

Author's response_March_2019

Line 10. I would suppress the term strategies and start directly by "The origin..

Corrected

Line 11. ‘determined’ replaced by “influenced”

successive?

I think just regimes

I would insert CH₄ between bracket here.... and the CO₂ here

Corrected

Line 11. This sentence is a repetition of the previous one. You might consider to delete it

Sentence removed

Line 11. when the primary organisms emerged

Sentence changed: However, the ancestral carbon used in metabolism may have been derived from CH₄ if the outflow of magma fluid to the surface of the Earth consisted mainly of methane.

Inserted: In such an environment, the primary autotrophic metabolic systems had to be methanotrophic.

Line 20. The fact that these systems emerged in hydrothermal systems arise too late in your abstract. This information should be given at the beginning of your abstract, maybe in the first sentence

Insert in line 4: origin of life in **hydrothermal** environments

Line 23. Corrected: we propose a model of carbon fixation where the methane is fixed/transformed in a sequence of reactions in an autocatalytic methane-fumarate cycle.

Line 25. Do you really represent the hydrothermal systems or do you represent your model of carbon fixation? here I am a bit lost

Corrected: The hydrothermal system model...

Line 31. I do not understand the role of this sentence in your story.

The sentence removed

Line 41. Here I do not really understand why do you want to say with "...in the form of relics present even in...". Could you reformulate please?

It was meant that even metamorphic transformations could not destroy traces of methane. But, in this case, I just remove the word “even”

Line 43. "...that were dated to...."

Corrected

Line 51. The referee asked for a reference supporting this statement

This data refers to the same reference: Yang et al., 2014

Corrected: In addition, the oxygen activity..

Line 83. Insert: The model of two-stage development of fluids (I → II) generated by the Earth's core via mantle magma chambers is presented in Figure 1.

Line 90. At this step we do not understand if this figure and related ideas are a result of this present work and are already presented elsewhere. Overall, try to better underline the new ideas/vision proposed by this work and separate them from the literature you might use to introduce these ideas. I hope you will understand what I am trying to say

I hope that I understand. Corrected: Insert on line 83 and line 90 changed: The water-carbonic regime of hydrogen fluid evolution is represented in the phase diagram, Fig. 1, as an area of thermodynamic stability (facies **I**) limited by C–CO₂–H₂O paragenesis.

Line 136. "consortia" rather than "relationship"

Line 150. Missing reference (McGlynn, 2017) inserted

Line 204. This is a typo, there is a word "and", corrected

Line 314. check your text. Some texts are still in correction mode

Corrected

Line 320, 353. Same issue, text highlighted, corrected

Line 437. This sentence is too long (4 lines). Consider to split it in two.

Corrected: The oxygen-containing nitrogen compounds are the best oxidants in the hydrothermal systems, but their presence there is unlikely. Nevertheless, the redox pairs of hematite-magnetite and quartz-magnetite-fayalite create a specific area of chemical potential of oxygen that satisfies the thermodynamic requirements of oxidation and assimilation of methane by protometabolic pathways.

All references suggested by reviewers are inserted: Added Etiope and Sherwood Lollar, 2013; Schulte et al., 2006; McGlynn, 2017.