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Interactive comment on "Biogeochemistry of a large and deep tropical lake (Lake Kivu, East Africa): insights from a stable isotope study covering an annual cycle" *by* C. Morana et al.

Anonymous Referee #1

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The authors derive conclusions about lake Kivu being autotrophic from the seasonal pattern in 13DIC and other limnological concentration data. I am concerned with their definition of and proof for autotrophy in lake Kivu. Autotrophy means the ratio of primary production (PP)/respiration (R) > 1. Because PP + I = O + B + R, this means that in autotrophic lakes PP-R = O + B - I > 0 , which means O + B > I, with O = organic carbon out through outflow, B = sediment burial of organic carbon, I = organic carbon inputs from catchment (allochthonous carbon). Please note that from the equations it follows that autotrophy means that the ratio of PP / I (= autochthonous / allochthonous carbon inputs) > R /(O + B). Therefore, true autotrophy cannot be demonstrated (or refuted) by the results shown in this paper. At best you can say that from the results,

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it seems ‘likely’ the lake is autotrophic. See Verburg 2007 (Verburg, P., 2007. The need to correct for the Suess effect in the application of 13C as a productivity proxy in sediment of autotrophic Lake Tanganyika in the anthropocene. J. Paleolimnology 37:591–602. DOI 10.1007/s10933-006-9056-z) for a treatment of this subject. Lastly, indicate whether the % cyanobacteria is a % of abundance (cell numbers) or of biomass (Figs 5 and 7)

Interactive comment on Biogeosciences Discuss., 11, 17227, 2014.