

We would like to thank the reviewers and editor for their constructive and insightful comments. Their feedback has been extremely helpful in improving the quality and clarity of our manuscript and dataset. Below, we summarize the main changes made in response to the reviews.

****1. Materials and Methods – Data acquisition and quality control:****

We have substantially revised the *Materials and Methods* section to include detailed protocols for all measured parameters.

- ****Chlorophyll a**** concentrations were determined following filtration of three 100 mL aliquots through Whatman GF/F glass fiber filters (nominal pore size 0.7 μm). Filters were stored frozen at $-20\text{ }^{\circ}\text{C}$ and extracted in 90% acetone for 12–24 h in the dark at $4\text{ }^{\circ}\text{C}$. Measurements were performed using a Turner Designs fluorometer, following the method described by Strickland & Parsons (1972). Results are expressed in $\mu\text{g L}^{-1}$.

- ****Dissolved nutrients**** (NH_4^+ , NO_2^- , NO_3^- , PO_4^{3-} , and Si(OH)_4) were measured via spectrophotometry. At the time of collection, samples were pre-filtered through a 50 μm mesh filter mounted directly on the Niskin bottle to remove large particles. After collection, samples were centrifuged at 4200 rpm for 10 minutes to remove residual suspended matter, ensuring that only the dissolved fraction was analyzed. Samples were kept at $4\text{ }^{\circ}\text{C}$ in the dark and analyzed within 4 hours of collection to prevent degradation.

- ****In situ temperature and salinity**** were recorded using a YSI 6600 multi-parameter sonde, calibrated before each field campaign according to the manufacturer's instructions. Salinity calibration used certified NaCl standards (35 PSU). The accuracy of the salinity sensor was ± 0.1 PSU and $\pm 0.15\text{ }^{\circ}\text{C}$ for temperature. Barometric pressure compensation was systematically verified.

- ****pH**** was measured in the laboratory using a Mettler Toledo F2 pH meter with a LE420 glass electrode. The instrument was calibrated daily using standard buffer solutions (pH 4.00, 7.00, and 10.00 at $20\text{ }^{\circ}\text{C}$). Measurements were conducted at a controlled temperature of $20\text{ }^{\circ}\text{C}$, on the NBS scale, without CO_2 equilibration. Water samples were stored in the dark at $4\text{ }^{\circ}\text{C}$ and analyzed within 4 hours.

- For all parameters, details on accuracy, precision, and detection limits have been added in the revised manuscript. Where possible, certified reference materials were used.

****2. Dataset format and metadata:****

We have revised the dataset hosted on Zenodo to improve usability and transparency:

- Column headers now include full variable names and units.
- A separate sheet provides a detailed variable dictionary, including methods and units.

****3. Justification of station and variable selection:****

We clarified in Section 2.1 that the three stations were selected. These stations were chosen primarily because they offer the most complete and continuous datasets since the beginning of the monitoring program in 2000, ensuring the robustness and reliability of long-term analyses. In addition to their data quality, these sites represent contrasting environmental conditions that allow for the exploration of a representative gradient along the Normandy coastline.

****4. Statistical analysis – PCA and time-series methods:****

Following RC2's suggestion, we developed Section 2.3 to better explain the statistical approach. We performed Principal Component Analyses (PCA) on seasonally detrended data.

****5. Figures and terminology:****

All figures have been redesigned to improve clarity:

- Font sizes and axis labels were enlarged.
- Redundant legends and subplot titles were removed.
- The confusion between “Tocquaise” and “Saint-Vaast-la-Hougue” was resolved. Only one name is now used consistently throughout the manuscript and figures.

****6. Discussion – Clarifications and removals:****

We revised the discussion to better reflect the dataset's scope:

- The speculative section on phytoplankton community shifts (including the reference to Mangala) has been removed.
- We expanded the discussion on the observed decrease in dissolved nutrient concentrations. We now consider plausible explanations including reduced river discharge, climate change, shifts in

precipitation, and decreasing agricultural inputs (mainly for N and P). The case of silicates, less directly influenced by human activity, is discussed with reference to hydrological changes.

We hope these substantial revisions meet the expectations of the reviewers and the editor, and we remain available for any additional improvements needed.

Sincerely,

Sosinski Julia

On behalf of all co-authors