# Monitoring of heavy metal subsurface contamination using trees

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**Abstract:**
Tree core sampling provides a new rapid, inexpensive and low-invasive alternative to investigate the extent and temporal development of subsurface contaminations (Trapp et al. 2008). Considering each tree as a combination of well, pump and passive sampler, the analysis of vegetation samples can deliver information on the occurrence of subsurface pollution. This method was repeatedly and successfully applied to delineate subsurface plumes of chlorinated solvents (Larsen et al. 2008). Two persons can sample up to 100 trees per day, and the only necessary equipment is an increment borer and vessels for the samples.

At the former waste dumping site Møringa, located at the Oslofjord near Horten, Norway, tree core sampling was done in order to test the methodology for finding heavy metal subsurface pollution. Different tree species were sampled, and the results obtained by ICP analyses were compared to element concentrations (As, Cd, Cr, Cu, Ni, Pb, Zn) in soil obtained from detailed site investigations prior to the tree core sampling campaign (Amundsen et al. 2005).

If all tree species were considered together, the correlation between concentrations in tree cores and soil samples was positive, but not significant for any metal. However, samples taken from willow trees (*Salix caprea*) showed high and significant correlation for arsenic, cadmium and chromium. Furthermore, there was a significant difference in the mean contents (t-test) in wood from the polluted site compared to wood from reference sites.

Investigations will continue at the Møringa site and at Danish sites contaminated with heavy metals. The goal is to obtain a rapid but reliable method for screening and monitoring of contaminated sites for subsurface pollution.

## References

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