



## Comment on esd-2021-26

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Referee comment on "ESD Ideas: Planetary Antifragility: A new dimension in the definition of the Safe Operating Space for Humanity" by Oliver López-Corona et al., Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2021-26-RC1>, 2021

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This is an interesting article using planetary albedo as a proxy for photon dissipation (or entropy production) to make an analysis of the time variability of the biosphere response due to, ostensibly, changing of planetary habitats by humans. I want to encourage the authors in their work since the manuscript provides a unique and more global way at looking at the whole question of ecosystem stability, fragility, resilience, etc. by considering all its interconnections in a global measure of entropy production, giving rise to, for example, homeostasis. However, the manuscript must be written much more carefully, respecting all the etiquette of good writing. The manuscript is difficult to read in parts as a result of poor attention to detail and because the English is lacking.

The Abstract must be improved in order to give the reader a clear understanding of what is being proposed. Any definitions, or new or novel phrases, for example, "Antifragility" should be left to the Introduction where they can be carefully defined.

The English should be improved by a native English speaker. Here are just some examples on only the first page, but similar dedication to improving the redaction should be made throughout the manuscript;

Line

12; ... humanity would operate safely..." to "humanity could operate safely..."

14; "Despite PB has been widely accepted,..." change to "Despite the concept of PB being widely accepted,..."

14; "Although the authors recognize..." change to "Although Rockstrom et al. recognize..."

16; "Then it would be necessarily to have ..." to "Then it would be necessary to have ..."

16; "Planetary Limits (LP)" to "Planetary Limits (PL)"

18; "the authors say" to "Rockstrom et al. say"

21; "Rockström and co-workers does recognise" to "Rockström and co-workers recognize"

The concept of "antifragility" should be more carefully defined and its relation to "Fisher Information" better explained.

62; All symbols in Eqs. (3) and (4) should be defined.

71; The paragraph beginning on line 71 should be re-written as it is difficult to make sense out of.

82; Include a reference in figure 1. The wavelength region used to determine the albedo should also be listed.

90; The variable " $\tau$ " does not appear in the equation. More information should be given as to how the Fisher Information for albedo was determined.

165; The References lack a consistent format and should be cleaned up.

Some questions I was left with concerning the analysis, whose answers would increase the value of the manuscript, are;

- 1) Is ocean surface albedo included in the data? If so, could this be dependent on periodic global events such as El Niño?
- 2) It would be nice to see the results for both the northern and southern hemispheres, alone and together, could this be done?
- 3) What are some of the problems that could arise by using visible albedo as a proxy for global entropy production?
- 4) Is there an explanation as to why the Fisher Information appears to go down and then up and down over time?