

## ***Interactive comment on “Assessing the relationship between the $\delta^{18}\text{O}$ signatures of siliceous sponge spicules and water in a tropical lacustrine environment (Minas Gerais, Brazil)” by M. C. Matteuzzo et al.***

**Anonymous Referee #2**

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The authors present a compelling argument for a strong kinetic fractionation effect on the  $\delta^{18}\text{O}$  values of freshwater sponge spicules from one pond, Lagoa Verde, in Brazil. As the authors indicate, there have been very few studies of  $\delta^{18}\text{O}$  variations in spicules and essentially no published records of  $\delta^{18}\text{O}$  variation in freshwater sponges. Therefore, this manuscript is timely and has great potential to advance our understanding of silica-water fractionation by freshwater sponges during spicule formation. To test the relationship between the  $\delta^{18}\text{O}$  values of freshwater sponge spicules and the water in which the sponges grew, the authors have implemented a monitoring study in which

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they can assess the growth of the spicules and other parameters (i.e. water  $\delta^{18}\text{O}$  values and temperature). Although there are a number of assumptions about variations in the water temperature and  $\delta^{18}\text{O}$  values, the authors have attempted to quantify these variations. The site selection and monitoring seems appropriate for the scope of the study and the field measurements are adequate. Ideally, a more complete sampling campaign would be undertaken to assess the variations in pond water  $\delta^{18}\text{O}$  values and temperature. Specifically, it not clear when the spicules grew and what exactly they are recording. The authors have also demonstrated that other parameters, particularly the amount of dissolved silica and sponge growth, might have a dramatic effect on the  $\delta^{18}\text{O}$  values of the spicules.

The authors conclude that the  $\delta^{18}\text{O}$  variations observed in sponge spicules in this study are significantly affected by kinetic/biologic fractionation and the spicules do not form in equilibrium. Although the data presented in this manuscript support this conclusion, there are a number of problematic assumptions that make it difficult to summarily accept their results as conclusive, including: 1) methodological bias, 2) timing of spicule growth, and 3) water T and  $\delta^{18}\text{O}$  values that the spicules are recording. I would stress that because of these assumptions, these data do not seem to conclusively support the authors assertion that “this study provides clear evidence that the freshwater sponge *Metania spinata* does not form its siliceous spicules in oxygen isotope equilibrium” with the ambient water.

There are a number of ways in which the manuscript could be strengthened, but I have major concerns about the  $\delta^{18}\text{O}$  values used in this study (see specific comments below). The details of the methodological bias are not addressed in the manuscript (external citations do not clarify the bias, either). Regardless of the observed relationships between the measured  $\delta^{18}\text{O}$  spicule values and the water in which the spicules grew, the potential for methodological bias undermines all potential results. Unless the authors can identify the source of the methodological bias, there is no way to “quantify” the bias and demonstrate that all samples (within this study and different types for

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silica) respond equally. Unless the authors can adequately address the source of the methodological bias in  $\delta^{18}\text{O}$  measurements, I cannot recommend this manuscript for publication.

Please also note the supplement to this comment:

<http://www.biogeosciences-discuss.net/10/C7239/2013/bgd-10-C7239-2013-supplement.pdf>

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