



## **A category-theoretic model framework as mediator between disciplines in the Anthropocene**

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The notion of the Anthropocene does not fit well into the frame of scientific disciplines. The proposed onset of a new geological epoch has become closely linked with human history and with notions such as purposeful human actions. Purposefulness, however, is also subject to interpretation in the humanities and does not fit into analytical methods in Earth sciences. Scholars have taken up this challenge and engage with Earth scientists in public discourse on the Anthropocene. Due to the lack of a common frame of reference, discussions suffer from incompatible abstractions, notions, methods and results. Here, we propose an abstract model-framework facilitating communication between Earth scientists and scholars. In Earth sciences, models are often employed to provide a representation of an independent reality which imposes limits to growth. In the humanities, self-reference and reflexivity of modernity at all scales including the globe becomes a key issue. In the former view models can be decomposed and locally tested, in the latter models and concepts involving human action need to be considered in all their contextual and semantic relations. Typically, such concepts, for example in anthropology, do not come in a mathematical language. Nevertheless, we suggest that a common reference can be sought in an abstract model language, rather than in realistic models. Category theory and formal notions developed in computer science may provide such an abstract framework to accommodate the apparently incompatible views of models and concepts, which are considered as successful by their respective home disciplines. Diverse models such as examples from game theory (economics), from dynamic system theory (Earth science) and from a classification of ethno-cosmologies (anthropology) can be formulated as different instances within a joint and abstract framework. Such a framework allows to investigate implications of the Anthropocene for logical similarities with past environmental events by seeking historical analogies (for example with the great oxygenation event) or formulating consistency requirements for the future (for example by defining sustainability). The prize for the common basis is a strict 'epistemic hygiene', avoiding most ontological assumptions and criticisms which often appear as dear to Earth scientists and scholars, but which may prevent a more fruitful exchange on an urgent interdisciplinary topic.