

Applications of Radiocarbon Analysis in Environmental Science in Korea

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Radiocarbon analysis is a powerful tool not only for estimating carbon turnover in ecosystems but also for tracing pollution sources derived from fossil carbon in a wide range of environmental settings, including the atmosphere, soils, rivers, wastewater treatment plants, and coastal sediments. We summarize the radiocarbon research that has been conducted in South Korea and discuss future research directions. To address the spatial heterogeneity, which is often a limiting factor in environmental science, future studies should move beyond investigations conducted at only a few locations and instead establish a systematic network encompassing the atmosphere, soils, rivers, lakes, and coastal sediments. Relatively high radiocarbon levels have been sporadically reported in precipitation, streams, and rivers in South Korea. Considering that radiocarbon analysis is widely used to estimate carbon residence times and identify carbon pools that may be vulnerable to climate change, understanding the sources of these elevated radiocarbon signals is an important research priority. Such anomalously high values could introduce uncertainties into estimates of ecosystem carbon turnover and storage. The development of a nationwide radiocarbon monitoring framework would provide valuable insights into carbon exchange among major carbon reservoirs and improve our understanding of carbon cycle dynamics.

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