Tree Coring as a Complement to Soil Gas Screening to Locate PCE and TCE Source Zones and Hot Spots

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Preliminary risk assessment for prioritisation of site investigations requires efficient screening to reveal type and level of contamination. The screening methods, tree coring and soil gas sampling were applied and compared at two forested sites contaminated with tetrachloroethylene (PCE) or trichloroethylene (TCE) to evaluate their ability to locate source zones and contaminant hot spots. One test site represented a relatively homogeneous sandy soil and aquifer, and the second a more heterogeneous geology with both sandy and less permeable clay till layers overlying a chalk aquifer. Tree cores from different tree species were sampled and analysed, and compared to soil gas measurements and existing soil gas data. Both methods were found useful as screening tools to locate hot spots of PCE and TCE in the shallow subsurface. Tree coring was found to be particularly beneficial as a complement to soil gas sampling at sites with low permeable soils, and where contamination was located in the capillary rise or shallow groundwater. The shorter time required for tree coring reduced the costs compared to soil gas sampling, but the sensitivity and precision of tree coring were lower. However, this did not affect the feasibility of using tree coring to locate the hot spots. Moreover, a combination of the two methods can help to focus any subsequent investigations like soil or groundwater sampling. The use of tree coring to complement soil gas sampling for pre-screening is expected to result in higher certainty for revealing hot spots and source zones at contaminated sites.

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