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**Biogeosciences Discussions**

# *Interactive comment on* "Inter-annual variation of carbon uptake by a plantation oak woodland in south-eastern England" *by* M. Wilkinson et al.

**Anonymous Referee #2**

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The manuscript presented a comprehensive result based on a long-term monitoring of carbon uptake over 12 years. The data was valuable, the description of method was clear and appropriate, and interpretation of the results was reliable. I could not find any serious problems in the paper but the discussion was partly a little simple and weak. The authors would be able to strengthen the manuscript by revising the following parts.

First of all, the inter-annual variations of NEP, GPP, and Reco were affected by several events significantly, and I would like to see more detailed and quantitative discussions on the effects of each event. For example, the authors mentioned the "relatively high levels of solar radiation over the spring and summer months of 2009 and 2010", "GPP was reduced from the long term monthly mean (in 2009 and 2010)", and "in both years there was a major outbreak of defoliating moth caterpillars" in page 9679, lines16-



19. Was there any possibility that the high solar radiation caused the outbreak of the insects? Could the reduction in LAI explain the reduction in GPP quantitatively? Was there any change in Reco (temperature and soil water dependence on Reco) after the defoliation? How long did it take the recovery of the leaf area, GPP, and Reco after the event? What was the cause of year-to-year change in the peak LAI except for 2009-2010?

Secondly, the different temperature dependence on Reco (Fig. 10) seems interesting and more interpretation would be valuable. Was the difference explained only by the soil water content? How was the ratio of growth respiration and maintenance respiration of plants? After the dry season, did the temperature dependence of Reco recover immediately after the recovery of the soil water condition?

Finally, since the interpretation of year-to-year change in carbon budget components was the essence of the manuscript, would it be possible for the authors to show more information by comparison with other sites in Europe? Could the authors show the patterns of year-to-year variations in the carbon budget components of nearby forests (or forests with similar dominant species in Europe) and discuss the amplitude and synchronicity in the response? Or was it possible to gain some information of year-to-year change (or trend) in the productivity from the biometric based estimations (section 3.5)?

Specific comments: - Page 9678, lines 21-23; page 9679, lines 4-5: Are these values based on 'per day (d-1)' or 'par year (y-1)'?

- Is there any evidence of spread of insect damage from one site (region) to another?

Interactive comment on Biogeosciences Discuss., 9, 9667, 2012.