

Interactive comment on “The effect of northern forest expansion on evapotranspiration overrides that of a possible physiological water saving response to rising CO₂: Interpretations of movement in Budyko Space” by Fernando Jaramillo et al.

Anonymous Referee #4

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The manuscript by Jaramillo et al., 2017 analyses long term changes in ET/P and PET/P of Swedish catchments. The topic is of general interest and well suited for the journal.

Many catchments show increasing ET/P even though the aridity index is decreasing due to slightly higher precipitation rates. The data is compared with forest inventory data which shows a significant increase in forest biomass. The data suggests that the

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overall increase in biomass is the dominant driver in increasing ET and thus ET/P. The authors argue that this “overrides physiological water saving responses”. I do agree, however, the improved water use efficiency due to higher CO₂ levels might still be an important effect and could decrease ET, but clearly only for the same amount of biomass. For biomass aggregated results are presented, but there is no estimate of the physiological water saving response. Furthermore, the time series data does not provide statistical correlations between biomass and ET/P. Thus the study can not provide quantitative links between biomass or physiological water saving response and ET/P. However, both topics are suggested by the title and hypotheses. Therefore I recommend to adapt the red line of the manuscript or improve the analysis. Nevertheless, the observation that increases in forest biomass are potentially linked with increasing ET/P is important and should be communicated.

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