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Relevance of pedotopographical indicators in the assessment of spatial distributions of soil depth and soil water resources under forest stands : General Methodology

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Poster session : abstract

Water resources constitute one of the most decisive factors of the adaptation of forest ecosystems facing climate changes. The assessment of soil water resources should lead a better understanding of forest sites vulnerability to water stress and provide appropriate management recommendations for the choice of trees species and sylvicutlural techniques. This study aims to assess the relevance of pedotopographical indicators in the assessment of spatial distributions of soil depth and soil water resources under forest stands. The study area is located in the shale-slate stones pedological context of the Belgian Ardenne ecoregion. It falls within the constrasted relief of the Houille watershed and is 90% covered by forests. The estimation of spatial and profile distributions of water resources will be based on a multi-year monitoring of real time soil moisture content using TDR technology : subsurface (15 cm) on systematic sampling and profile (≤ 70 cm) on 32 local sites equipped with TDR pvc tubes. Additional laboratory analysis will be conducted to determine soil properties influencing soil water content (texture, organic matter content...). Directly impacting soil water content, soil depth and stoniness will be investigated in contrasting topographic conditions by *(i)* two traditional and destructive methods : 32 soil pits & 160 holes with auger soil; and *(ii)* an electromagnetic and non intrusive method : 5120m of Ground Penetrating Radar traces with 200 and 500 MHz antennas. The identification of soil and terrain attributes, able to explain distribution of soil water content and soil depth, will be done by digital cartographic resources exploitation : *(i)* Digital Elevation Model with different spatial resolutions (Lidar, 1 m^2; Erruissol DEM, 100 m^2; Aster DEM, $9.10^3 m^2$) and *(ii)* Digital Soil Map of Wallonia. It is expected that the results could lead to the development of operational tools to ensure the forest site – tree species adequacy in order to increase resilience of forest ecosystems to ecological drifts.