

## ***Interactive comment on “Changes in growth of pristine boreal North American forests from 1950 to 2005 driven by landscape demographics and species traits” by M. P. Girardin et al.***

**Anonymous Referee #3**

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The authors present a detailed assessment of the complex drivers of tree growth and related forest productivity in boreal North America. They combine empirical growth measurements from an extensive tree-ring network with NPP estimates derived from a process-based model. Such integrative approaches are urgently needed to cross-validate different methodologies and improve understanding of forests' response to environmental change. Using innovative techniques, the authors isolate age and species specific growth trends and monthly climate response patterns. In addition, the apparent productivity decrease in overmature black spruce stands were attributed to enhanced respiratory losses due to higher temperatures.

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The authors discuss various potential biases influencing their results. These seem minor apart from the relatively uncertain climate (i.e. moisture) data, which derives from a rather coarse-spatial resolution reanalysis dataset. Efforts have been made to validate temperature and precipitation data using CRU 2.1 (0.5° res.) grids. Not surprisingly, the authors found a poor match between the precipitation variability of the climate model (NCEP) and station based (CRU) data. I agree with the choice of the 20CR dataset since in absence of reliable long-term measurements from climate stations, CRU precipitation data might not be robust for the study area. Yet, the interpretation of the climatic drivers of forest growth (i.e. fig. 3) should be made cautiously in light of the suboptimal moisture data.

Overall, this study represents an interesting and novel approach to address constraints of boreal tree-growth and significantly improves understanding of age and species specific impacts on forest productivity. I thus recommend the paper to be published.

Some minor changes are:

- 2.2, lines 14ff: Some more details on the biomass calculation would be useful, especially on how the upscaling from single trees to the stand level was done. To me it was also not fully clear, how these total aboveground biomass data were included in the study since later, only the TGI were used.
- 2.3, line 21: This should probably be “NCEP”, not NECP

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