believed the principal impediment for absolute soil dating. Recent studies, eg, Becker-Heidmann (1989) indicate that a soil ^{14}C age of > 1000 years cannot have more than 0.1% carbon rejuvenation. Earlier observations were problematic, with age *versus* depth increase in ^{14}C profile curves showing an inflection of reduced age in the deepest samples, *ie*, the rim of the organic carbon-containing epipedon. Our ^{14}C dating of earthworms and study of their feeding habits could explain this phenomenon in mollic horizons. Becker-Heidmann (1989) showed, in a thin-layer soil profile dating, a highly significant correlation between the highest ^{14}C age and the highest clay content in the profiles. Thus, optimization of soil dating is, to a lesser degree, related to the used extraction solvent then to soil texture fractions. Examples will be presented. Our observations tend to mitigate error ranges inherent in dating dynamic systems such as soils, with their eluviation, illuviation and turbation processes.

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THE ORIGIN AND TURNOVER OF DISSOLVED ORGANIC CARBON IN FORESTED WATERSHEDS DETERMINED BY CARBON ISOTOPIC (^{14}C AND ^{13}C) MEASUREMENTS

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Dissolved organic carbon (DOC) is important in the acid-base chemistry of fresh waters and in determining the mobility, persistence and toxicity of metals and pollutants in natural waters. Yet, very little is known about the origins and cycling of DOC in natural watersheds. In this study, carbon isotopes (^{13}C and ^{14}C) are used to study the origins, transport and fate of DOC in a small, acid-stressed watershed near Haliburton, Ontario. Carbon isotopic measurements were made on DOC from precipitation, streams, soil A and B horizon percolates, shallow and deep groundwaters, bogs and lake water. In addition, ^{13}C and ^{14}C measurements of soil organic matter, phytoplankton and sediments were made to determine the relative importance of these potential DOC sources. These data were used to construct whole watershed mass balances for DOC. Analyses of $DO^{14}C$, only recently possible with the aid of accelerator mass spectrometry (AMS), indicate that a large fraction of the DOC turns over rapidly (50% in about 40 years). ^{14}C measurements of humic and fulvic acid fractions of the DOC indicate differences in the origin and turnover of these components.

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