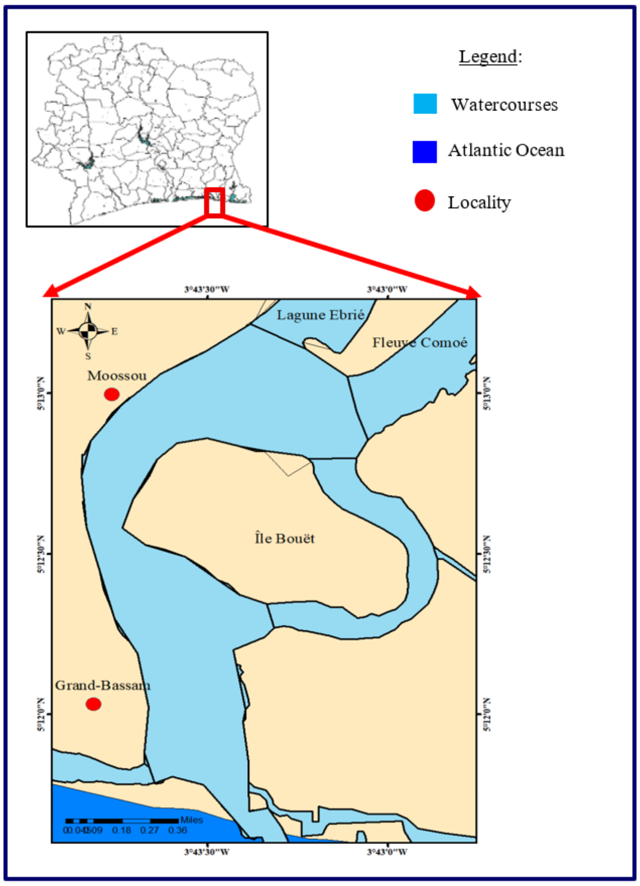

Figure 1. *Geographic location of the Comoé River Estuary.*

2.2. Field Equipment

2.2.1. Bathymetric Data Acquisition Equipement

The equipment used during the bathymetric survey consisted of:

1) A motorized boat for navigating across the water body.
2) A Garmin GPS (Global Positioning System) used to determine the location of measurement stations. It continuously provides accurate positioning and navigation data.
3) A LOWRANCE Elite FS7 echo sounder powered by a battery. This device records data in digital format. It includes a transducer, which emits acoustic signals by converting electrical energy into sound energy, and a central processing unit that receives and converts the signals into digital data.

2.2.2. Physicochemical Data Acquisition Equipment

During the field campaign carried out in the study area, water samples were collected using a plastic sampling container (a cut water bottle) used as a sample collection device. The physicochemical parameters of the water were measured in situ using a PCE-PHD 1 multiparameter probe, which allows the simultaneous determination of several parameters, including temperature (T °), pH, electrical conductivity, dissolved oxygen, and salinity.

2.3. Methods

2.3.1. Bathymetric Data

(i). Bathymetric Survey

Bathymetric surveys were conducted on January 3, 2026, to characterize the morphology of the Comoé Estuary bed at Grand-Bassam. A bathymetric survey allows for the accurate determination of water depth and its representation in the form of a map including isobaths, regardless of the nature of the site under investigation. Measurements were carried out according to the bathymetric survey standardization guide [5]. These standards define the spacing between survey transects and the sampling interval according to the surface area of the aquatic environment. In total, approximately 44,000 georeferenced sounding points (X, Y, Z) were recorded throughout the Comoé Estuary (Figure 1), providing the database required for the production of morphobathymetric maps using SURFER 11.5.1069 mapping software developed by Golden Software Inc.

Table 1. Bathymetric Survey Standardization Guide.

Water Body Area (ha)	Distance Between Transects (m)	Distance Between Soundings (m)
< 50	25	10
50 to 200	50	10
200 to 1000	100	10
> 1000	150	20

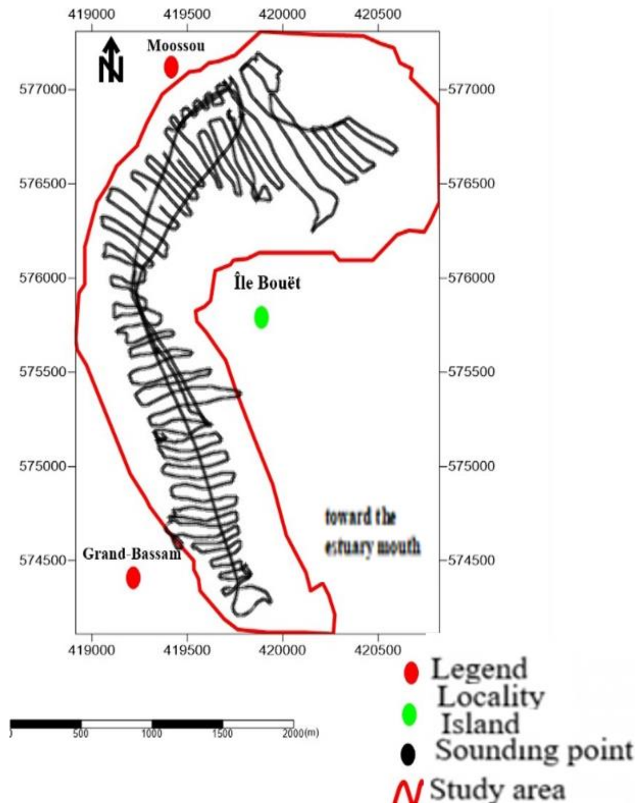

Figure 2. Distribution Map of Bathymetric Sounding Points in the Comoé River Estuary.

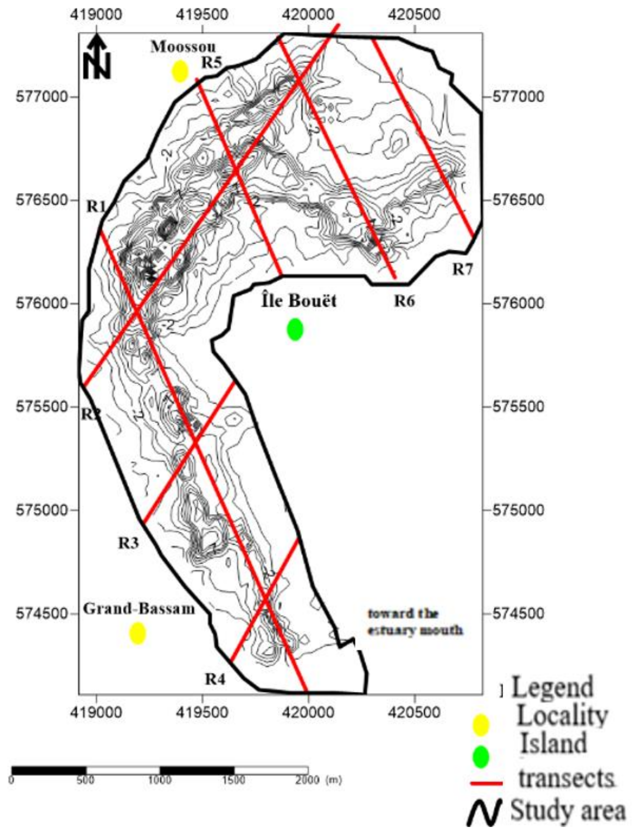

Figure 3. Location Map of Bathymetric Transects.

(ii). Channel Configuration

Characterizing the channels makes it possible to monitor morphological changes in the bed of the Comoé Estuary. To this end, seven transects were drawn on the bathymetric map to identify the main types of morphological profiles present in the study area (Figure 3). These transects, oriented along SW-NE and NW-SE directions, cover the entire estuarine system, extending from the northern area toward Moossou to the estuary mouth toward Grand-Bassam, including both banks of Bouët Island. The profiles extracted along these transects were used to identify the principal bottom forms characteristic of the estuary.

2.3.2. Physicochemical Data

(i). Sampling Methods

Sampling consisted of collecting representative portions of water in order to characterize its physicochemical properties. For this study, the sampling campaign was conducted on February 28, 2026. Samples were collected aboard a motorized boat used to travel across the water body. Sampling was carried out at the surface, at an approximate depth of 0.5 m, in order to characterize the physicochemical conditions of the surface water layer.

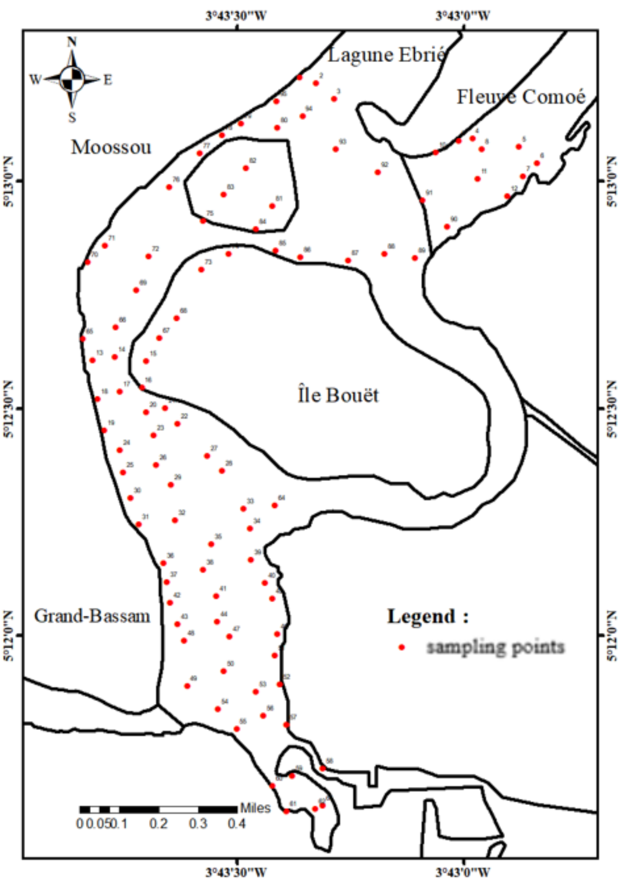

Figure 4. Location of Physicochemical Sampling Stations.

A total of 95 stations were sampled throughout the study area (Figure 4). Among these, stations 4 to 12 were located within the Comoé River in order to account for the influence of river inputs on estuarine water quality. Physicochemical parameters were measured *in situ*. The probes were immersed directly in the water sample collected in the container. Measurements were taken once the values displayed on the instrument screen had stabilized, thereby ensuring data reliability and minimizing any alteration of water properties.

The use of *in situ* measurements helps prevent physicochemical modifications that may occur during sample transport and storage, thus ensuring a more accurate representation of actual environmental conditions. Bathymetric maps were generated using SURFER 11.5.1069 mapping software developed by Golden Software Inc.

(ii). Processing of Physicochemical Data

All data collected during the field survey were recorded on field sheets for subsequent processing and analysis. Using ArcGIS software, spatial distribution maps were produced for each physicochemical parameter. The preparation of these maps involved two major steps.

The first step consisted of entering into an Excel spreadsheet the numerical values of the physicochemical parameters previously measured, together with the coordinates of the sampling locations. These coordinates were then combined with the boundary of the study area obtained from Google Earth.

The second step involved the actual creation of spatial distribution maps for each physicochemical parameter based on the sampling points. Using ArcGIS, interpolation was performed through the Inverse Distance Weighted (IDW) method. This interpolation technique estimates the value of a location by calculating a weighted average of neighboring known points [6]. The closer a known point is to the location being estimated, the greater its influence on the averaging process.

3. Results

3.1. Morphobathymetry of the Estuary

3.1.1. 2D Bathymetric Map and Digital Terrain Model (DTM)

The 2D bathymetric map of the Comoé Estuary reveals depths ranging from 0 to 17 m, with an average depth of 4 m (Figure 5). Maximum depths are concentrated within the main channel located in the central part of the estuary, where a pronounced depression reaches 17 m. The bottom is generally heterogeneous, characterized by a succession of channels and shallow depositional zones.

The Digital Terrain Model (DTM) confirms this heterogeneity. The three-dimensional representation highlights the alternation of deep depressions associated with erosive currents and dredging activities, and sedimentary shoals corresponding to low-energy hydrodynamic environments favorable to material accumulation (Figure 6).

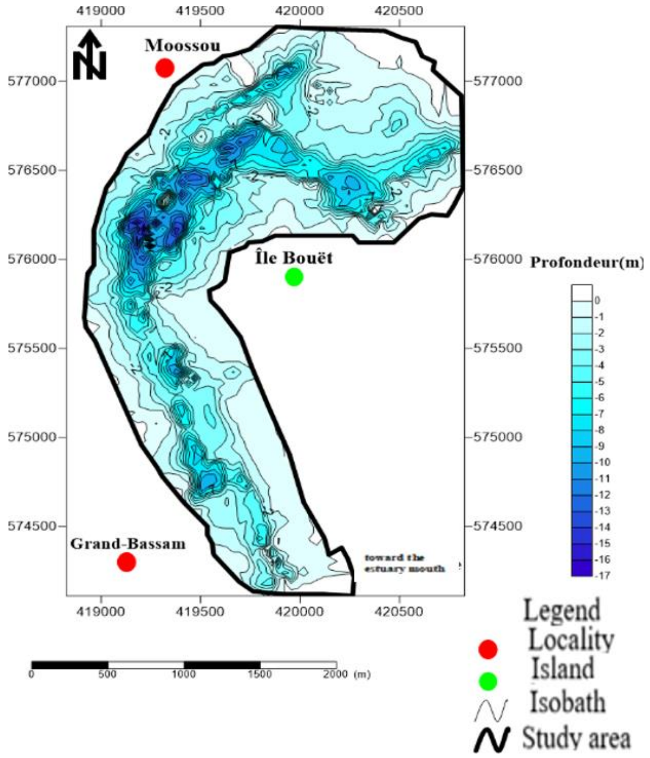

Figure 5. *2D Bathymetric Map of the Como éRiver Estuary.*

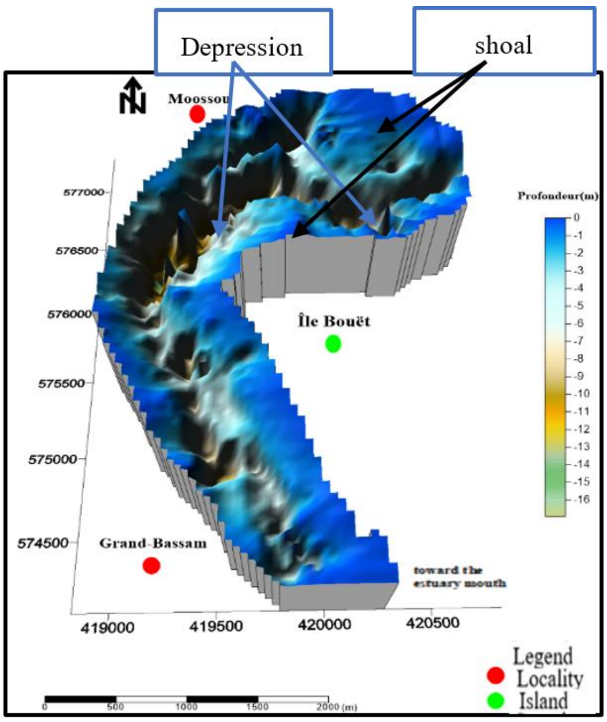

Figure 6. *Digital Terrain Model (DTM) of the Comoé River Estuary.*

3.1.2. Water Circulation and Slope Evolution

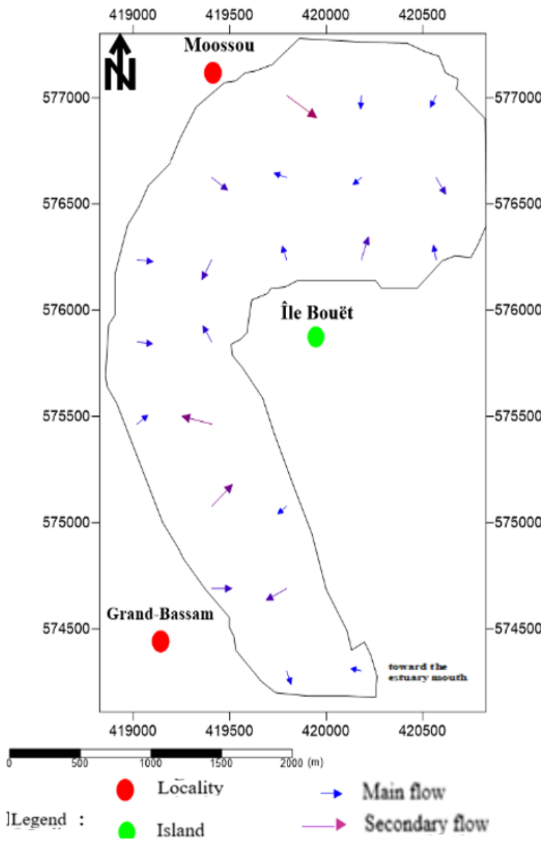

Figure 7. *Water Flow Circulation Map of the Comoé River Estuary.*

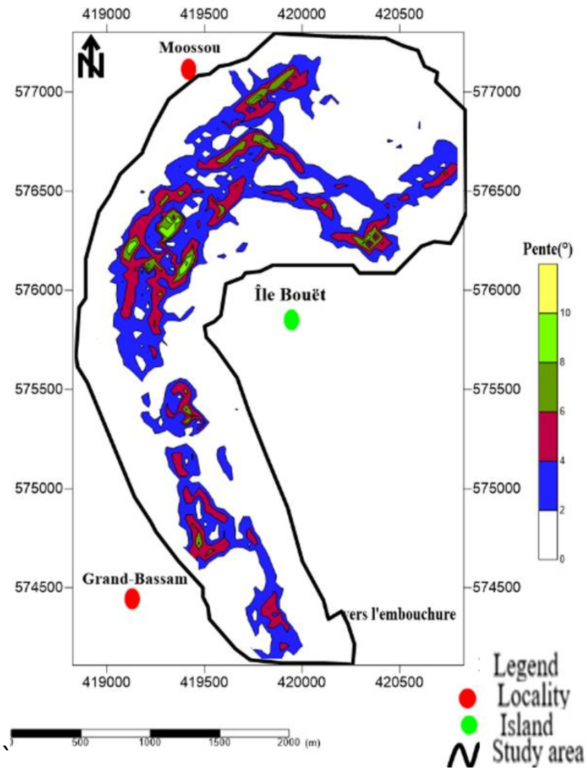

Figure 8. *Slope Map of the Como éRiver Estuary.*

Flow vectors derived from the bathymetric map are mainly oriented along the North-South and East-West directions, converging toward the deepest areas of the estuary (Figure 7). Slope analysis, based on the Canadian classification system (GTCS, 2002), identified five slope classes: sub-horizontal slopes (0-2 °), which are by far the most dominant, very gentle slopes (2-4 °), gentle slopes (4-6 °), moderate slopes (6-8 °), and steep slopes (8-10 °). The latter are strictly confined to the flanks of the main channel, where dredging-related erosional processes are most active (Figure 8).

3.1.3. Interpretation of Morphological Profiles

Processing of the bathymetric data collected from the Como é Estuary made it possible to identify two types of morphological profile s « V » shaped profiles and intermediate profiles.

(i). V-Shaped Profile

The profiles corresponding to transects R3, R4, R5, and R7 (*Figure 9*) exhibit a V-shape, with inclined sides descending toward a narrow and deep bottom. This morphology indicates that erosion is the dominant process in these areas. Water currents are sufficiently strong to remove sediments and deepen the channel further. This process is also reinforced by dredging activities carried out within these sectors of the estuary.

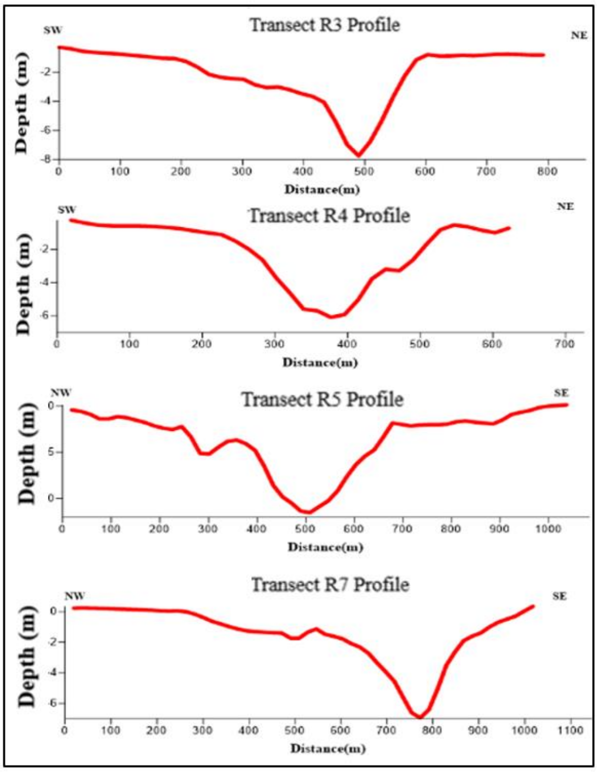

Figure 9. *V- Shaped Bathymetric Profile.*

(ii). Intermediate Profile

The profiles corresponding to transects R1, R2, and R6 (*Figure 10*) are classified as intermediate profiles, characterized by a succession of depressions and elevations. They do not correspond either to a V-shaped or a U-shaped morphology. They reflect conditions in which erosional and depositional forces compete without either process becoming dominant. This type of profile represents a transitional stage in bottom evolution, between a strongly eroded V-shaped form and a more stable U-shaped morphology.

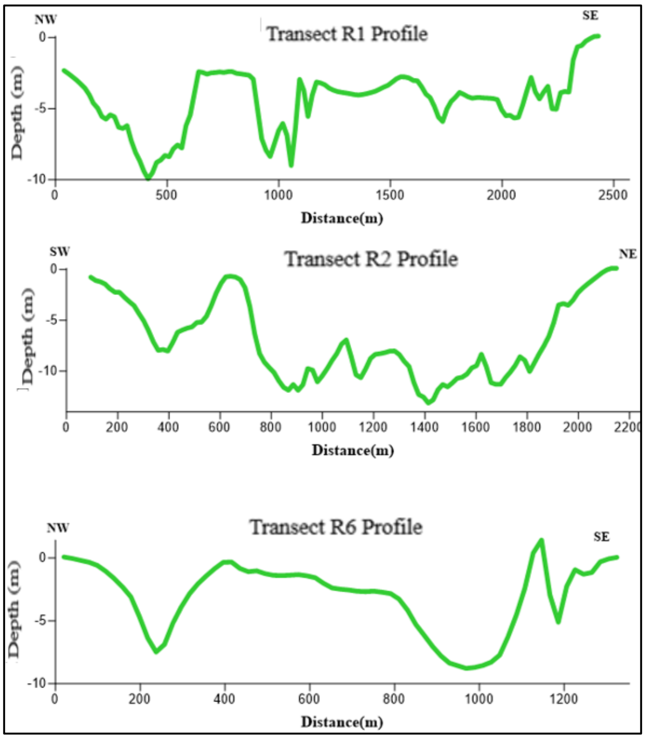

Figure 10. ***i****ntermediaite Bathymetric Profile.*

3.2. Spatial Variability of Physicochemical Parameters

Descriptive statistics for the five parameters measured at the 95 sampling stations are presented in Table 2.

The pH and temperature values remain stable across all sampling stations, showing low variability. Conductivity, salinity, and dissolved oxygen exhibit moderate variability, suggesting spatial and/or temporal heterogeneity likely related to river inflows, tidal influence, or freshwater-seawater mixing within the estuary. Although dissolved oxygen displays a moderate coefficient of variation (27.78%), its absolute values remain extremely low (0.10-0.30 mg/L), indicating conditions close to hypoxia.

Table 2. Descriptive Statistics of Physicochemical Parameters in the Waters of the Comoé Estuary.

Parameter	Minimum	Maximum	Mean	Standard Deviation	Coefficient of Variation (%)
pH	7.13	8.38	8.17	0.32	3.92
Conductivity (µS/cm)	17.43	55.20	49.44	10.84	21.93
Temperature (℃)	28.20	30.20	28.63	0.53	1.85
Salinity (‰)	0.968	3.59	3.15	0.75	23.81
Dissolved O_2 (mg/L)	0.10	0.30	0.18	0.05	27.78

3.2.1. pH

The pH ranges from 7.13 to 8.38, with an average value of 8.17, indicating generally alkaline waters. The highest values (8.15-8.38) dominate the downstream portion of the estuary under marine influence, whereas the lowest values (7.13-7.45) occur in the riverine section (northeastern area), where organic matter decomposition processes enrich the waters with CO_2 (*Figure 11*).

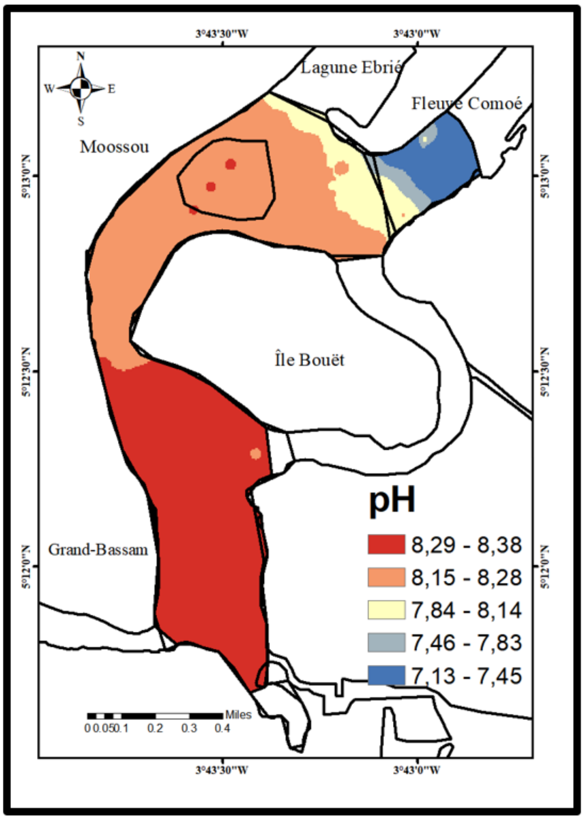

Figure 11. Spatial Distribution of pH in the Comoé Estuary.

3.2.2. Electrical Conductivity and Salinity

Conductivity ranges from 17.43 to 55.20 µS/cm (mean: 49.44 µS/cm) (*Figure 12*), while salinity varies between 0.968 and 3.59‰ (mean: 3.15‰)(*Figure 13*). Both parameters display nearly identical spatial distributions: maximum values occur in the southern sector toward the estuary mouth, reflecting a strong marine influence, whereas minimum values are observed in the northeastern riverine zone. A decreasing south-to-north gradient reflects the progressive mixing of mineralized marine waters with freshwater inflows.

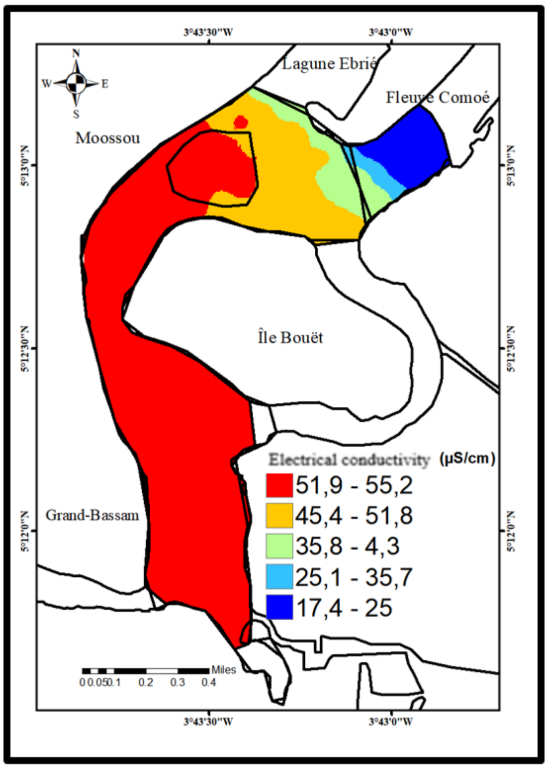

Figure 12. Spatial Distribution of Electrical Conductivity in the Comoé Estuary.

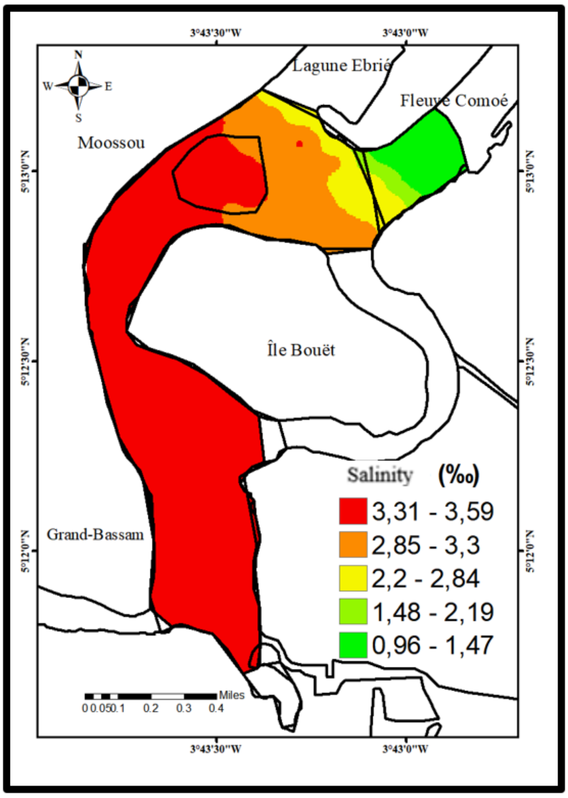

Figure 13. *Spatial Distribution of Salinity in the Comoé Estuary.*

3.2.3. Temperature

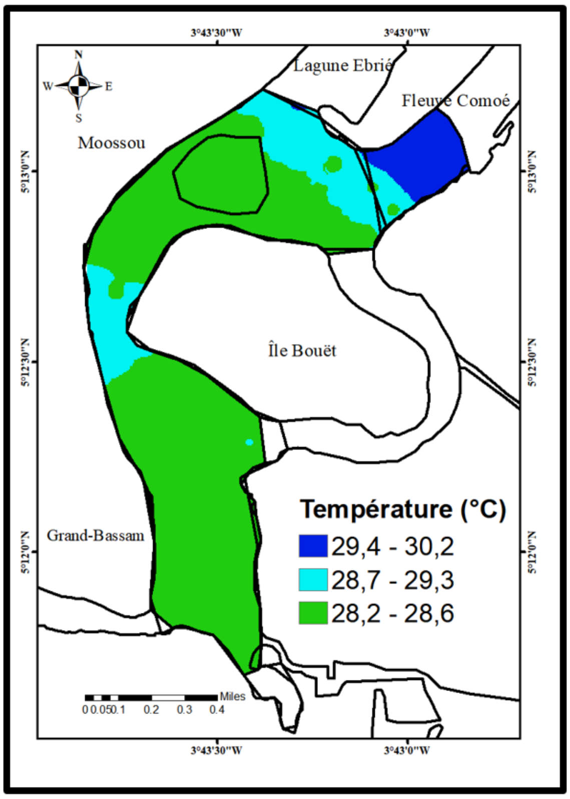

Figure 14. *Spatial Distribution of Water Temperature in the Comoé Estuary.*

Temperature ranges from 28.2 to 30.2 ℃, with a mean value of 28.63 ℃, confirming the stable thermal conditions characteristic of tropical environments. The highest temperatures (29.4-30.2 ℃) were recorded in the riverine sector, which is shallower and more exposed to solar radiation, whereas cooler temperatures prevail in the estuarine zone, where marine waters exert a thermal buffering effect (*Figure 14*),

3.2.4. Dissolved Oxygen

Dissolved oxygen concentrations range from 0.10 to 0.30 mg/L (mean: 0.18 mg/L), values well below the critical threshold of 2 mg/L generally required for the survival of most aquatic organisms. This severe hypoxic condition is observed throughout the estuary, with the lowest concentrations (0-0.19 mg/L) located in the central and southern sectors (*Figure 15*).

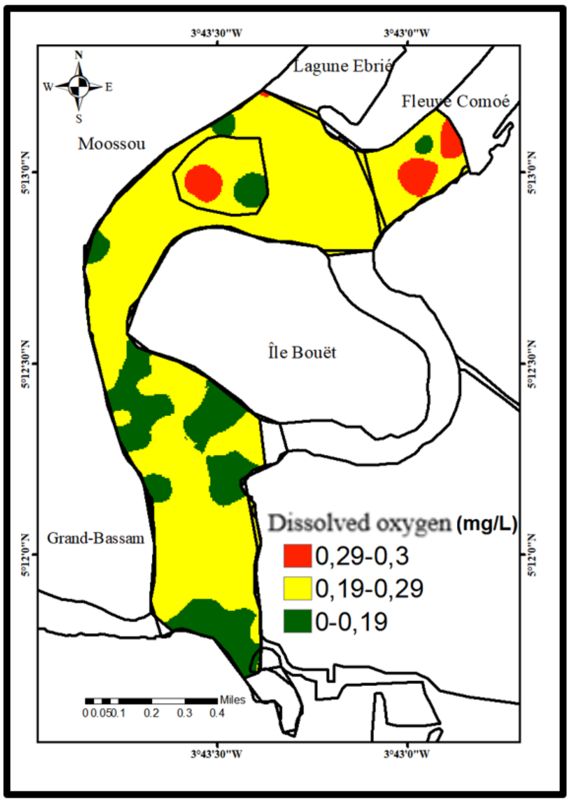

Figure 15. *Spatial Distribution of Dissolved Oxygen in the Comoé Estuary.*

3.3. Pearson Correlation Analysis

The correlation matrix (Table 3) reveals a very strong positive correlation between conductivity and salinity (r = 0.998), confirming their common origin in marine mineralization processes. Significant positive correlations were also observed between pH and conductivity (r = 0.959), as well as between pH and salinity (r = 0.956). Temperature showed strong negative correlations with conductivity (r = -0.930) and salinity (r

= -0.929). Dissolved oxygen exhibited no significant correlation with any of the other parameters (|r| < 0.28).

Table 3. *Pearson Correlation Matrix of Physicochemical Parameters in the Waters of the Comoé Estuary.*

Parameters	pH	Conductivity	Temperature	Salinity	O2
pH	1	-	-	-	-
Conductivity (μS/cm)	0.959	1	-	-	-
Temperature (℃)	-0.937	-0.930	1	-	-
Salinity (‰)	0.956	0.998	-0.929	1	-
Dissolved O_2 (mg/L)	-0.212	-0.238	0.223	-0.243	1

Key Interpretation of the Correlation Analysis

The extremely strong relationship between conductivity and salinity confirms that seawater intrusion is the main driver of mineralization in the estuary. The strong positive correlations between pH, conductivity, and salinity indicate that alkaline conditions increase downstream under marine influence. Conversely, higher temperatures are associated with less mineralized waters located in the upstream riverine zone. The absence of significant correlations involving dissolved oxygen suggests that oxygen dynamics are controlled by additional factors such as biological respiration, photosynthesis, organic matter decomposition, and anthropogenic inputs rather than by marine-freshwater mixing processes alone.

4. Discussion

4.1. Morphobathymetric Dynamics and Hydrosedimentary Evolution

The morphobathymetric configuration of the Comoé Estuary reveals an active and evolving hydrosedimentary system. Maximum depths reaching 17 m exceed by approximately 3 m those reported by [10], who recorded a maximum depth of 14 m in the same estuary. This increase suggests a significant intensification of erosional processes during the last two decades. The observed deepening is likely related to both continuous dredging activities and the permanent opening of the estuary mouth in September 2023, which enhanced ocean-estuary exchanges and modified current patterns within the system.

The coexistence of V-shaped and intermediate profiles reflects contrasting hydrosedimentary dynamics. V-shaped profiles, observed within the main channels, indicate dominant erosional processes associated with concentrated water flows and dredging activities [7]. Intermediate profiles, identified along the peripheral zones of the estuary, correspond to sectors in unstable equilibrium where reduced hydrodynamic energy favors the onset of sediment accumulation without allowing long-term stabilization [8] The predominance of sub-horizontal slopes over most of the estuarine bed, contrasted with the steep slopes along the main channel, further reflects this spatial alternation between active erosion zones and depositional environments.

4.2. Environmental Variability and Ecological Implications

The pH values measured in the Comoé Estuary (7.13-8.38; mean: 8.17) are comparable to those reported by El Morhit et al. [9] in the Loukkos Estuary (Morocco), where an increasing pH gradient from upstream areas toward the estuary mouth reflected the growing influence of alkaline marine waters. This spatial pattern, also observed in the Comoé Estuary, constitutes a reliable indicator of longitudinal environmental variability within the system. The lower pH values recorded in the riverine zone can be explained by organic matter decomposition and biological respiration processes, which generate CO_2 and contribute to the acidification of freshwater environments.

Electrical conductivity (17.43-55.20 μS/cm) and salinity (0.968-3.59‰) display a pronounced spatial gradient, with the highest values occurring in the southern sector under strong marine influence. This longitudinal organization is consistent with the findings of [10] for the Sassandra Estuary, confirming that such gradients are characteristic features of estuarine systems along the Ivorian coastline. From an ecological perspective, this salinity gradient controls the distribution of aquatic organisms by favoring euryhaline species while simultaneously imposing environmental constraints on strictly freshwater and exclusively marine species.

Water temperature showed limited spatial variability, ranging from 28.2 to 30.2 ℃. These values are close to those reported by [11], suggesting that the thermal regime of the Comoé Estuary has remained relatively stable over time. According to these authors, temperature variations are mainly controlled by water depth and solar radiation, which explains the warmer conditions observed in the shallow riverine sector.

The severe hypoxia revealed by dissolved oxygen concentrations between 0.10 and 0.30 mg L^{-1} constitutes the most alarming environmental result of this study. These values are lower than those reported by [3],) who measured average concentrations around 0.5 mg L^{-1} during flood periods. The decline in oxygen availability suggests a progressive deterioration of environmental conditions. According to [12, 13], dissolved oxygen concentrations below 2 mg L^{-1} can induce severe physiological stress and increased mortality among aquatic organisms. Consequently, the hypoxic conditions observed throughout the Comoé Estuary may threaten biodiversity, fisheries productivity, and ecosystem functioning.

4.3. Statistical Relationships

The very strong positive correlation between conductivity and salinity (r = 0.998) confirms that these two parameters are controlled by the same process, namely the mineralization of estuarine waters through marine intrusion. This finding is consistent with the results reported by N'Guessan et al. [1-10] for the Sassandra Estuary, where similar relationships were observed. Strong negative correlations between temperature and mineralization-related parameters ($r \approx -0.93$) indicate inverse interactions that are characteristic of tropical estuaries along the Ivorian coast: the most mineralized waters, located downstream under marine influence, are also the coolest because of the thermal buffering effect exerted by oceanic water masses.

The absence of significant correlations between dissolved oxygen and the other parameters suggests that oxygen dynamics are governed by additional factors [13]. emphasized that dissolved oxygen is strongly influenced by biological respiration, organic matter decomposition, photosynthesis, and anthropogenic inputs. Therefore, the severe hypoxia identified in the Comoé Estuary cannot be attributed solely to hydrological processes and likely reflects increasing environmental degradation of the ecosystem.

5. Conclusion

His study provides an updated and integrated assessment of the morphobathymetric and physicochemical status of the Comoé Estuary at Grand-Bassam in the post-opening context of the estuary mouth (September 2023), a situation that had not previously been documented.

From a morphobathymetric perspective, maximum depths now reach 17 m, representing an increase of 3 m compared with measurements reported in 2008. This evolution reflects the intensification of erosional processes resulting from both dredging activities and the permanent opening of the estuary mouth. The coexistence of V-shaped and intermediate profiles highlights an active and spatially heterogeneous hydrosedimentary regime throughout the system.

From a physicochemical standpoint, the marked spatial gradients observed in pH, conductivity, salinity, and temperature reflect the interactions between riverine and marine waters and play a key role in structuring the longitudinal environmental variability of the estuary. Severe hypoxia (dissolved oxygen: 0.10-0.30 mg/L), which has worsened since 2009, represents the most critical ecological threat to the biodiversity and biological productivity of the system.

Overall, the results demonstrate that the permanent opening of the estuary mouth has profoundly modified hydrosedimentary functioning and environmental conditions within the Comoé Estuary. Continuous environmental monitoring and sustainable management measures are therefore essential to limit ecological degradation and preserve the ecosystem services provided by this strategic coastal environment.

Abbreviations

GPS	Global Positioning System
IDW	Inverse Distance Weighted
DTM	Digital Terrain Model

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Author Contributions

Chiayé Larissa Koffi Epse Coulibaly: Conceptualization, Formal Analysis, Funding acquisition, Project administration, Supervision, Writing – original draft

Yves Cédric Bagoro: Formal Analysis, Funding acquisition, Project administration, Supervision

N'diaye Edwige Hermann Meledje: Formal Analysis, Project administration, Supervision

Sylvain Monde: Supervision, Validation

Data Availability Statement

The data supporting the outcome of this research work has been reported in this manuscript.

Conflicts of Interest

The authors declare that they have no conflicts of interest.

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Biography

Chiayé Larissa Koffi Epse Coulibaly is a Assistant Professor in the Department of Geological and Mining Sciences at the University of Man in Côte d'Ivoire. She earned her Ph.D. in Marine Geoscience and Sedimentology from Félix Houphouët Boigny University in Abidjan in 2017, as well as a master's degree from the same institution in the same field in 2014. She is the head of the Department of Mining and Reservoirs at the University of Man. She has supervised more than seven master's students, served as an examiner for several master's theses, and participated in numerous national and international conferences.

Yves Cédric Bagoro holds a Master's degree in Mining, Geology and Environment from the University of Man, Côte d'Ivoire (Faculty of Geological and Mining Sciences), where he also earned a Bachelor's degree in Geological and Mining Sciences in 2026. His research focuses on the morphobathymetric and physicochemical characterization of the Comoé River estuary at Grand-Bassam, with particular emphasis on hydrosedimentary dynamics and the environmental variability of estuarine environments. His research interests include coastal and estuarine geomorphology, hydrogeology, Geographic Information Systems (GIS), and environmental water quality assessment. He is proficient in Surfer, QGIS, and ArcMap for bathymetric mapping, digital terrain modeling, and spatial analysis. His research contributes to a better understanding of the evolution of coastal ecosystems in West Africa.

N'diaye Edwige Hermann Meledje is a Research Fellow at the Centre for Ecological Research, Nangui Abrogoua University. He completed his PhD in Environmental Sciences and Management, specializing in Hydrosedimentology and GIS, in 2016. His research focuses on the dynamics of sediment flux in the Ayamé dam, as well as drought modeling using Markov chains. He has also applied the Wischmeier equation through GIS to quantify water erosion in the Bia watershed and contributed to the morphobathymetric and physicochemical characterization of the Comoé River estuary at Grand-Bassam and other estuarine systems in West Africa. He has participated in several international conferences organized by the International Association of Sciences and serves as a reviewer for the prestigious publishing house Springer Nature.

Sylvain Monde is a Full Professor of Geosciences at Félix Houphouët-Boigny University (UFHB), Côte d'Ivoire, where he currently serves as Head of the Department of Geosciences. He holds two Ph. D. degrees: one from UFHB and another from La Rochelle University (France), complemented by postdoctoral research in oceanography at Québec University (Canada). Professor MONDE's research spans marine geology, sedimentology, coastal dynamics, and hydrosedimentary modeling. He has authored over 130 scientific publications and supervised numerous doctoral and master's theses. His work has contributed to national and international projects, including oceanographic missions and environmental assessments. He is actively involved in scientific networks such as the International Association of Sedimentologists and the Order of Geologists of Quebec. Beyond academia, he serves as a municipal councilor in Azaguié and Vice-President of the Commission for Social and Cultural Affairs. His career reflects a strong commitment to scientific excellence and sustainable development in Africa.

Research Field

Chiayé Larissa Koffi Epse Coulibaly: Marine Geosciences, Environmental Geosciences, Paleontology and Stratigraphy, Petroleum Exploration and Production, Coastal Dynamics, Geological and Geochemical Mapping, Sedimentology of Sedimentary Formations

Yves Cédric Bagoro: Estuarine Geomorphology and Dynamics, Bathymetry and Seafloor Mapping, Tropical Coastal Hydrosedimentology, Physicochemical Characterization of Estuarine Waters, Applied Geographic Information Systems (GIS), Fluvio-Marine Sedimentology, Environmental Quality of Aquatic Ecosystems

N'diaye Edwige Hermann Meledje: Environmental Geosciences, Physicochemical Characterization of Estuarine Waters, Hydrodynamics of Tropical Estuaries, Coastal Geomorphology, Water Resources Management, Environmental Quality of Aquatic Ecosystems

Sylvain Monde: marine geology, sedimentology, coastal dynamics, and hydrosedimentary modeling