Doctoral Thesis Proposal: Analysis and assessment of forest structure parameters from photogrammetric products and their incidence in modelling fuel potential.

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Abstract: Spatial and temporal variability of the three-dimensional structure of vegetation is a subject widely studied in forestry (Ruiz et al., 2014). Modifications in the structure generated by human action through agricultural and forestry practices, or changes in land uses, generate a concern regarding the integrity and the orderly operation of these ecosystems (Dellasala et al., 2004; Keane et al., 2008). The importance of the characterization of the forest structure is increased in a context of climate change where forest biomass is being modified globally. It has been proven that certain anomalies in the forest structure with respect to their historical variability entail an increase in the incidence of high intensity fires (Hessburg et al., 2005). The analysis of the forest structure is important in studies of carbon balance, in the elaboration of forest inventories, or in the elaboration of models of fire risk (Andersen et al., 2005). Characterizing the forest structure is fundamental for generation of combustibility maps that allow increasing the efficiency in the treatments of cleaning and maintenance of the forests, to predict the severity of the fires, and to predict the behaviour and propagation of the fire.

The objective of the thesis is the characterization of the forest structure in Mediterranean forests through the study and analysis of high resolution image processing methodologies at different scales. Specifically, it is intended to develop methods for the estimation of forest structure variables from images acquired by low cost drones in specific parcels. It will be studied structure variables such as biomass (Estornell et al., 2015), and other combustibility fuels. These variables are useful for their introduction in models of fire behaviour and carbon estimation. In addition, the potential of these techniques for the generation of carbon estimation models in marginal areas will be studied.

Available Means: The thesis plan will be carried out in the framework of the research project "Analysis and assessment of forest structure parameters from LiDAR and other emergent techniques for modelling fuel potential" funded by the Ministry of Economy and Competitiveness from 12/30/2016 until 12/29/2019 (CGL2016-80705-R). In addition, additional study areas will be used and work stays will be carried out within the framework of the project Ref. 823805 MAIL-H2020-MSCA-RISE-2018, which will begin in January 2019.

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