

Ecological interruption on food web dynamics by eutrophic water discharge from the world's longest dike at Saemangeum, Yellow Sea



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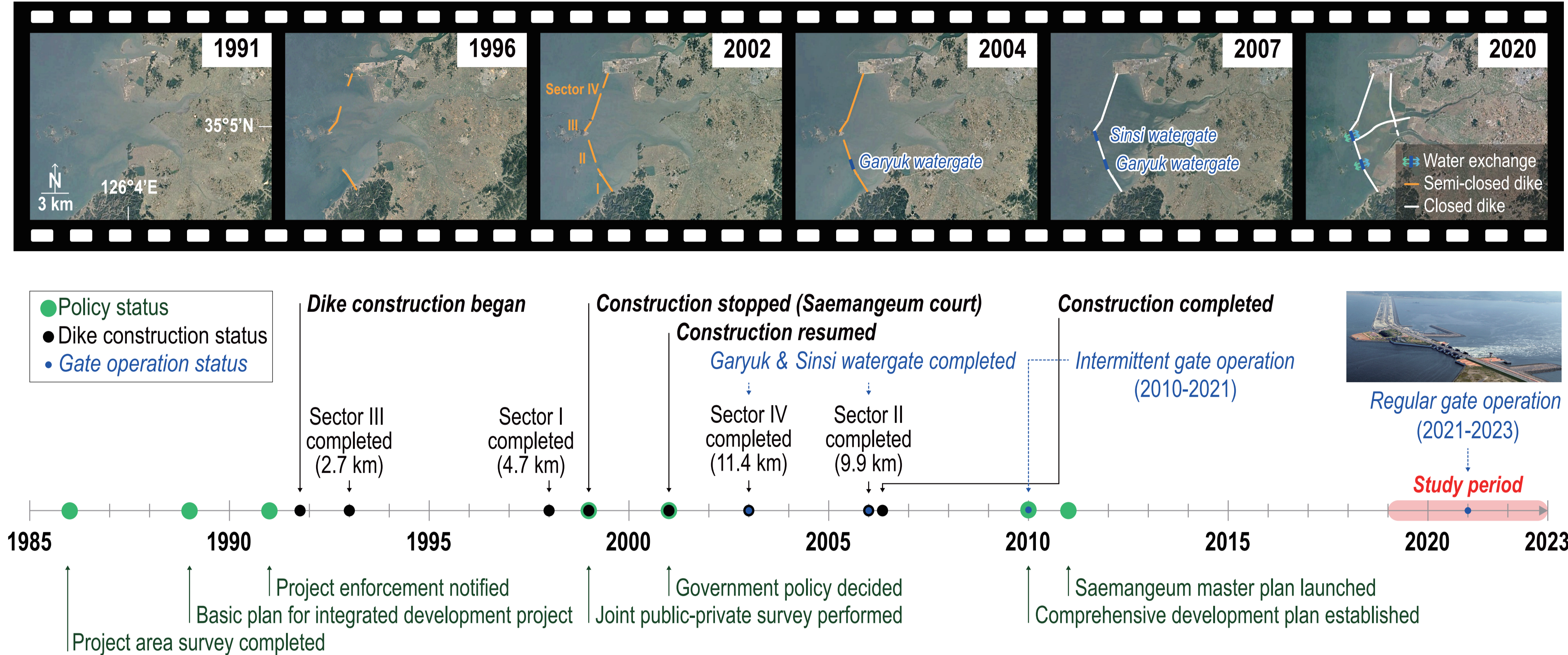


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Backgrounds and objective

To improve water quality in Saemangeum Lake, water gates have been used to discharge water into the outer tidal flats. In this study, we examined the benthic trophic dynamics under the influence of eutrophic water input.

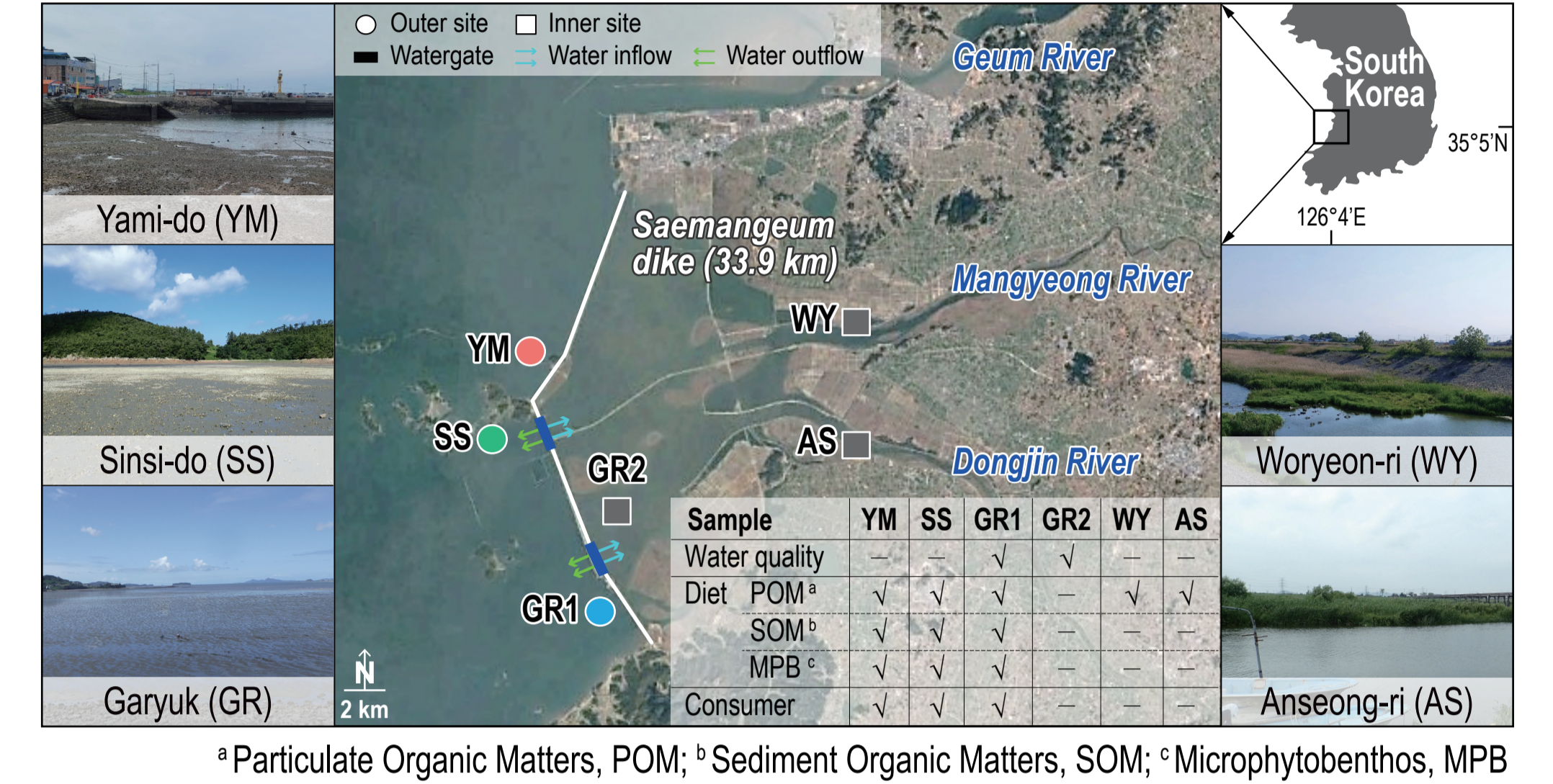
A) History of the world's longest Saemangeum dike in South Korea



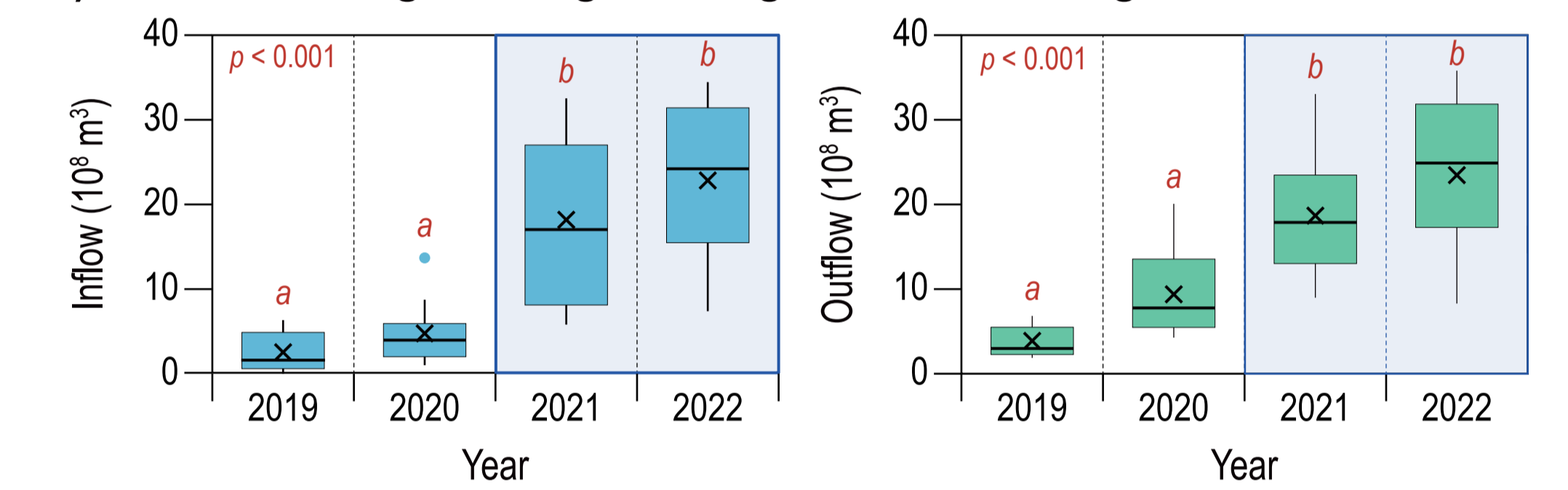
Study area and water discharge from water gates

Seasonal sampling was conducted for four years. Water exchange has increased since 2021.

A) Study area and sampling information

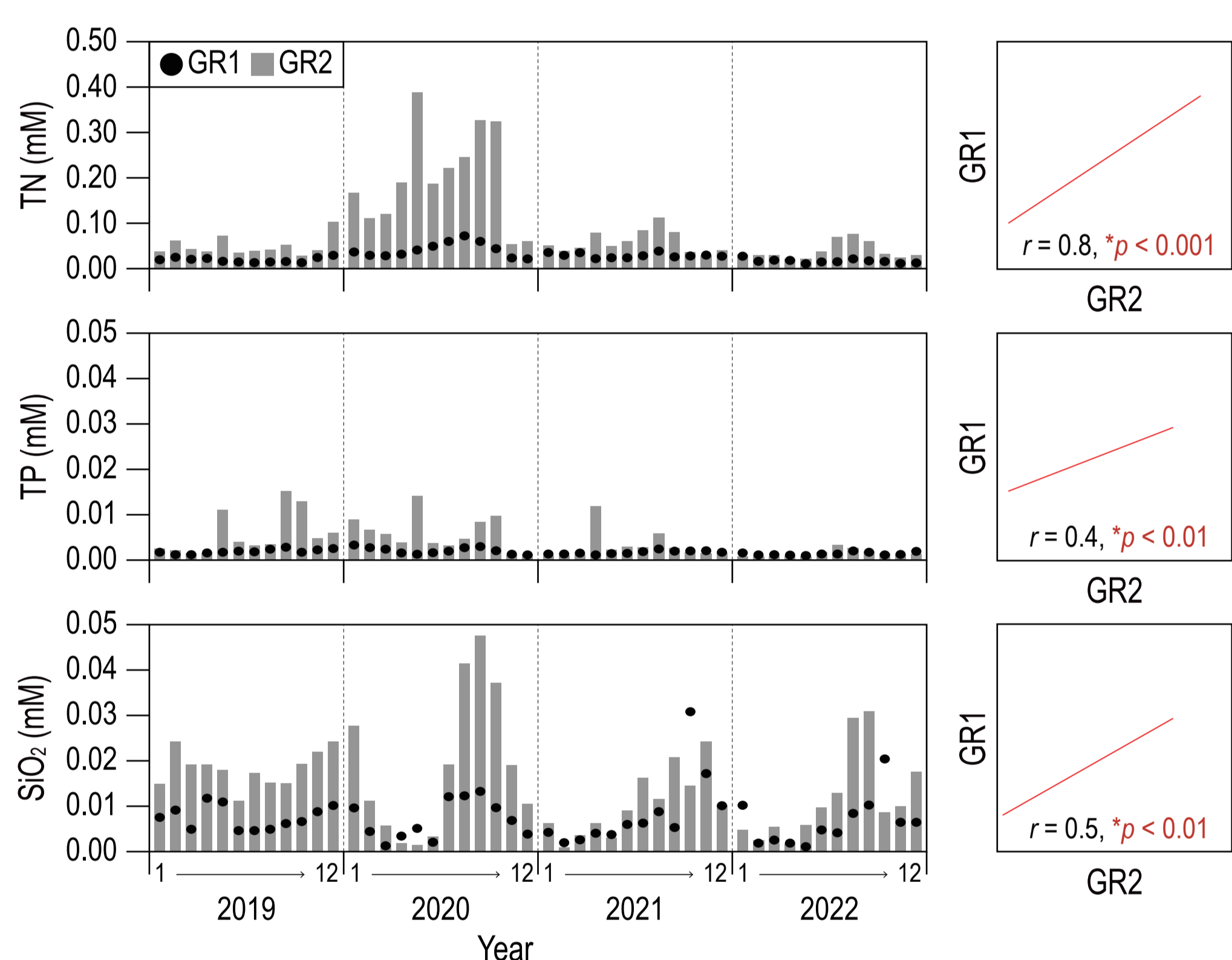


B) Water exchange through watergates of Saemangeum dike



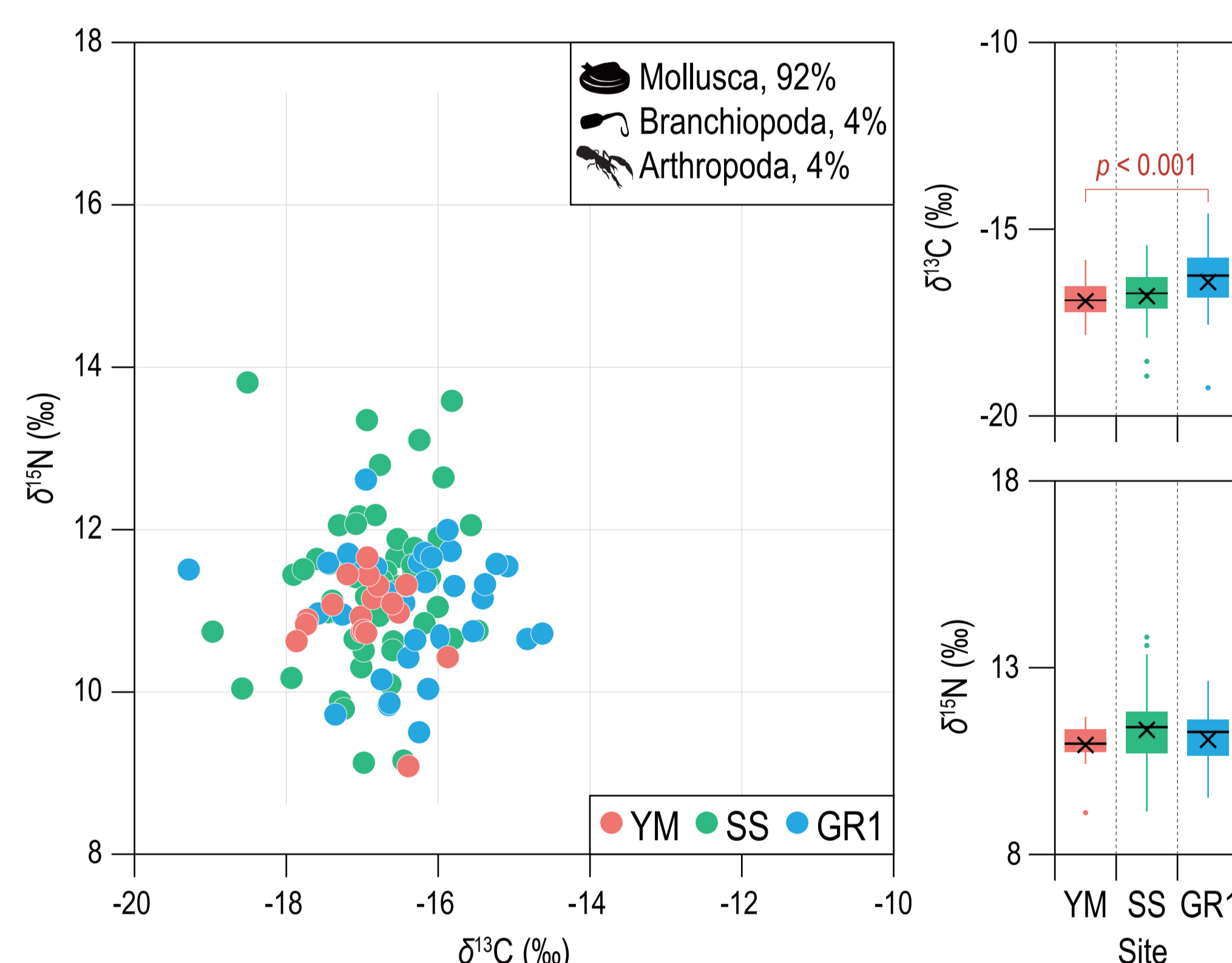
Environmental conditions in the water column

All nutrient concentrations showed a positive correlation between GR1 (outer) and GR2 (inner).



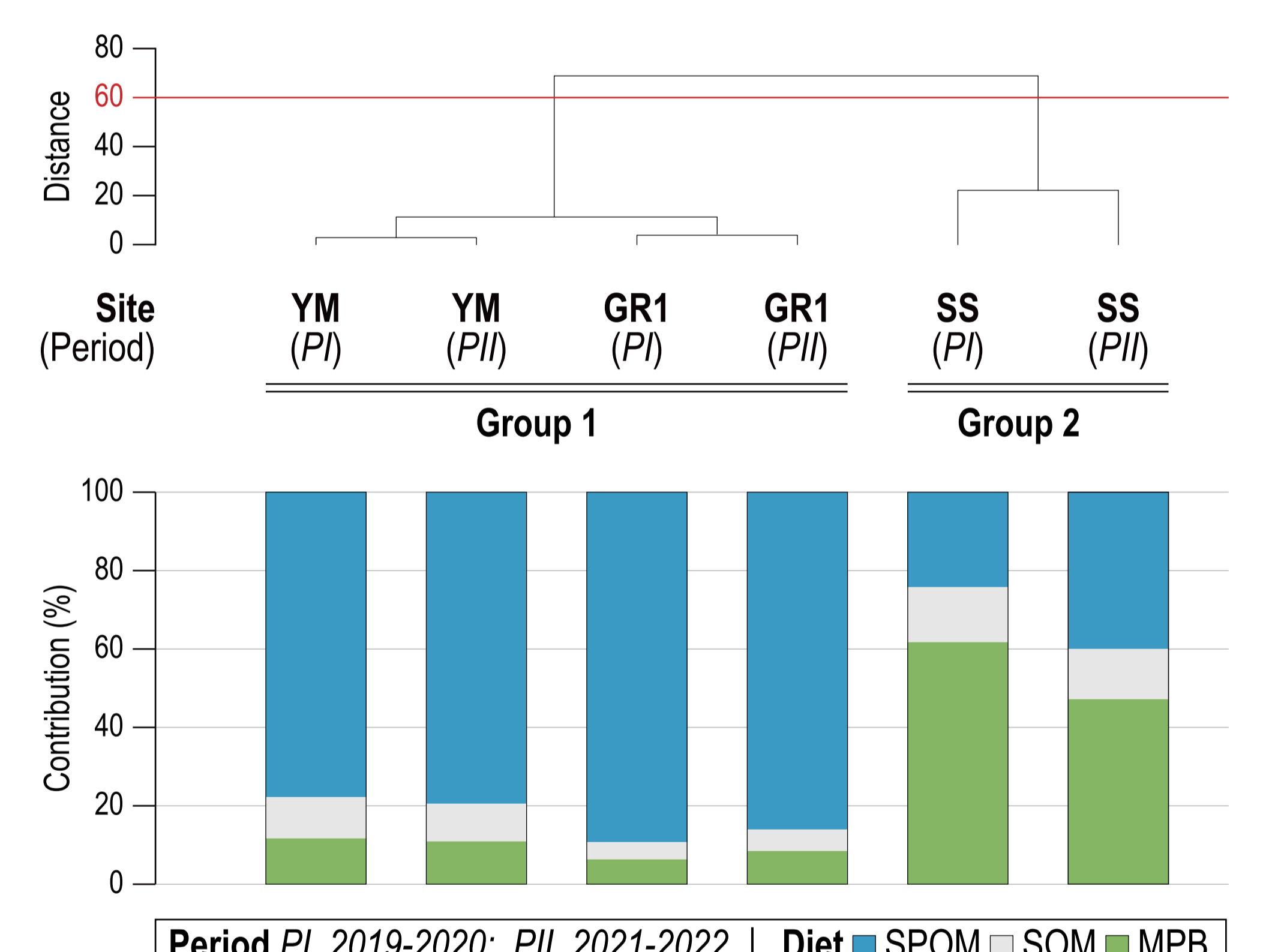
Stable isotope values of filter feeders

The spatial $\delta^{13}\text{C}$ difference of the filter feeders indicated their different diet consumption among sites.



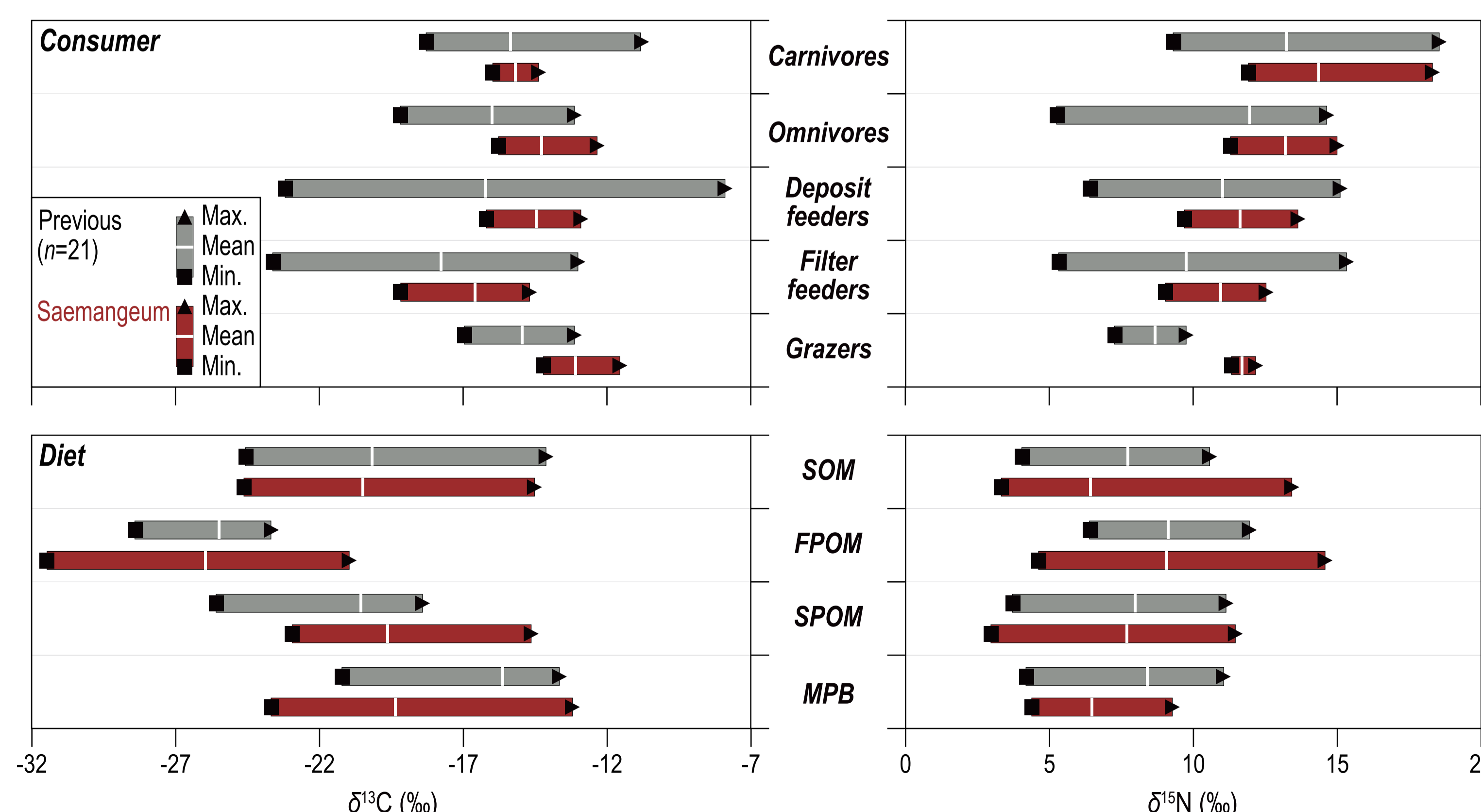
Diet utilization of filter feeders

Filter feeders mainly consumed SPOM in SMG tidal flats, but they consumed more MPB near the SS watergate.



Review: distribution of C and N stable isotopes in Korean tidal flats

Particulate organic matter (FPOM and SPOM) had large C and N stable isotope ranges in SMG, revealing the diverse organic matter inputs in the SMG tidal flat compared to other tidal flats in South Korea.



Summary

- The discharged water affected the nutrient concentrations and MPB biomass in the Saemangeum tidal flat
- Filter feeders showed a sensitive response to the spatial distribution of organic matter in the tidal flat
- SPOM and MPB were the main diet of benthos at the Saemangeum tidal flat
- The SMG food web showed a large $\delta^{13}\text{C}$ range influenced by diverse organic matter inputs compared to other regions

Acknowledgments

This work was supported by the project entitled "Integrated Management of Marine Environment and Ecosystems Around Saemangeum [grant number 20140257]" and "Development of living shoreline technology based on blue carbon science toward climate change adaptation [grant number 20220526]" funded by the Ministry of Oceans and Fisheries of Korea (MOF) granted to J.S.K. This work was also supported by the project entitled "Ecosystem functional changes to halophyte and mangrove planting in the coastal wetland: Evaluation of blue carbon storage and food web structure using mesocosm system [RS-2023-00213511]" funded by the National Research Foundation of Korea (NRF) granted to J.N.