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MAXIMIMIZING FOREST VALUE THROUGH USING SENTINEL-2 IN COMBINATION WITH HYPERSPECTRAL UAVS

Abstract

The global forest economy is subject to a number of threats to its production value. Forest diseases keep emerging due to globalisation and climate change – they are difficult to contain and mitigate. According to FAO, in the period 1980-2002 more than 52 mill. hectars forest in 37 countries were damaged by pests. Now the Pine Wilt Nematode is estimated to have the potential to spread to 34

These changes are costing not only society, but also forest owners and managers. In Portugal, forest owners are fined 44 000 EUR by the government if they do not clear-cut diseased trees within 15 days. Forest fires are escalating in severity and cost due to climate change. Europe lost in 2017 three times as large areas than during the period 2008-2016 in total. The forest fires cost Portugal alone more than 200 mill. EUR and killed 64 people in 2017.

These threats to forest economy require accurate, precise and frequent information for monitoring their status and planning any relevant mitigation actions. Sentinel-2 becoming operational in 2015, and deep learning techniques improving their performances beyond human capacity in 2015, served as an ideal starting point for the automated forest monitoring service Silvisense. As its products have been demonstrated with pilot customers in Portugal and Norway, it became clear that adding in synergistic use a high resolution, hyperspectral dataset, captured by airborne UAVs over Portugal, would increase the capacity to detect disease outbreaks at an earlier stage, enabling more efficient mitigation measures to take place and preserving a greater volume of high quality standing wood. This is the basis for the H2020 project FOCUS, the topic of this paper, and how FOCUS is expected to add value to forest monitoring in Europe through enhancing interpretation of Sentinel-2 satellite data by combining it with hyperspectral airborne measurements.