

Interactive comment on “Re-evaluating the 1940s CO₂ plateau” by Ana Bastos et al.

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This paper represents a comprehensive analysis of the processes that may have been responsible for the plateau in CO₂ growth rates that occurred during the 1940s and early 1950s. The mismatch between model reconstructions and observations during this period was 0.9 to 2.0 PgC yr⁻¹. Ocean carbon models from CMIP5 suggest that natural variability in the oceans could have accounted for no more than 0.5 PgC yr⁻¹, while TRENDY models suggest that the land's response to CO₂ and a strong El Niño would not have accounted for the necessary carbon sinks on land. Using the OSCAR model, the authors explored whether changes in land use (LUC) might have led to large terrestrial sinks. They found that LUC might have provided the necessary land sinks for carbon, likely through the effects of socio-economic changes during WWII, but that such conditions are not well captured by existing LUC analyses. While I completely agree with the statement that many activities associated with wars and

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economic disasters are not well captured by land-use statistics, I am surprised that stopping deforestation and logging could have an effect large enough to create sinks of 1-2 PgC yr⁻¹. Sources that large are believable, but sinks that large would require large areas of regrowth, largely because per hectare sinks from forest growth are generally slow in comparison with per hectare sources from harvest and deforestation. Would the changes during WWII have been widely enough distributed to affect Europe, the USSR, China as well as SE Asia and perhaps other regions? Regardless, the authors are to be commended for the multiple and penetrating analyses carried out for this exploration. They have a solid understanding of land-use data sets. While the observed plateau in CO₂ growth rates during the 1940s may appear small in the scheme of things, it is not so small as to be easily explained. This analysis is interesting, packed with information from many disciplines, and impressive.

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