



Comparing the accuracy of terrestrial laser scanner in measuring forest inventory variables to enhance better decision making for potential fire hazards

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Forest inventory variables are essential in accessing the potential of wildfire hazard, obtaining above ground biomass and carbon sequestration which helps developing strategies for sustainable management of forests. Effective management of forest resources relies on the accuracy of such inventory variables. This study aims to compare the accuracy in obtaining the forest inventory variables like diameter at breast height (DBH) and tree height from Terrestrial Laser Scanner (Faro Focus 3D X 330) with that from the traditional forest inventory techniques in the Mediterranean forests of Greece. The data acquisition was carried out on an area of 9,539.8 m² with six plots each of radius 6 m. Computree algorithm was applied for automatic detection of DBH from terrestrial laser scanner data. Similarly, tree height was estimated manually using CloudCompare software for the terrestrial laser scanner data. The field estimates of DBH and tree height was carried out using calipers and Nikon Forestry 550 Laser Rangefinder. The comparison of DBH measured between field estimates and Terrestrial Laser Scanner (TLS), resulted in R squared values ranging from 0.75 to 0.96 at the plot level. An average R² and RMSE value of 0.80 and 1.07 m respectively was obtained when comparing the tree height between TLS and field data. Our results confirm that terrestrial laser scanner can provide nondestructive, high-resolution, and precise determination of forest inventory for better decision making in sustainable forest management and assessing potential of forest fire hazards.