



Impacts of agricultural expansion on sedimentary organic matter composition in Lake Soyang (South Korea)

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The agricultural area has been expanded since the 19th century and agricultural activities such as eroded soils, nutrient, and organic matters may impact aquatic environments. The Lake Soyang is the deepest and largest artificial dam reservoir constructed in South Korea in 1973. Lake Soyang has been experienced an expansion of agricultural area since the 1990s. In this study, we investigated the impact of agricultural expansion on sedimentary organic matter in Lake Soyang. We collected soils (n=7), lake surface sediments (n=9) and a 50-cm sediment core at near the dam for the analysis of total organic carbon (TOC) and total nitrogen (TN) contents, stable isotopic composition of TOC and TN ($\delta^{13}C_{TOC}$ and $\delta^{15}N$), and glycerol dialkyl glycerol tetraethers (GDGTs). The age model of the sediment core is based on ^{210}Pb analysis. In lake surface sediments, bulk and GDGT-derived geochemical data indicate that C_3 -derived soil OM was the major source in the upper part of the lake while an aquatic contribution increased in the lower part of the lake. The sediment core showed a distinctive shift in all parameters considered at 15 cm core depth. However, it was difficult to constrain the exact age of this depth due to the dating uncertainties. Nonetheless, our study implies the potential influence of agricultural expansion on changes in sedimentary OM composition in Lake Soyang.