Biogeosciences Discussions

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Comment on bg-2021-199

Anonymous Referee #1

Referee comment on "Reply to Lars Olof Björn's comment on "Fundamental molecules of life are pigments which arose and co-evolved as a response to the thermodynamic imperative of dissipating the prevailing solar spectrum" by Michaelian and Simeonov (2015)" by Karo Michaelian and Aleksandar Simeonov, Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-199-RC1, 2022

Michaelian and Simeonov reply to the critique of their article: "Fundamental molecules of life are pigments which arose and co-evolved as a response to the thermodynamic imperative of dissipating the prevailing solar spectrum". In response they highlight that Björn's critique focuses almost entirely on how albedo is the only important factor is the only important factor related to photon dissipation (entropy production) occurring in the light-pigment interaction in living systems. The authors believe that other contributing factors have been overlooked by Björn's. The authors then go into further detail regarding these additional aspects.

Comments
Some of the references are not-pier reviewed or are self-published, e.g. Michaelian and Santillán Padilla 2014, and Michaelian 2009. Are there more up to date, peer reviewed articles that could replace these citations?

Section 1.
L19. Change: 'there are many data available' to, 'there is much data available'.
L18-20. Many forests have a high seasonal variability in their albedo. For example in some latitudes, in wintertime, the albedo is more variable due to changing snow cover. Could the increased albedo in winter may be offsetting the higher irradiance in summer?
L39. What do you mean by 'bodies devoid of life'?
L43. How could other factors indicative of (later) life on Earth such as oxygen affect entropy?

Section 3
L94. Reverse 'does vegetation'. It should read 'vegetation does'.
L94-94. Further explain the role of water and the water cycle.

L96. ‘Even beyond the red-edge.’ This does not follow on from the section above.
L99. Reverse ‘significantly’ and ‘reduce’. ‘Significantly reduce’.
L99-100. ‘An important component within biocrusts is the cyanobacterial pigment scytonemin which significantly reduces albedo…’

Section 4.
L104. Include a reference at the end of the first sentence.
L107-8. ‘’…which further increases the photon dissipation….’
L114. What is meant by ‘larger times’?
L120-124. This sentence is too long, it needs restructuring.
L128-132. I am not sure I follow the logic of this section. Please explain or expand on this to make it understandable.

Section 5.
L144. Do you mean ‘forests’?