**Community comment**

**General Comments**

| Comments | Responses |
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| *This well-written manuscript investigates soil organic carbon stocks, burial rate, source composition, and turnover rate along an urbanization gradient in natural (low urbanization) and restored mangroves (moderate urbanization), as well as adjacent tidal flats (high urbanization) in Zhanjiang, Huizhou, and Shantou, Guangdong Province, Southern China. The study found that urbanization reduces carbon stocks and burial rates and shifts carbon sources from mangrove detritus toward planktonic and algal inputs. Linking urban growth to blue carbon performance is interesting and useful for defining actionable thresholds to sustain coastal carbon.* | We sincerely thank the community reviewer for the positive evaluation of our manuscript. We appreciate your encouraging comments and support. |

**Specific Comments**

| Comments | Responses |
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| *My main concern is that the investigation in areas with low, moderate, and high levels of urbanization was conducted in three different cities in China. Whether or to what extent do the substantial differences in environmental factors among these cities affect the conclusions?* | Thank you for raising this important concern. We agree that the three cities differ not only in urbanization intensity but also in environmental and geomorphic setting. Because each urbanization level was represented by a single city, city identity and urbanization level are confounded in the present study design. Consequently, the available data do not allow us to quantify precisely how much of the observed variation in soil organic carbon stocks, source contributions, burial, and turnover is attributable to urbanization rather than to differences in hydrodynamics, tidal regime, sediment supply, salinity, sediment texture, or natural accretion processes among cities.<br><br>All study regions are located along the subtropical coast of Guangdong Province and therefore share a broadly comparable climatic setting. This regional consistency reduces large-scale climatic variation, but it does not eliminate local environmental and geomorphic differences. We have revised |

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| | the Discussion to make this distinction explicit.<br><br>We therefore interpret the observed patterns as associations between soil-carbon properties and contrasting urbanization contexts, rather than as causal effects of urbanization isolated from city-specific environmental conditions. The broadly concordant changes observed across several carbon indicators and habitat categories increase confidence that urbanization may contribute to the reported patterns, but they do not independently separate urbanization from regional environmental heterogeneity. We have tempered the causal language throughout the manuscript accordingly.<br><br>We have also added this limitation to the Discussion and Conclusions. A more rigorous test would require several independent cities within each urbanization category, comparable habitat types within each city, and direct measurements of tidal dynamics, sediment supply, geomorphic setting, and other environmental covariates. Such a replicated design would allow urbanization effects to be separated from regional variation using hierarchical models or variance-partitioning approaches. |
| *As shown in the manuscript, annual sunshine duration increases from less than 1,500 hours in Shantou (north) to over 2,100 hours in Zhanjiang (south), indicating that environmental conditions, climate, and biological processes differ greatly. The impacts of these differences on carbon sources cannot be ignored. The manuscript should address and discuss the extent to which these differences affect carbon sources.* | Thank you for raising this important point. We agree that the substantial difference in annual sunshine duration among the three regions represents more than background geographic variation and may influence both the production and the isotopic characteristics of potential carbon sources.<br><br>Differences in solar radiation and associated climatic conditions may affect soil organic carbon source contributions through several pathways. Greater light availability can alter mangrove productivity, litter production, and belowground carbon inputs, while also influencing phytoplankton productivity and the supply of aquatic organic matter to coastal sediments. Regional climatic differences may additionally affect organic matter decomposition and preservation. Moreover, light availability, temperature, |

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| | salinity, growth conditions, and community composition can influence the $\delta^{13}C$ and $\delta^{15}N$ signatures of both vascular plants and phytoplankton. These differences may therefore affect not only the actual supply of carbon sources but also their estimated contributions in the isotope mixing model.<br><br>Because each urbanization level is represented by a different city, the present study cannot quantitatively separate the influence of sunshine duration and other regional environmental conditions from that of urbanization. We have therefore revised the Discussion to clarify that the observed changes in organic carbon source contributions are associated with contrasting urbanization and regional environmental contexts, rather than being attributable exclusively to urbanization. We have also tempered causal statements throughout the manuscript accordingly.<br><br>The concordant shift from C3 vascular plant-derived carbon toward phytoplankton-derived carbon across several habitat categories suggests that urbanization-related changes may contribute to the observed pattern. However, regional differences in solar radiation, hydrodynamics, sediment supply, salinity, and primary productivity may also have influenced the magnitude of this shift. We now identify this geographic confounding explicitly as a limitation of the study.<br><br>A rigorous quantification of these relative effects would require multiple independent cities within each urbanization category, together with direct measurements of solar radiation, primary productivity, hydrodynamics, and sediment transport. Future studies should also use locally resolved source end-members to determine whether geographic variation in isotope signatures affects source-apportionment estimates. |