

Forest crown cover estimation in northern boreal and temperate European forest

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Forest crown cover that is defined as the percentage of the forest area covered by vertically projected tree crowns is a versatile indicator of forest's structure and condition. The most used definitions of forested areas are based on crown cover percentage. Crown cover reflects forest's productivity and carbon assimilation. Decrease of crown cover may indicate forest degradation.

While it is laborious and expensive to assess crown cover on ground, earth observation provides a cost efficient alternative for the fieldwork. For independent accuracy assessment of the crown cover estimates, reference data can be collected by visual interpretation of very high resolution optical earth observation data with a reasonable effort.

A method for forest crown cover estimation using high resolution optical earth observation data was developed and tested at four study sites in Europe. Crown cover was estimated using the probability estimation method of VTT and Image2006 data. The accuracy of the crown cover predictions was assessed using reference data that were collected by visual interpretation of very high resolution aerial and space borne imagery.

The average crown cover values in the reference data varied from 17 % to 86 % and in the predictions from 18 % to 80 %. The absolute root mean square error of the crown cover predictions varied between 14 % and 33 %. The results of the study showed that it is possible to map forest crown cover with twenty to thirty meter spatial resolution optical earth observation data using the single pixel values. However, understanding the variable results at different sites requires further investigation. To support this, a more comprehensive set of validation data is being collected and analyzed.

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