Predicting the severity of defoliation due to the pine processionary moth using remote sensing and UAV imagery

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BACKGROUND

Pine processionary moth (PPM), Thaumetopoea pityocampa, is one of the major defoliating insects in Mediterranean forests.

After PPM outbreaks, defoliated stands may not be refoliated in the following years, resulting in significant reductions of the tree growth.

Despite the annual forest health survey and mapping in Catalonia, Spain, it requires more timely information which enables to monitor the latest forest condition.

Espunyola was selected as a severely attacked study area where Pinus nigra and P. sylvestris are primary host trees with the elevation range at 600-900 m.

OBJECTIVES

For improving the current monitoring system spatially and temporally,

Analyze Landsat-based vegetation indices (VI) for predicting the severity of defoliation by the recent PPM outbreak (winter 2015-2016)

Calibrate the VI models with defoliation degrees interpreted by unmanned aerial vehicle (UAV) imagery for severity classification

RESULTS

Linear regression model

Threshold classification

CONCLUSIONS

New additional UAV images should be incorporated in the further study to improve the classification accuracy and validate previously calibrated results in the same study area or adjacent areas affected.

The UAV technology holds great potential as ground-truth data for cost-effectively monitoring the current health of forests.

Combining UAV images with satellite data should be considered to validate model predictions of the future forest condition for developing Ecosystem Service tools.