

Biogeosciences Discuss., community comment CC4
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Comment on bg-2021-135

Karo Michaelian

Community comment on "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 K. Michaelian and A. Simeonov (2015)" by Lars Olof Björn, Biogeosciences Discuss., <https://doi.org/10.5194/bg-2021-135-CC4>, 2021

We have submitted a formal Reply (bg-2021-199, see supplementary .pdf file attached to this comment) to Lars Olof Björn's Comment on our 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**" by Karo Michaelian and Aleksandar Simeonov. In summary, Björn makes the erroneous assumption that albedo (reflection) is the only important factor related to photon dissipation (entropy production) occurring in the light-pigment interaction in living systems. He ignores the other contributions to entropy production due to the photon interaction which were listed in our article; 1) the shift towards the infrared of the emitted spectrum, 2) the diffuse emission and reflection of light into a greater outgoing solid angle, 3) the coupling of photon-induced evapotranspiration in the pigmented leaf to further photon dissipating processes such as the water cycle, which further allows dissipating biopigments to flourish over all of Earth's surface. His assumption is therefore incorrect and his analysis does not provide legitimate reason for doubting our assertion that the fundamental molecules of life arose as pigments as a response to the thermodynamic imperative of dissipating the prevailing solar spectrum. Please see our attached .pdf file for details.

In the interest of furthering a deeper, open, and fair discussion of this important theme within the community, we believe that both our **Reply** and Björn's **Comment** should be published together in Biogeosciences. Lars Björn has indicated his agreement with this arrangement in his comment in this list.

Karo Michaelian and Aleksandar Simeonov

Please also note the supplement to this comment:

<https://bg.copernicus.org/preprints/bg-2021-135/bg-2021-135-CC4-supplement.pdf>