Taking responsibility: Geo-societal studies of alternative futures

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Societies deploy technologies and infrastructures to interact with natural systems – for which geoscience expertise is key, including understanding changes due to unsustainable human practices. Despite its geoscience basis, however, human interaction with natural systems primarily is an economic, social and cultural endeavour about a desirable human niche. Depending on the ‘political spin’ of given actors – stewardship or engineering, for example – a geo-societal narrative is created when shaping the global human niche. These narratives explain how a given technology or infrastructure shall support production, consumption and societal well-being, as well as societal change and environmental alteration. Relatedly, as highlighted by the geoethics approach\textsuperscript{[*]}, geoscience research has ethical, social and cultural implications – for example, in terms of explanatory narratives. Led by climate research, contemporary Earth System Science illustrates that anthropogenic global change is as much a socio-cultural than a science theme\textsuperscript{1–3}, which cannot be neatly disconnected.

Because the science and the socio-cultural spheres are so inevitably intermingled, a holistic approach to geoscience is required, e.g. when it comes to the future of humankind. Applying the ethical concept of responsibility for future generations (intergenerational justice), the geoscience community should engage with studying pathways to possible futures; that is: to embrace integrated assessments, which are holistic, involving personal and societal concerns, economic and environmental choices as well as philosophical conceptions of the world, human histories and human futures. While some geoscience domains, such as climate sciences, embarked on integrated assessments, others focus on past and present dynamics. In particular, studies of hydrology, nutrient cycles, soils and natural hazards seem prone to engage with holistic, future-oriented integrated assessments.

Swift geo-processes such as the rise of the global sea-level are a ‘geological present’. However, human perception sees them shaping ‘a later future’ only – which sometimes blurs people’s sense-making of the present. Therefore, intergenerational justice calls upon geoscientists to engage with studies of possible future configurations of the Earth System; that is, geoscientist should study the networked geo-, bio-, techno- and societal-cultural systems holistically. It would be negligent grounding political governance on a body of expertise that lacks the integration of future-oriented geoscience knowledge with social science and humanities. More specifically, we argue to envisage a highly integrated exploration of alternative future policy pathways\textsuperscript{4}. This approach envisages a
deliberative learning process about policy alternatives in light of their practical (geoscience and socio-cultural) implications, engaging the potential of geoscience research for humankind.

[*] http://www.geoethics.org/definition