

Interactive comment on “ESD Ideas: It is not an Anthropocene; it is really the Technocene: names matter in decision making under Planetary Crisis”

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We thank the anonymous reviewer for her/his comments that we respond below.

Comments (»>)

»> And ‘the Technocene’ is not a bad name, and has been used in a number of publications, for example by the anthropologist Alf Hornborg and the sociologist Hermínio Martins.

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The reviewer is right we don't want to extent to much de article since it is in ESD-idea format (very limited number of words) but we included a pair of paragraphs citing them and others which appears in a quick scholar search using "technocene" in the title: https://scholar.google.com.mx/scholar?as_sdt=1,5&q=allintitle:+technocene&hl=en&as_vis=1

New text included:

"The concept of thechnocene is now new as it has been used by anthropologist Alf Hornborg (Hamilton, 2015) and the sociologist Hermínio Martins (2018) whose make a historical and critical review of the role of science in technological development, reviewing the relationship between nature and society from an interdisciplinary perspective. His analysis, which examines the need for political ecology, environmental anthropology and the relationship between science and society, is valuable for understanding different concepts such as the one proposed in this letter from the different disciplines: the Technocene.

In this ESD-Idea paper, we use the notion of Technocene as an environmental concept, in which Environmental Sciences, Earth Sciences converge, and as Hamilton (2015) says the post-Cartesian Social Science, too. At the same time that the interdiscipline of science is intertwined to explain environmental phenomena such as global warming.

For us it is clear that thinking about the concept of Anthropocene is exceeded in the face of technological development and its environmental impact (Cera, 2017). So treating environmental problems and their research from an anthropocentric approach is not adequate.

On the other hand, ethical and political problems must be treated in their right dimension (Hensel, 2017), and for this it is necessary to take into account that we are technological subjects that develop economically on the transformation of nature".

»> The authors miss the chance to reference and summarise other literatures that support the idea that the relevant entity that might be pushing the Earth into a new

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system state is an assemblage comprising biological humans plus the exteriorisations of culture and technology. Some better examples would help too – that of fracking and Earth tremors doesn't seem to work so well, as it is not evidence of a proper systemic shift; there are many better examples in the canonical Anthropocene science papers, such as the shaping of rivers (e.g. <http://dx.doi.org/10.1016/j.ancene.2015.03.003>).

We think the reviewer is right, river reshaping is historically a good example and we added other clarifying examples.

New text included:

“Nevertheless, although these new technologies as fracking should be considered under very high scrutiny, some “old” technologies such as hydraulic engineering, has already proved to have the potential of drive major ecosystemic changes. In fact, Williams and co-workers (2014) identify “Humans as the third evolutionary stage of biosphere engineering of rivers”. For the authors, the first two bio-engineering forces are oxygenic photosynthesis and the development of vascular plants with root systems. Then in third place comes human activities such as drainage, agriculture, the construction of artificial water bodies, the development of artificial water storage and flow regulation structures and some second-order effects as changes in global-scale chemical and biogeochemical modification of terrestrial water bodies (Meybeck, 2003). Sometimes even small and apparently innocuous technology can add up to produce huge effects, which is the case of human use of chlorofluorocarbons (CFCs) often used in aerosol cans and cooling devices such as fridges, that was demonstrated were the driver of Ozone layer depletion. Discovered using 20 years of ozone levels measurements over the Antarctic stations of Halley and Faraday by Joe Farman, Brian Gardiner and Jonathan Shanklin, it was published in a foundational paper of 1985 that transformed the fields of atmospheric science and chemical kinetics, and led to global changes in environmental policy (Farman, J. C., Gardner, B. G. & Shanklin, 1985; Solomon, 2019). Even “green” technologies could lead to important planetary changes if implemented massively (Kleidon, 2016) as could happen with Eolic energy production



that at the end of the day extract kinetic energy out of climatic systems, “Large-scale exploitation of wind energy will inevitably leave an imprint in the atmosphere” (Buchanan, 2011)”

»> ... Secondly their normative conclusion – that we therefore need to reject technology, revert to classical Homo Sapiens, and thereby stay in the Holocene – does not follow...

We are not saying that at all. What we are saying is that we need to take technological coupling into account when trying to understand Earth System Dynamics and that some types and intensities of technological coupling should be treated with the maximum application of the non-naive (this is key for not falling into misunderstanding) Precautionary Principle.

New text included: “A word of warning here, by no means we are proposing to neglect scientific or technological progress, nor we are thinking we should live as hunter-gatherers. We are merely saying that we need to take technological coupling into account when trying to understand Earth System Dynamics and that some types and intensities of technological coupling should be treated with the maximum application of the non-naive (this is key for not falling into misunderstanding) Precautionary Principle. As pointed out by Taleb and co-workers (2014), “a non-naive view of the precautionary principle is one in which it is only invoked when necessary, and only to prevent a certain variety of very precisely defined risks based on distinctive probabilistic structures. But, also, in such a view, the PP should never be omitted when needed”. For example, in small quantities even controversial technologies as nuclear plants which we know may be prone to catastrophic accidents (Perrow, 1984) don’t require to invoke PP. What Perrow notice after his analysis of the Three Mile Island nuclear accident in 1979 is that normal or systemic accidents, often catastrophic, are mainly inevitable in extremely complex systems as nuclear power plants. Nevertheless, even when terrible, the effects of one nuclear plant accident, don’t propagate to other nuclear plants and most of the worst damage is local. In this sense, although it is known that the

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potential harm due to not only accidents as radiation release or core meltdowns but also by radioactive waste can be large. At the same time, the nature of these risks has been extensively studied, and the risks from local uses of nuclear energy have a scale that is much smaller than global (Taleb, 2014). On the other hand we have geoengineering, an unproven new technology whose potential effects are clearly of a planetary scale and for which we don't have any understanding of direct or indirect risks. Then, to make it very clear, our approach for the use of the Technocene term is not to limit, reject or demonize technology per se, but to promote awareness to only some type of technologies depending on their use, type of risk, scale and coupling with other Earth Systems compartments. Very similar to the idea of incorporating defaunation concept and not only use the established loss of biodiversity. In addition, and maybe more important perspective is that thinking of Technocene rather than Anthropocene, also opens debate and analysis of philosophical (ontological, ethical), political and social problems about Climate Change and other components of Planetary Crisis, enhancing a deeper integral understanding of it."

»> The Shakespeare quote, 'What's in a name? That which we call a rose by any other name would smell as sweet' (line 71) seems very ill-chosen by the way – the quote is generally taken to mean that names are not important.

We thank for the heads up on this, we were not aware of that and it certainly is not a necessary quote for the argumentation of the text but only cosmetic, so we removed it.

»> On more minor matters, the English language needs work. Most sentences have at least something wrong, but the worst slips are 'Inhere' instead of 'in here' (line 17 – though in fact it would be better to delete the word altogether), 'fall out' instead of 'follow' (line 58), 'scare' instead of 'scar' (line 94).

Thank you, we corrected these and gave the manuscript a new language revision.

Interactive comment on Earth Syst. Dynam. Discuss., <https://doi.org/10.5194/esd-2019-49>, 2019.

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