

Interactive comment on “Chemosynthesis in the deep-sea: life without the sun” by C. Smith

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This discussion paper describes the ways in which chemosynthetic ecosystems are partially and indirectly dependent on photosynthesis. It reads like a popular science article, and assuming that is its purpose, it is well-written and easy for a non-specialist to follow. A common misconception among people not fully familiar with chemosynthetic ecosystems is that they are completely independent of sunlight, and the author helps to clarify this point. From this perspective, the article could be useful for teaching purposes.

I agree with the points brought up by Lisa Levin and will not repeat her concerns. I concur that it would be better if the author signs with his full name to prevent confusion.

Here are some suggestions for improvement:

C7417

The article might benefit from including at least a reference to terrestrial chemosynthetic ecosystems such as in Movile cave (Romania) or Frasassi cave (Italy).

The title says "Chemosynthesis in the deep-sea: life without the sun" but much of the article is focussed on how chemosynthetic communities indirectly depend on sunlight. Perhaps a question-mark at the end of the title ("Chemosynthesis in the deep-sea: life without the sun?") would be more appropriate. Also "Life without sunlight" is more suitable than "Life without the sun" (consider this point throughout the paper)

Abstract: Not sure what the author means by "developed a way of life in the deep-sea". Chemoautotrophic anaerobes are widespread in anoxic environments on earth and not exclusive to the deep-sea.

There seems to be confusion regarding energy production by aerobic chemoautotrophs using reduction rather than oxidation reactions: Page 17041: Line 14: Should be sulphide-oxidizing instead of sulphide-reducing Page 17043: Line 5: should be "oxidation reactions of aerobic chemosynthesis" instead of "reduction reactions of aerobic chemosynthesis"

Page 17038, Line 18: The term chemoautotrophy is more appropriate here than chemosynthesis, as the latter usually includes methanotrophy. it would be useful for the author to define these two terms and differentiate between them. This applies throughout the manuscript

Page 17038, Line 26: Would be better to say " Hydrothermal vent, . . . , and cold seep animal communities. . ."

Page 17039, Line 17: unclear what the author means by "structure of the organisms"

Page 17039: Line 20: " First observed in the deep sea in the 1970s, chemosynthesis is . . ." This contradicts the earlier statement in the introduction that chemosynthesis was discovered by Winogradsky in 1887. Also, it might be better to define chemoautotrophy/chemosynthesis earlier in the article.

C7418

Page 17039: Line 23: I suggest replacing "are comprised of three fundamental elements" with "have three fundamental requirements". Also, not all metabolic processes require a carbon source.

Page 17041: Line 14: I suggest deleting the words "While interesting"

Page 17041: Line 26: Evidence from 2008 is not really "new"

Page 17042: Line 14: Correct punctuation: ...elements that support them; for a full review of 24 distinctive sites...

Page 17043: second paragraph: I suggest deleting most of this paragraph except for the first 2 lines, as it is irrelevant to the point the author is trying to make, i.e., that larval stages of many symbiotic animals are dependent on photosynthesis (sufficiently covered in the last paragraph of the discussion).

Page 17044, lines 21-23: the stepping stone hypothesis and the paper cited is quite old. Newer evidence could be considered here.

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