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Interactive comment on “Inventory-based estimation of aboveground net primary production in Japan’s forests from 1980 to 2005” by Y. Wang et al.

Anonymous Referee #1

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General Comments This is a concise, well-written paper that quantifies the above-ground NPP (ANPP) for Japan’s forests, providing both interesting and useful analysis of trends over 25 years for the major forest types. The method combines periodic inventory data, a data base of biomass and NPP components from published field studies, and allometric methods to construct mathematical relationships between ANPP and measured components of NPP, and between biomass and ANPP. Although elements of this approach have been used occasionally in the past (these studies are appropriately cited), the allometric methods used in this study are novel and their errors are well quantified. Results reveal that the mean ANPP of needle-leaf forests increased significantly over the study period, and somewhat inconclusive results for broadleaved

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forests. Much of the increase observed in needle-leaved forests is attributed to plantations of fast-growing trees and intensive forest management. Japan's forests appear to be more productive, on average, than other forest areas of the Northern Hemisphere. I evaluate the scientific significance as "good" since this research includes some novel methods even though not the first attempt to integrate inventory data and field measurements of ANPP, and the analysis provides some useful information about Japan's forest productivity. Likewise, the scientific quality is "good" because the approach is valid though lacking in a few details discussed later, leading to conclusive results. I rated the presentation quality as "excellent" because the paper is concise and clearly written, including necessary details but not more than necessary to understand and evaluate the findings.

Specific Comments 1. Although the authors did not include below-ground NPP (BNPP) for good reason, there is some literature available and it would be informative if there could be a short section added to the discussion about the relative magnitude of BNPP compared with ANPP, even if the available estimates are not from Japan. 2. Regarding the mean ANPP values for "Other Needle-leaf forests" and "Other broadleaf forests" (table 3 and p. 1469), because these values are constant over the time series (lack of significant relationship), perhaps these types should be excluded from the analysis after table 2. Also in table 3, the area of "OtherN" includes an unusual temporary increase in 2000, which may be a land classification problem embedded in the inventory data. 3. Final paragraph of discussion and table 4. It would be informative to compare the results from Japan with published estimates from plantations elsewhere in the temperate zone, not just averages which in many countries include some very low productivity sites. For example: McNulty, S. G., J. M. Vose, et al. (1996). "Loblolly pine hydrology and productivity across the southern United States." *Forest Ecology and Management* 86(1-3): 241-251. 4. Figure 3. It would be very useful to include error bars in this figure.

Technical Corrections 1. P. 1467 line 6: TNPP is not a component of NPP. Need slight

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re-wording of this. 2. P. 1467 lines 25-26: when I look at the statistics in table 2, it seems like Chamaecyparis should be added to the list of forest types that lack a strong relationship. 3. P. 1470 line 16: change “likely” to “did”. 4. P. 1471 line 8: change “different” to “compared”.

Interactive comment on Biogeosciences Discuss., 8, 1463, 2011.

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