Annual mapping of fires and harvest across Canada’s forests using 250 m MODIS imagery

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CONTEXT: Disturbances such as fire and harvesting shape the dynamics of the Canadian forest and must be accounted for when modelling forest properties including its carbon content. We have therefore developed an approach to detect annual forest change resulting from fire and harvesting across Canada using MODIS imagery at 250 m spatial resolution across Canada.

METHOD: The method was developed using a large Canada-wide database of training and validation pixels drawn from local fire databases and visual interpretation of harvest pixel clusters. A Regression Tree model was used to attribute observed pixel-level changes to either fire and harvest, while a Decision Tree model was used to estimate the within-pixel fractional change.

RESULTS: When applied to annual MODIS mosaics covering the 2000 to 2011 period, the detection accuracy of burnt and harvested areas against our validation dataset is of 82% and 80%, respectively.

CONCLUSION: The method provides credible spatially explicit identification of fires and harvests across Canada on an annual basis. Attribution of disturbance type is of particular importance to a host of strategic analyses, including carbon accounting, bioenergy feedstocks from harvest and fires, and impacts of fire and harvest on timber supply. Timely and spatially-explicit provision of this information will greatly benefit such efforts.