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| **Type the title of your abstract:** **Estimating and mapping forest age across canada’s forested ecosystems** |
| **Introduction/Aim:** Accurate knowledge of forest age is a critical input variable for carbon modelling, forest management, and for assessments of habitat and biodiversity. Conventional estimates of forest age are typically derived through tree coring, or photo-interpreted from aerial imagery. However, both methods are typically sample or plot-based, and spatially-explicit maps of forest age are usually not made over very large areas. For regional to national monitoring and land-management decisionmaking purposes, wall-to-wall, spatially explicit maps of forest age are desirable.Remotely sensed satellite data, such as from Landsat, has allowed for the creation of wall-to wall maps of land cover and stand-replacing forest disturbance from 1985 onwards. However, due to the limited temporal range of these datasets, and the relative infrequency of disturbance, they only allow for the estimation of age within the past few decades, and other methods for estimating forest age are required for a fuller understanding of forest age dynamics.**Methods:** This research combines three approaches to estimate forest age across Canada at 30-meter resolution from 0-150 years with an older than 150 class. The first method avails upon existing change detection methodologies to detect pixels which were disturbed between 1985-2019, using time since disturbance as a proxy for forest age. The second method uses Landsat surface reflectance composites to track the spectral trajectory of pixels in the early Landsat record, and identify any which show evidence of recovering from a disturbance which happened before the Landsat record, extending age estimates to 1965. The last method combines Landsat-derived maps of tree species and height with productivity metrics and existing allometric equations to estimate forest age for pixels which show no evidence of disturbance within the satellite record, recognizing that as age increases, so too does uncertainty in age estimates. **Results:** By combining these three approaches, age is estimated for every treed pixel in the forested ecoregions of Canada, accounting for 650 Mha. Nationally, mean estimated forest age for forests less than 150 years old (94.1% of treed area) was 70 years, with a standard deviation of 32.1 years. Forest age estimates were compared to reported forest age in the Canadian National Forest Inventory (NFI) both spatially and aspatially. Nationally, 5.9% of the forested area was estimated to be older than 150 years, compared to 9.5% of area within in the NFI sample. Median estimated forest age for forested pixels ≤150 years old was 68 years, while median forest age reported in the NFI was 73 years. Regional variability was present in results, with lower agreement found in areas characterized by older forests. **Conclusion:**Accurate and spatially explicit maps of forest age are a useful tool for land management, forest monitoring, carbon modelling, and other scientific endeavours. The results found in this work provide a useful basis for a variety of these activities in Canada, and the methodologies utilized are portable to other areas where similar base datasets exist. |

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