Geophysical Research Abstracts
Vol. 20, EGU2018-16061, 2018
EGU General Assembly 2018

Assessing the tree detection rate from terrestrial laser scanner (TLS) using the applied algorithm, for potential applications in forest fire management and modeling

Suman Ghimire (1,2) and Nikos Koutsias (2)

(1) 1 School of Information, Computer and Communication Technology (ICT), Sirindhorn International Institute of Technology, Thammasat University, 131 Moo 5, Tiwanont Road, Bangkadi Muang Pathum Thani 12000 Thailand, (2) Department of Environmental and Natural Resources Management, University of Patras, G. Seferi 2, GR-30100 Agrinio, Greece

This study presents the methodological workflow for the accurate tree detection in Pinus brutia using terrestrial laser scanning, which acts as an initial step for recovering the forest inventory parameters critical to fire occurrence modeling. For the field data acquisition, we designed six circular plots, each of radius 6 m located at E 21.26875 and N 38.48271 decimal degrees (WGS84) in Aetoloakarnania, western Greece. We applied clustering on the point cloud based on least square fitting, followed by log based merging to group the clusters that belonged to the same tree for individual tree classification. Finally, the tree position was determined by normalizing the point cloud to the lower cluster within merged logs, and its coordinate set by the associated digital terrain model (DTM). Our result demonstrated an average tree detection rate of 91%, where the poor result was recorded in plot 3, with detection rate of 84% due to the presence of outliers, occlusions and comparatively sparse point clouds. Therefore, it is highly recommended to have multiple scan points within a single field plot in order to minimize the obstructions. Nevertheless, our proposed methodology successfully recovered tree position with an accuracy that ranged between 84-96 %, which demonstrates the importance of TLS in supplementing further research towards the estimation of important forest inventory variables, and thereby feeding fire occurrence models for the application in forest fire management and modeling.