

Interactive comment on “Species-specific trajectories of nitrogen isotopes in Indiana hardwood forests, USA” by K. K. McLauchlan and J. M. Craine

Anonymous Referee #2

Received and published: 1 September 2011

The paper is interesting, well written and scientifically sound. It should be published with some minor changes and reflections. These are mainly related to the time series analysis and in particular to the piecewise or segmented linear regression. Figure 2 shows an enormous variation for both subsets. The trend lines suggest opposite trends with similar external influencing factors documented by the breakpoints. But why these statistical method is used? A nonlinear model also could be applied showing the trends (as in figure 3 for N). A view at figure 4 shows that the result of the piecewise regression is very likely nothing else but an artefact. From the five *Quercus* samples there is for N15 data one sample without any trend and the others curves show (after certain minima) positive and constant trends since about 10, 30, 50 and 110 years. Maybe

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the artefact is the effect of the unequal distances between the data points in the outer (younger) part of several samples from all species. This should be indicated in the method description where the reader has the impression that all rings were analysed. In the other species there is a similar picture: wide span of variation from year to year in the juvenile wood and then either no trend (e.g. *Carya*, “Cumberland”, *Fagus* “Arboretum”) or a more or less constant decrease since many decades. I recommend to omit or redraw figure 2 and consider this in the related text and discussions.

For N-concentration: The higher concentrations are not necessarily related to the sapwood/heartwood boundary, in many cases this is far from the peak values. These however are measured in the youngest one two or three samples and doubtless can be explained with the formerly living tissues in this region.

Minor comment: please replace throughout bores with cores (it is an increment borer, the sample is a core)

Interactive comment on Biogeosciences Discuss., 8, 5935, 2011.

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