Abstract:
With a new method, the Threshold Age Mapping Algorithm (TAMA) [1], we mapped forest age from a Landsat image time series over Rondônia, Brazil. Combining mapped forest age with aboveground live biomass (AGLB) estimated from coincident GLAS waveforms yielded a regional biomass accumulation rate in secondary forest (See Summary Figure). We also mapped old-growth forest types and estimated their AGLB with GLAS.

Introduction:
Major uncertainties in the global forest carbon budget include the biomass of tropical forests that are cleared and the biomass accumulation rates of secondary forest [2]. Maintaining reserve networks of old-growth tropical forests also require automated ways to map forest age and disturbance.

Methods:
With the new Threshold Age Mapping Algorithm (TAMA) [1], we mapped the age of lowland forests from a Landsat image time series for a southwestern Amazonian study area [2]. TAMA is self-calibrated and was automatic for the study area.

Figure 8. TAMA is self-calibrating for mapping forest age (Fig. 3-4). TAMA then uses the minimum forest mask to find image-specific minimum wetness and maximum greenness thresholds for the forest and secondary forest in each date (Fig. 3 combines these results to map forest age [Fig. 1 and Table 1]). Forest classes never both appear secondary or forest in the same class, so mostly old-growth forest is in this region.

Figure 1. Study area, reference data, and GLAS tracks.

Figure 2. Landsat image time series.

Figure 3. The Histogram Fitting for Mapping (HFM) procedure.

Figure 4. Grey-scale image of the Wetness-Brightness Difference Index (WBDI) and the forest mask that results from applying HFM to WBDI.

Figure 5. Lowland forest age and hill forest types (forested wetlands shown in Fig. 6). Figure 6. Old-growth forest types and land cover.

Figure 7. Using Google Earth for accuracy assessment data.

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Literature Cited:

Figure 7. Using Google Earth for accuracy assessment data.