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Quantifying the role of biogeochemical interaction between macro- and micronutrients on carbon cycling in mangroves soil

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Mangroves provide important ecosystem services as coastal protection, carbon (C) storage and nutrient retention. Despite their importance, mangroves are threatened around the world by land reclamation, sea-level rise, eutrophication, and pollution. To provide adequate conservation measures it is imperative to fill some critical knowledge gaps in their functioning. Productivity of mangroves is arguably the highest of all marine ecosystem and is closely intertwined with soil physiochemistry, microbial ecology, and biogeochemical cycles. Up to 95% of the minerals required to produce structural and reproductive tissues are supplied to mangrove from the soil and nutrients are obtained from interstitial water. Biogeochemical and microbial processes affecting soil are thus crucial in regulating the ecosystem dynamic and ecological energetic of the forest.

Most biogeochemical research focus on the role of nitrogen (N) and phosphorus (P) in regulating biosphere activity, productivity, and C storage. However, little is known about the interactions of these major cycles with other macro- and micronutrient nutrients such as sulfur (S) and iron (Fe). The rapid cycling between different redox states of these macro-and micronutrients influences C, N and P cycling in mangroves by modulating crucial processes that includes organic matter decomposition, nitrification, denitrification, and anaerobic ammonium oxidation.

We will present geochemical data of S, Fe, N and C as well as microbial community composition to elucidate key processes regulating carbon storage in mangroves subjected to high salinity, nutrients and metals gradients in Hong Kong coastal waters.