



## Measuring soil erosion on a decadal scale

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Soil deterioration and erosion is a major problem worldwide. Various agricultural practices, deforestation and engineering works add to erosion in various ways. However, we are often unaware of the rate of natural processes affecting soil formation and erosion, which could serve as baseline for the assessment of human impact.

Roots of trees and shrubs start to grow underground. Wherever we find them subaerially, we can be sure that erosion exposed them. By studying the age and anatomical texture of roots, it is possible to tell the year of exposition, and calculate the rate of erosion.

Analysis of growth-rings of tree roots is applied to estimate the time of the exhumation of the root. Various types of observations are to be applied to identify the exposure time of a root. (1) Since the first ring of a root can only grow under the surface, the number of the tree rings of a living root defines the maximal age of the exhumation. (2) The uncovered root can be damaged after exposure. (3) Exposed roots change geometry and texture of rings. The age of a damage of the cambium also can be measured by the counting the number of overgrown tree-rings, which defines the minimal age of exhumation.

Examples from root-exposure soil erosion studies will be displayed from Budapest, from the nuclear waste repository site in Mecsek Hills (Hungary) and from Guizhou and Gansu provinces (China). (OTKA T43666, K67.583; TET\_12\_CN-1 2012-0008; LP2012-27/2012).