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Interactive comment on "Proxies and uncertainties for ^{13}C/^{12}C ratios of atmospheric reactive gases emissions" *by* Sergey Gromov et al.

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Dear authors,

first of all let me congratulate for this excellent manuscript. I very much appreciate the huge efforts you have made for putting this work together. It certainly will provide us with a better understanding of the global CO budget when applying stable carbon isotopes. However, it also indicates the limitations and uncertainties when applying a stable isotope approach.

I have one major issue regarding the stable carbon isotope source signatures of methanol derived from vegetation which I hope the authors consider in their revised manuscript. In Table 4 'Biogenic emission sources strengths and their isotopic signatures' the stable isotope values has a value of -25.8 ‰ . The authors might be not

aware of some recent studies by Keppler et al. (2004) and Giebel et al. (2010) which clearly show that methanol emissions from living plants and from combustion are considerably more negative than provided by Gromov an co-authors. Relative to the bulk biomass of plants, the carbon isotope fractionation exhibited by the plant methoxyl pool - which is definitely the major carbon source of methanol emitted from living plants - is very large. Methoxyl groups in the plant kingdom are exceptionally depleted in 13C and thus plant-derived C1 volatile organic compounds such as methanol have drastically depleted stable carbon isotope values. The range provided by Keppler et al. 2004, was -50 to -85 ‰ . A similar range was measured by Giebel et al. (2010). Thus I would like to suggest that the authors update their manuscript with this data but also use them for their model simulations.

With regards to the application of delta notation (see also comment by reviewer 1 "either per mil or ‰ ") I have an alternative suggestion. To comply with guidelines for the International System of Units (SI), the authors might follow the recent proposal of Brand and Coplen (2012) and use the term urey, after H.C. Urey (symbol Ur), as the isotope delta value unit. In such a manner, an isotope-delta value expressed traditionally as -25 ‰ can be written -25 mUr. However, this might be a matter of taste.

References:

Keppler, F., Kalin, R.M., Harper, D.B., McRoberts, W.C. and Hamilton, J.T.G. (2004) Carbon isotope anomaly in the major plant C1 pool and its global biogeochemical implications. Biogeosciences 1, 123-131.

Giebel, B.M., Swart, P.K. and Riemer, D.D. (2010) δ13C Stable Isotope Analysis of Atmospheric Oxygenated Volatile Organic Compounds by Gas Chromatography-Isotope Ratio Mass Spectrometry. Anal. Chem. 82, 6797-6806.

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