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Climate of the Past Discussions

Interactive comment on "Modelling tree-ring cellulose δ^{18}O variations of two temperature-sensitive tree species from North and South America" *by* Aliénor Lavergne et al.

Anonymous Referee #1

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The authors test the MAIDENiso model in regard to O-isotope fractionation with "temperature-sensitive" tree species in Quebec and from Patagonia (which I interpret as ring growth being sensitive to temperature). In the case of the Canadian site, the high latitude indicates temperature sensitivity, whereas for the Argentina site the elevation probably contributes more to the temperature sensitivity. A number of parameters in the mechanistic models must be estimated, among which the estimated δ18O of precipitation may have the greatest uncertainty, but parameters are also tested for sensitivity in simulating the observed tree-ring δ18O. The authors found that xylem water δ18O is less influential than leaf evaporative enrichment in predicting tree-ring δ18O. Furthermore, temperature effects are more related to effect on leaf evaporative enrich-

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Discussion paper

ment that T effects on precipitation isotopes.

The analysis is important and results reasonable, although there are some large δ18O differences in the actual tree-ring composition between the N. American and S. American sites.

p. 35, 'tree rings' p. 101-102, 'which is an angiosperm deciduous species dominating' p. 111-112, 'In western Argentina, precipitation is largely concentrated from late fall to early spring followed by a drier and mild period during summer and early fall'... isn't late fall to early spring summer in Argentina, and therefore the following 'mile period' would be during the Argentina winter and early spring? p. 188, 'for N. pumilio, and therefore the' 216-217, 'we also used modelled daily data from the GCMs described above for both the western Argentinian and northeastern Canadian sites' 221-222, 'For the years 1950-1957,' 240 (and 159), the authors refer to 'dampening factor fo', but Eqn 1 suggests it is actually the fraction of the tree-ring δ18O signal that derives from xylem water... perhaps they are synonymous? 287, in "temperature and precipitation dependences", the authors seem to mean "temperature and precipitation coefficients", i.e., a and b. 289, "more strongly" 319, what is the "reference one"? perhaps "reference simulations"? 320, what is the "source one"? perhaps "than are the XW_source simulations"? 325, what does "these results are limited upstream" mean? 341-342, change "ratio in a high amount of precipitated water" to "ratio increased higher precipitation" 362-363, why is it 'interesting(ly)' that "the δ18OP signal in northeastern Canada is comparatively more depleted than in western Argentina". Given the latitude of northeastern Canada, I would expect δ18OP to be isotopically lighter. 363, "northeast" 385-386, "GNIP stations" 434-435, "tree growth is inhibited, leading to a decrease of" 465, "tree rings" 719, are the "mean simulated δ18OTR levels" (here in caption and in B y-axis labels) actually "δ18OTR values"? or "δ18OTR output"

REFERENCES The "13"s and "18"s in isotope designations in titles need to be superscripted. DeNiro and Epstein 1979, Rozanski et al. 1993, Yakir and Deniro references: too many words in title begin with upper-case letters

Figure 4, shouldn't the label on the y-axis be "kernel density"?

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