Some Soil Factors Affecting Decomposition and Environmental Risk

Soil Temperature

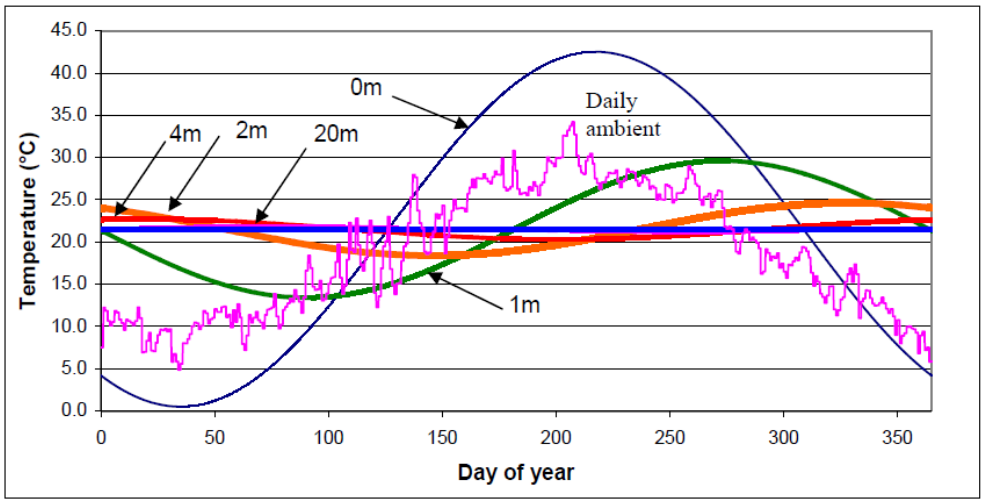


Figure 1. Temperature distribution with respect to time for various depths, calculated with the Kasuda formula for Nicosia, Cyprus.

Temperature variations at the surface are dampened at depth. (Florides, G. and Kalogirou, S., 2005. Annual ground temperature measurements at various depths. In *8th REHVA World Congress, Clima, Lausanne*). At 2 m (orange line) the variation in temperature is almost flat and does not respond much to ambient variations. At 1 m (green line), there is still a good response to ambient temperature variations.

Oxygen needed for efficient decomposition

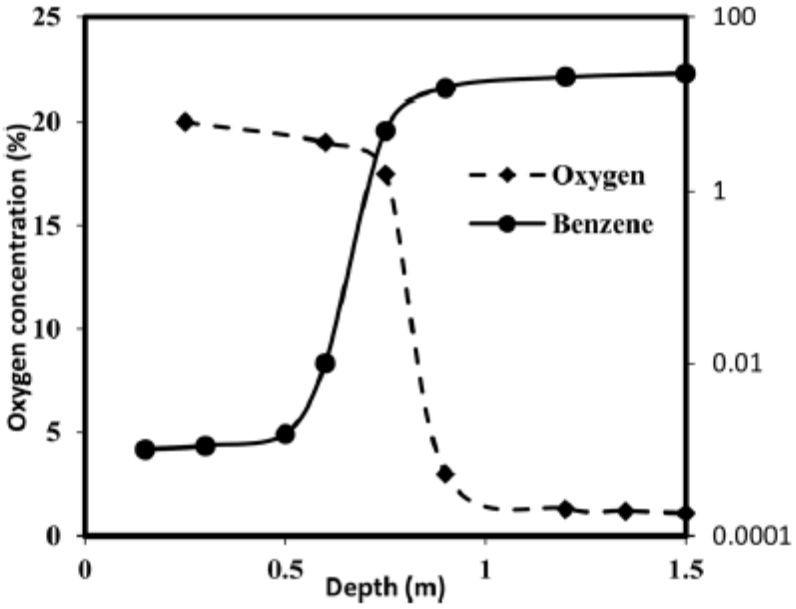
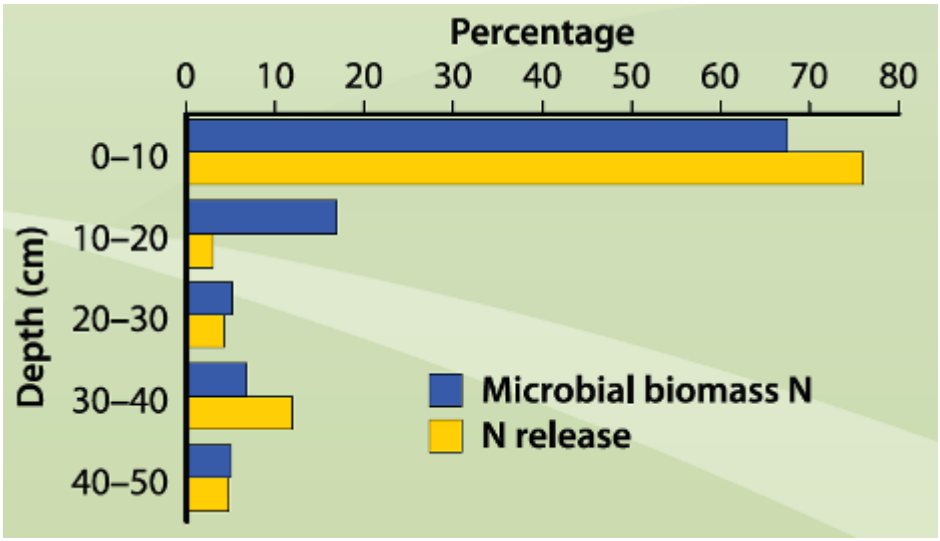


Fig. 1 Selected measured benzene and oxygen soil vapor concentration profiles with natural soil cover.[3]

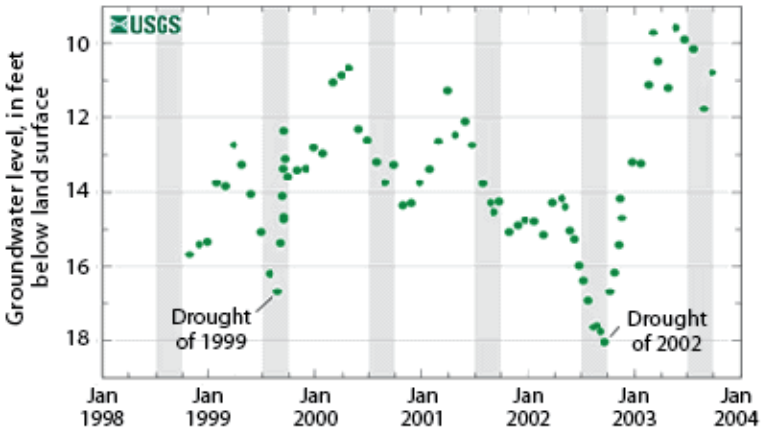
Oxygen concentrations decrease with depth. In above graph, the concentration drops precipitously between 0.6 and 1 m. Oxygen is required for fast decomposition. (Yao, Y., Shen, R., Pennel, K.G. and Suuberg, E.M., 2013. A numerical investigation of oxygen concentration dependence on biodegradation rate laws in vapor intrusion. *Environmental Science: Processes & Impacts*, *15*(12), pp.2345-2354.)

Environmental Risks: Ground Water



http://soilquality.org.au/factsheets/microbial-biomass

The most microbial activity is in the top foot of a soil. Newer, alternative septic systems make use of this fact by having their leach fields close to the surface.



A 5-year groundwater-level hydrograph for water-table-aquifer observation well M0 Eh 20 in Montgomery, Maryland, showing seasonal variations in groundwater levels and the low levels during the droughts of 1999 and 2002.

Redoximorphic features, indicators of seasonal high water table (left image; www.nesoils.org), variation of water table (right image; https://water.usgs.gov/edu/droughtandgw.html)