



## **Monitoring age of private owned Holm oak (*Quercus ilex* L.) and Pubescent oak (*Quercus pubescens* Willd.) forests in Croatian Mediterranean and sub-Mediterranean with Sentinel 2 multispectral satellite**

Alen Berta (1), Zrinka Mesić (1), Tom Levanič (2), Ivona Žiža (1), Davor Korman (1), Nela Jantol (1), Dalibor Hatić (1), and Vladimir Kušan (1)

(1) Oikon Ltd. Institute of Applied Ecology, Laboratory for Remote Sensing and GIS, Croatia (aberta@oikon.hr), (2) Slovenian Forestry Institute, Slovenia

More than a half of Croatian Mediterranean and sub-Mediterranean ie. circa 800.000 ha are covered with forest vegetation. Further, more than 95 percent of it are consisting of Holm oak (*Quercus ilex* L.) or Pubescent oak (*Quercus pubescens* Willd.) forests in mainly degraded forms (coppice or shrubs/maquis). Regarding ownership, half of those forests are private properties and although Croatia has more than 250 years of organized forestry, this mostly entailed state forests. Private forests in history were managed when and with intensity that owner wanted. This led to uneven aged forests with great diversity of stand structure in small areas. This can be seen in small forest plots and multiple owners on one plot making sustainable management impossible. In these areas, average private forest plot is 0.27-0.37 ha with forest estates between 1.73- 2.43 ha with, in many cases, multiple owners. Because of all that, it is essential to have simple and effective monitoring of changees. This research is focused on determination on average stand/area age and monitoring it with Sentinel 2 multispectral satellite. For this purpose we have cored more than 1200 tree across almost 400 hundred locations in Croatian Mediterranean and sub-Mediterranean. By coring to the center 2-3 trees of mean diameter on the plot and one dominant tree, we determined average plot age. This research is in final stage and age data will be used for correlation with Sentinel 2 multispectral satellite data ie. with plain multispectral bands and various vegetation indices (NDVI, EVI, LAI, etc.). This paper will show the final results of this research and suitability of this remote sensing method. Created models can be used in forest management since age is main input in normal models for evenaged stands that are used also for these forest. Also, these result can be used in monitoring of stand degradation by human influence since clear-cutting or high intensity cutting will led to decrease in stand age. This is also applicable for abiotic negative influence observing slow dieback due to drought or abrupt decrease in stand age by forest fires.