

Compound specific radiocarbon and $\delta^{13}\text{C}$ measurements of fatty acids in aerosol samples and their paleoceanographic significance

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Compound-specific radiocarbon analysis of individual fatty acids was conducted for semi-urban aerosol samples using preparative capillary gas chromatography (PCGC) system and accelerator mass spectrometry (AMS).

The aerosol fatty acids (C16 to C34) showed a typical bimodal distribution with two maxima at C16 and C26. Their carbon isotopic compositions ranged from -30.3 per mil (C26) to -23.3 per mil (C18), suggesting that they are derived from terrestrial higher plants and marine sources.

Radiocarbon measurements of C16-C22 fatty acids showed modern ^{14}C ages, suggesting that the acids are emitted from living higher plants and possibly from marine organisms. On the other hand, C24-C26 fatty acids that are characteristic to terrestrial plant waxes showed ^{14}C ages of 5860 years. This suggests that some portion of higher molecular weight fatty acids have been stored in geochemical reservoirs such as soils at least for hundreds to thousands of years and then emitted to the atmosphere. These aged fatty acids could be in part transported long distances from the Asian continent through the atmosphere.

In future, the intensity of variations in paleoclimatic and paleoceanographical events, such as terrestrial inputs and glacial-interglacial cycles would be estimated quantitatively using CSRA with data of CSIA and molecular distributions.