

Interactive comment on “GAIA 5.0 – A five-dimensional geometry for the 3D visualization of Earth’ climate complexity” by Renate C.-Z.-Quehenberger et al.

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Dear Prof. Clarke,

Thank you very much for your comment and your very provocative question.

Personally I do not see that the 5-dimension, hyper-geometrical dimensionality and even fractals by themselves support a sort of planetary sentience, or sensitivity beyond metaphorical free associations. This is because two sort of arguments:

1- only the realization of self-referential (autopoietic) systems is able to enaction and sense making. The Gaia 5.0 project is not about describing the form of autopoietic

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systems or to show the causal relations that allowed us to pass from 5D geometry to sense-making.

2- if there is some kind of geometry that must be link to the self-referential systems it should be the one I call the Strong-geometric entropy (a) and the Soft-information geometry (b).

a) the geometric entropy is relate to the resolution of Poincare's conjecture <https://science.sciencemag.org/content/314/5807/1848> in the geometric structure of the Ricci flow (<https://arxiv.org/abs/math/0211159>, <https://arxiv.org/abs/math/0303109>, <https://arxiv.org/abs/math/0307245>) and its possible connection with the thermodynamics of black holes, which the art-science Gaia 5.0 project does not intend to show.

b) the information geometry is related to the formal expression of autopoietic systems and their boundary in dynamical and Markovian terms <https://royalsocietypublishing.org/doi/full/10.1098/rsta.2019.0159>. This means that any autopoietic system, including the earth system <https://royalsocietypublishing.org/doi/10.1098/rsif.2020.0503>, equipped with a Markov boundary may have sensory activity and therefore sentience <https://www.mdpi.com/1099-4300/22/5/516>. The Gaia 5.0 project, in its current version, is not linked to this.

The art-science Gaia 5.0 project rather propose a 5-Dimensional partition of geometrical space of the atmosphere instead of the cubic 4D partition that the current climate models are based on. Therefore, this art-media proposal suggests that 5D partition could allow us to 'see' perhaps dynamics of the atmosphere far beyond current climatic models based cubic 4D, and thus a closer approximation to a living –Gaian– system. However, this should be clarified in a further version of the manuscript.

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