



## Geoethical Thinking and Wicked Socio-Environmental Systems

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So far, Geoethics represents a way of thinking that is emerging within some communities of terrestrial and applied geosciences, such as engineering geology or studies of natural hazards. Also, geoethical thinking has roots in the practices of chartered geo-professions. Here I explore whether the concepts that underpin 'geoethical thinking' may have a wider application range than terrestrial and applied geoscience communities.

Drawing on its initial scope [1], Geoethics is about responsible conduct of geoscience research. It got described as "appropriate behaviours and practices, wherever human activities interact with the Earth system". So far, scholarly inquiries into geoethical thinking described an actor-centric ethic ('appropriate behaviours and practices'), a multi-faceted purpose of Geoethics, and a range of underpinning values. Conceptually, geoethical thinking broadly refers also to environmental or professional ethics. Hence I conclude, in times of anthropogenic global change, Geoethics offers a tool to understand the societal relevance of geosciences.

Drawing on a such extended scope, I argue further that Geoethics has the potential to apply to the generic anthropological issue of 'building a human niche'. Hence, the application scope of geoethical thinking ("wherever human activities interact with the Earth system") extends beyond geosciences: First, application in any natural, engineering and social science, which is relevant for 'building the human niche'; second application in the governance of socio-economic systems under anthropogenic pressure.

To start exploring this hypothesis, small-scale fishery and seabed mining are my pivot-examples for initial reflections. Small-scale fisheries are multi-actor socio-environmental systems under pressure by anthropogenic global change and industrial exploitation. Seabed mining is an emerging industrial activity at the margin of commercial exploitation, which plans to operate remotely controlled technology under conditions of significant environmental and technological risks in a harsh environment that, in turn, hampers monitoring of the operations. The technical and commercial operations, the embedding into global supply chains, and the multi-level regulation/management give small-scale fishery and seabed mining the features of a wicked system; their governance therefore is a 'wicked game'.

Exploring these two examples through a 'geoethical lens', 'geoethical thinking' seems suitable to guide actors, which have to operate in socio-environmental system that are under anthropogenic pressure, exposed to important environmental and technological risks, and exhibit a multi-level governance. Hence, I postulate that 'geoethical thinking' may apply to different realms of wicked human niche-building and that actors may consider 'Geoethics is providing a helpful orientation'.

[1] International Association for Promoting Geoethics 2016, Cape Town Statement on Geoethics, <http://www.geoethics.org/ctsg>

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