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Spatial variability of δ18O-PO4 in soils.

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There is growing interest in the potential for using the δ18OPO4 values of different phosphate sources in the environment to enable identification of sources of phosphate in surface waters. The basis of the study is the belief that different sources of PO4 may have different δ18O values. One of the primary sources of PO4 in runoff from agricultural land is the soil itself. Therefore, in order to account for the PO4 derived from soils in surface waters, it is vital that the degree of spatial variability of its δ18O isotopic values are known, in order that suitable soil sampling approaches can be taken when assessing the soil as a source in future studies. A spatial study of the variability of the δ18OPO4 variability of soils collected from a grazed pasture on the North Wyke Farm Platform was carried out incorporating grid-sampling at a range of spatial scales. Results show that variability across a range of scales is minimal, meaning that, in this case, a relatively small number of samples would be required in order to identify accurately the mean δ18OPO4 value of the soil. This study represents an important contribution towards the methodological development studies required in this field of research in order that the full potential of the δ18OPO4 technique for biological and environmental research can be achieved.