

Assessing Terrestrial Organic Matter Contributions in the Nakdong River Basin Using Locally Derived Endmembers

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Estuaries play a crucial role in transporting terrestrial organic matter (OM) to coastal ecosystems, influencing regional carbon cycling. The contribution of terrestrial OM to riverine particulate organic matter (POM) is often estimated using globally or other regionally generalized Endmember values. However, such approaches may not accurately reflect the characteristics of OM sources in different environments. This study focuses on the Nakdong River Basin, applying a region-specific Endmember approach based on C/N ratios and $\delta^{13}\text{C}$ values to assess terrestrial OM contributions. Unlike previous studies that relied on globally or other regionally established Endmember values, this research derives Endmember values specific to Korean land use types, including forests, agricultural lands, and wetlands. The Endmember values were derived using a combination of land use data, including vegetation cover and soil composition, and measured geochemical signatures from various organic matter sources, allowing for a more accurate representation of local conditions and environmental influences. The findings suggest that the use of locally derived Endmember values enhances the accuracy of OM source apportionment in riverine environments, providing more reliable information on terrestrial contributions. By incorporating Korea-specific Endmember values rather than relying on broadly generalized datasets, this study presents a refined approach to evaluating terrestrial OM contributions. The results contribute to a better understanding of carbon cycling in estuary systems and emphasize the need for regionally specific geochemical tracers in studying OM transport, particularly in riverine environments influenced by diverse land use patterns.