

One Realm: Thinking Geoethically and Guiding Small-Scale Fisheries?

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Abstract This essay explores common features of the ‘FAO Guidelines for small-scale fisheries’ and ‘geoethical thinking’ (geoethics). These two approaches to governability stem from communities/environments that habitually do not interact. Small-scale fisheries are socio-environmental systems heavily pressured by anthropogenic global change. The FAO Guidelines for small-scale fisheries propose how to address this challenge. The concept of geoethics has emerged amongst geoscientists as a way of thinking to understand the societal implications of geoscience professions. When comparing these approaches, they both turn out to be actor-centric and aim to further a path/context-dependent development that respects interests of all actors mutually. Supposedly, such guidance to handle socio-environmental systems may also apply to other communities/environments. To that end, ‘geoethical thinking’ may offer a helpful ‘meta-order’. In turn, geoscientists may like to enrich geoethics from experiences outside their community, e.g. from managing small-scale fisheries.

Résumé Cet article explore les caractéristiques communes des « lignes directrices de la FAO pour la pêche artisanale » et de la « pensée géoéthique » (géoéthique). Ces deux approches de la gouvernabilité proviennent de communautés/environnements qui habituellement n’interagissent pas. Les pêcheries à petite échelle sont des systèmes socio-environnementaux fortement soumis aux changements mondiaux anthropiques. Les lignes directrices de la FAO pour la pêche artisanale proposent des moyens de relever ce défi. Le concept de la géoéthique a émergé parmi les géoscientifiques comme une façon de penser pour comprendre les implications

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sociétales des professions géoscientifiques. En comparant les deux approches, elles se révèlent toutes deux centrées sur l'acteur. De plus, toutes deux visent à favoriser un développement relatif au cheminement/au contexte qui veille au respect mutuel des intérêts de tous les acteurs. Il semblerait que de tels conseils pour gérer les systèmes socio-environnementaux puissent également s'appliquer à d'autres communautés/environnements. À cette fin, la « pensée géoéthique » peut offrir un « méta-ordre » utile. À leur tour, les géoscientifiques pourraient aimer enrichir la géoéthique à partir d'expériences en dehors de leur communauté, comme par exemple la gestion de la pêche artisanale.

Keywords Small-scale fisheries · Socio-environmental system · Governance · Geoethics · Actor-centric approach · Anthropogenic global change

Introduction

This essay discusses the link between the 'Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication' (hereinafter SSF-Guidelines, <http://www.fao.org/3/a-i4356e.pdf>) and the concept 'geoethics', that is, the societal relevance of geosciences. The Committee of Fisheries of FAO adopted the SSF-Guidelines in 2014 to foster sustainable development of fisheries communities in coastal regions. The SSF-Guidelines have the form of a rights-based top-down initiative. Still, the processes to agree on content and implementation of these guidelines exhibit strong bottom-up features. Geoethics or 'geoethical thinking' shall offer geoscientists in applied and basic disciplines a tool to understand the societal implications of their professions. Geoethical thinking has emerged in a bottom-up process within geoscience communities (Peppoloni and Di Capua 2015). To further the development of the notion of 'geoethics', it needs exposure to neighbouring fields of scholarly inquiry (in social and natural sciences), such as environmental ethics, and to the debates of philosophers of science (Douglas 2009; Hulme 2009; Hourdequin 2015; Castree 2017). This essay provides a case study for such an exposure and illustrates its mutual benefits.

Four lines of scholarly enquiry help to relate the SSF-Guidelines and geoethical thinking. It emerges, first, that the emphasis on the human actor is a shared central lever of both approaches. Second, the two ancillary notions of 'human niche' and 'Anthropocene' help to understand the relationship between both approaches. A first line of enquiry, which the paper 'Global change and the future ocean: a grand challenge for marine sciences' (Duarte 2014) illustrates, describes the state of the global ocean and coastal seas under the impact of anthropogenic global change, that is, within the 'Anthropocene'. Duarte also offers a definition of 'anthropogenic global change' (p. 1), namely 'the global-scale changes resulting from the impact of human activity on the major processes that regulate the functioning of the biosphere', which in the context of this essay should be read as 'functioning of the geo-biosphere'. The paper 'Global Ocean Governance: New and Emerging Issues' (Campbell et al. 2016) illustrates a second line of enquiry. It describes issues such



as ‘small-scale fisheries’, ‘ocean acidification’, ‘seabed mining’ or ‘blue carbon’ as pressing to develop better marine governance. The paper ‘Walking the talk: implementing the international guidelines for securing sustainable small-scale fisheries’ (Jentoft 2014) illustrates a third line of enquiry. It emphasizes that governance is the key challenge to implementing the SSF-Guidelines. The book ‘Earth System Governance—world politics in the Anthropocene’, illustrates a fourth line of enquiry (Biermann 2014). It shows that the implementation challenge of the SSF-Guidelines is a particular realization of the more common challenge regarding how to govern ‘global commons’ sustainably.

These ‘global commons’ are socio-environmental systems, which are composed of (i) human systems and practices, (ii) natural systems and processes and (iii) their dynamic intersections (Smith and Zeder 2013; Bohle 2016; Head and Xiang 2016). These systems can change simultaneously at local, regional and planetary scale. They are a composite of natural and societal processes and exhibit non-linear system dynamics, multiple feedbacks and counter-intuitive behaviours (Hulme 2011; Tickell 2011; Monastersky 2015; Seitzinger et al. 2015; Schimel et al. 2015). When considering socio-environmental environmental systems of planetary scale, two ancillary notions are useful: ‘human niche-building’ (Ellis 2015; Fuentes 2016) and ‘Anthropocene’ (Steffen et al. 2016; Zalasiewicz et al. 2015).

Scholars in social sciences and humanities have criticised the notion of the ‘Anthropocene’ as being ill-conceived because it conceals the particular actors and their respective responsibility in the historical contexts. These views were justified a decade ago; they have since been addressed (Sayre 2012; Haraway 2015; Pálsson et al. 2013; Lövbrand et al. 2015; Emmett and Lekan 2016; Autin 2016; Rosol et al. 2017; Olsson et al. 2017). Mutatis mutandis, the term ‘Anthropocene’ is a shorthand for our times (Clark and Gunaratnam 2017; Walton and Shaw 2015; Veland and Lynch 2016; Lorimer 2017). Notwithstanding these debates, ‘the genie is out of the bottle’ (Lorimer 2017, p. 123), and in turn, philosophers may say that ‘the Anthropocene for the first time gave birth to a universal “Anthropos”’ (Hamilton 2017, p. 118). A comprehensive introduction to current global changes and related societal impacts, the Anthropocene, is found in the book by Biermann (2014, pp. 2–8).

Small-Scale Fisheries as Part of Building a Human Niche

Since prehistoric times, people have purposefully altered their environments at local, regional and/or continental scale, including the coastal zone (Mee 2012). Niche-building is a historical process (Bonneuil and Fressoz 2013; Latour 2015). Many acknowledge that the cumulated anthropogenic change of the geo-biosphere triggered a new stage of the Earth’s system, the ‘Anthropocene’, that is dynamically different from the ‘Holocene’ (Waters et al. 2016). Some set its onset at the mid 20th century (Zalasiewicz et al. 2015). Since then, the human population has tripled and the affluence of people living in the developed world has taken off. Under such circumstances, maintaining the functioning of marine socio-environmental systems for human well-being becomes a challenging niche-building exercise (Jentoft and Chuenpagdee 2009; Brown et al. 2014). The change of the marine environment and



the need for its shared governance made to ‘conserve and sustainably use the oceans, seas and marine resources for sustainable development’ the 14th United Nation’s Sustainable Development Goal.

The industrial global supply chains are the main driver to shift the dynamics of the Earth’s systems. Yet, the cumulated number of local or artisanal activities also has its impact, in particular when triggered through shifts of environmental systems that industrial exploitation is straining. The collapse of the small-scale fisheries off Central West Africa may serve as an example:

Fish stocks have declined along the Central West African coast due to a large extent to rapid exploitation by high-tech international fishing fleet and due to the degradation of mangrove forests, sea grass beds and coral communities as a result of, for example, climate change and pollution. Consequently, diets and trading activities shift to so-called ‘bushmeat’ such as chimpanzees and flying foxes. These are well-known sources of zoonotic diseases such as Ebola, Marburg viruses and human monkeypox... The combined impacts of fish stock decline, epidemic outbreaks, additional losses in ecosystem services, water stress, and poverty put already fragile states such as Congo and Cameroon under severe pressure (Galaz et al. 2011, pp. 7–8, edited).

Shifting attention from this particular case to the general pattern, the small-scale fisheries (within the industrialised use of the coastal zone) provide a key example of how people are changing the marine geo-biosphere (Newton et al. 2012). As outlined in the SSF-Guidelines (p. 4), the small-scale fisheries business, which operates aside intensive industrial fishing, lands about half of the global catch of fish and employs about 90% of the workforce. Likewise, small-scale fisheries deliver an example of the difficulty of measuring the impact of people (Pauly and Zeller 2016)—in this case the share of small-scale fisheries (artisanal, subsistence and recreational) of the total landings of fish.

Small-scale fisheries have a potential to contribute to sustainable development because they contribute directly to food and livelihood security, balanced nutrition, poverty reduction and wealth creation, foreign exchange earnings and rural development of many, not only developing, countries. Therefore, in June 2014 after a decade-long process, the FAO member states endorsed the voluntary SSF-Guidelines, which offer a comprehensive framework of several building blocks. Founded on a human-rights-based approach to social development and an empowerment process for community organisations (including decision-making power of women) the SSF-Guidelines argue in favour of an adaptive co-management that accounts also for traditional knowledge and customary rights. Further important building blocks of the SSF-Guidelines are to protect (and to legislate) the rights of small-scale fishing communities to fishery resources and land. Likewise, the SSF-Guidelines promote market access through improved post-harvest handling and access to credit. Furthermore, the SSF-Guidelines emphasise supporting diversified livelihoods including access to basic social services and overarching capacity building and networking.



Facilitated by the political choice to make voluntary the adherence of stakeholders, the SSF-Guidelines could be comprehensive in terms of topics that are covered. They could integrate social, cultural and economic sustainability issues, and address resource access (allocation) as well as use rights matters guided by human-rights principles. Hence, the SSF-Guidelines are an opportunity for a coordinated strategy for any institutional and individual actor to ensure the sustainability of small-scale fishers and their communities. Implementing the SSF-Guidelines will require policy intervention and innovation at many levels, contributions of civil society organisations and academia, and the empowerment of fishers as participants in decision-making processes. An effective implementation of the SSF-Guidelines will package many threads of (top-down and bottom-up) action in a context-specific and actor-dependent manner. Hence, implementing the SSF-Guidelines will be challenging case by case, whether at local, national or regional level (Jentoft et al. 2017). Therefore, an effective and efficient governability across various scales calls for meta-systems that associate the actors across these scales (Biermann 2014). Implementing voluntary governance instruments such as the SSF-Guidelines would benefit from such meta-systems.

A Perimeter: Geoethics' Application Contexts

The combination of the prefix 'geo' and the term 'ethics' indicates quite different content; e.g. Geographers used the term 'geoethics' when referring to ethical issues related to mapping (Harley 1990; Sánchez-Gutián 2013). In the last two decades, geoscientists developed a particular notion, that is 'geoethics', as part of their thinking about geosciences and society (Wyss and Peppoloni 2015; Peppoloni and Di Capua 2016) along with other scholars (see reference in Martínez-Frías et al. 2011) who use a variant connotation.

Obviously, geoethical thinking shares many subjects with professional ethics, conservation ethics, sustainability ethics and environmental ethics (Shearman 1990; Jamieson 1996; Proctor 1998; Lynn 2000; Jax et al. 2013; Kopnina 2014; Ott 2014; Hourdequin 2015). Among these relations, environmental ethics is related most closely to geoethical thinking. Hourdequin (2015) reviews in her book theory and application of environmental ethics. Within this frame, geoethical thinking focusses on the human actor, in particular the geoscientist. The 'Cape Town Statement on Geoethics' (<http://www.geoethics.org/ctsg>), prepared during the 35th International Geological Congress (Cape Town, 2016), describes the purpose of geoethical thinking. It states 'to improve both the quality of professional work and the credibility of geoscientists, to foster excellence in geosciences, to assure sustainable benefits for communities, as well as to protect local and global environments; all with the aim of creating and maintaining the conditions for the healthy and prosperous development of future generations'. Hence, 'geoethics' is not a catchall term. Instead, it has the particular function of supporting geoscientists when acting in their professional capacity. The development of geoethics has happened 'by constituency', 'on a case-by-case basis', and 'by the matters to tackle'. Examples are the design of professional codes (Gundersen and Townsend 2015; Abbott 2017), the



conception of training events (Mogk et al. 2017) or the need to reach out to the public (Peppoloni and Di Capua 2012; Stewart and Nield 2013). Considering human activities in a geoscience context also has led to philosophical reflections (Kleinhans et al. 2010; Lucchesi and Giardino 2012).

In a first instance, geoscientists developed geoethics as a professional tool. However, geoethical thinking (or geoethics) has a wider application context that stems from the role of geosciences and geo-technologies in supporting the setting up of humankind's production systems and consumption patterns. Evidently, geosciences share that feature with many other disciplines, for example agricultural research or fisheries management, and geosciences even may be a late addition. Yet, geosciences provide the particular expertise on how to intersect production systems and the geosphere (Bohle 2017). In view of this specificity, geoethical thinking concerns also the 'ethics of a wider professional audience' or issues such as 'expert advice and citizen's insights', 'application cases for human value systems', or 'layperson's responsibility in daily dealings'.

Only when seen in its initial context is geoethical thinking a tool for geoscientists. To that end, geoethical thinking includes various dimensions, such as individual behaviour, societal responsibility and viewing Earth as a home for many. Hence, geoscientists use philosophical, scientific and socio-economic concerns to reflect upon professional conduct in different societal settings. As well, they study shared professional responsibility, integrity, mutual understanding of diversity and intellectual honesty. When seen in a further context, geoethical thinking addresses sound practices in various professions. Anthropogenic global change challenges multiple disciplines regarding risk-taking, managing uncertainties, or revising options. Professionals will examine whether the scientific, technical and socio-economic matters which have underpinned a professional practice so far remain 'valid', or whether the established scientific and governance choices remain professionally 'sound'. When seen in a third context, geoethical thinking addresses expert advice and citizens' insights. The phenomena that illustrate the intersections of humankind's cumulated activities and the geo-biosphere are not part of the common knowledge of citizens. Hence, beyond using the knowledge of experts, any insight into anthropogenic global change processes is an outcome of societal processes. It encompasses debates about lifestyles and preferences, as well the denial of global change. In such circumstances, practitioners, professionals and scientists also act as citizens who shall share their insights with decision-makers or non-professionals, and debate value statements, world-views and preferences. When seen in a fourth context, geoethical thinking addresses value systems; our species has acquired the power to alter Planet Earth, namely to drive anthropocentric global change by the number of people, societal structures and technological skills. Anthropocentric global change is about governing the intersections of human economic activities and the geo-biosphere, as a function of humankind's needs. Hence, it is value-driven, e.g. how to appropriate and distribute natural resources, by whom and at what cost, whether to accept side effects and the risk of collateral damage. In the context of anthropocentric global change, the complexity of such ethical issues has no precedent because of the number of concerned people with different needs, diverse world-views and various preferences. When seen in a fifth



context, geoethical thinking addresses how to take responsibility for Earth system dynamics in anyone's daily dealings; so far, people did not intend to modify Earth at a planetary scale, although many were aware of the impact of humankind's cumulative activities upon the biosphere. Until rather recently, most people had no insights into the intersection of humankind's economic activity with the geosphere. Nowadays, having lost innocence, contributing to anthropocentric global change is an intentional act, and its denial a liability.

When extending the application context of geoethics as outlined above, then it overlaps with neighbouring topics of scholarly inquiry and debates of philosophers of science. Consequently, to distinguish geoethics among related topics, such as environmental ethics, some specific features have to be agreed.

Sketching Geoethics' Place among Neighbouring Fields

Three inquiries situate geoethics within adjacent topics, namely by the application field (e.g. 'environment'), by the cognitive content (e.g. 'research integrity') and by the methodology (e.g. 'philosophical theory'). Exploring the relationships of geoethics with adjacent topics is an ongoing effort to which this essay contributes.

Possibly the most well explored relationship between geoethics and adjacent topics concerns research integrity and outreach to society (Stewart and Nield 2013; Bohle 2015; Mayer 2015; Martin and Peppoloni 2017). The reflections about the 'geoscientist's promise' should be mentioned explicitly (Matteucci et al. 2014; Riede et al. 2016; Bohle and Ellis 2017). However, exceptions apart (Stewart and Lewis 2017), insights into geoscience/science–society interactions (Douglas 2009; Hulme 2009; Cairney 2016; Kowarsch 2016) are less used.

Possibly, the most promising interface of geoethics with a neighbouring topic concerns the studies of environmental ethics (Hourdequin 2015). Scholars may even argue that geoethics is a genuine part of environmental ethics. Such a reflection seems valid because of either the similarity of the human interactions with the living and the non-living world or the close connectivity of abiotic and biotic processes to shape fluxes of matter and energy in various environments. In addition, several subjects of environmental ethics are relevant for the ethical thinking of geoscientists, such as the application of the 'precautionary principle', considering a 'utilitarian approach' or 'environmental justice', reflecting about a 'generic value of beings and environmental features' or studying how to make 'value judgements in circumstance of uncertainty'. Hence inquiries, such as those of Nikitina (2016), using such perspectives to describe geoethical thinking belong to the discipline of environmental ethics.

Geoethics and environmental ethics are distinct. The concern for the relationship between humans and other living beings is central to environmental ethics, in particular regarding beings that feel pain and exhibit traits of consciousness. Contemporary geoethics does not include the specific subject 'relationship between humans and other living beings', although one early user of the notion of 'geoethics' did not apply this abstraction (Lynn 2000). When specified in this manner, then geoethics still could qualify within environmental ethics as a 'virtue ethics of an individual actor' (e.g. geoscientists). It would distinguish geoethics, for example,



from norms that apply utilitarian ethics. Beyond this observation, which provides for some distinction of geoethics from environmental ethics, applied geoscience expertise relates directly with engineering, thus technologies and managerial professions (Bohle 2017) and ethical issues of exercising them (Buhmann 2016; Nurmi 2017).

Summarising this sketch-out, any debate to delineate geoethics from environmental ethics is a question of degree, and possibly of ‘professional identity’. In the following discussions, geoethical thinking is described as a ‘virtue ethics of an individual actor’. To paraphrase Peppoloni and Di Capua (2015), the application scope of geoethics is ‘to guide behaviours and practices of the individual actor whenever human activity interacts with the Earth system’.

Entangling Small-Scale Fisheries and Geoethics

This section offers three threads of thought regarding how ‘governing small-scale fisheries’ and ‘describing geoethics’ entangle mutually.

Common Thread: Human Bearings, Complexity and Scales

Niche building is a generic activity of our species (Bonneuil and Fressoz 2013; Smith and Zeder 2013; Ellis 2015; Fuentes 2016). Debates are ongoing ‘since when’ and ‘to what degree’ such ‘making of socio-environmental systems’ alters the Earth, thus going beyond tracing the existence of our species (Zalasiewicz et al. 2015). Notwithstanding these debates, it is evident that human niche building also affects the coastal seas. The United Nations Economic and Social Council qualified in 2016 five coastal seas to be ‘at risk from coastal eutrophication’ (<https://unstats.un.org/sdgs/files/report/2016/secretary-general-sdg-report-2016-EN.pdf>, Vol. E/2016/65, p. 18). Likewise, niche-building affects the world oceans; Duarte (2014, pp. 4–5) summarises the review:

The rapid increase in human population since the industrial revolution and their preferred settlement in coastal areas...has led to a major physical transformation of the shoreline...associated with the widespread loss of habitats fringing the shoreline...Together with human settlement in coastal areas, changes in the land use in watersheds and river regulation through the massive construction of reservoirs over the past 60 years have affected the delivery of materials, from sediments and organic matter to nitrogen, phosphorous... Efficient atmospheric transport also delivers dust, organic carbon, nitrogen and pollutants to the most remote regions of the ocean...

Regarding obstacles to address these changes, Duarte (2014 p. 6) identifies:

the largest source of uncertainty rest with human drivers, as not only social dynamics and shifts in the consumer attitudes are difficult to forecast, but the introduction of new, disruptive technologies are intrinsically unpredictable... A third source of uncertainty is the prevalence of non-linear systems that can



lead to abrupt changes... departing from the linear, smooth responses that are amenable to prediction....

The issues ‘uncertainty with the human drivers’, ‘impact of disruptive technologies’ and ‘behaviours of non-linear system’ are generic features of terrestrial and marine socio-environmental system, be it small-scale fisheries in coastal seas or systems explored by geoscientist. These features make sustainable governance of these systems a most complex problem. The multiple spatial scales (local, regional and global) of these systems, the diversity of actors, and their shifting attitudes towards exploitation and governance of resources add to the complexity.

Common Thread: Context Dependence in Socio-environmental Systems

Over the last 200 years, people have considerably developed their skills to appropriate resources from terrestrial and marine environments. In relation to how their skills developed, the perceptions of people varied as regards what is appropriate exploitation and governance. As an example, Purdy (2015) describes the history of public opinion and politics in the USA, how to perceive terrestrial wilderness and the right, or even the moral obligation, to exploit it. In the same manner, the marine environments were portrayed as ‘unpeopled spaces of nature, but not society...[that] support a commitment to freedom of the seas’ (Campbell et al. 2016, p. 519). Such a perception of ‘freedom’ supports a practice of exploitation by actors that have the necessary means to do so. For illustration, some decades ago, the United Nations Convention on the Law of the Sea (UNCLOS) had coined the notion ‘common heritage of mankind’ to qualify the mineral resources at sea bottom. Nowadays, as mineral exploitation in deep waters becomes more feasible, this view is challenged (Jaeckel et al. 2016; Campbell et al. 2016).

Generalising, the abilities of a given actor to appropriate resources from the environment vary with: (i) the socio-economic status of the community to which the actor belongs, (ii) the resources and technological means at the disposal of this community, and (iii) the particular situation of the individual actor within this community. Correspondingly, views (of the individual actor and the codified guidance) vary regarding what to consider as sound exploitation and rightful appropriation. The evolving abilities of the various actors to exploit resources and the actors’ understanding of fair appropriation rights together set a shifting context for planning, decision-taking and action, i.e. how to tackle the various features of a given socio-environmental system. Regarding the context of abilities and understanding, Campbell et al. (2016, p. 519) identified three environmental governance themes: ‘actors, scale and knowledge’ as being common for several emerging ocean governance issues including fisheries. To handle context dependence requires strategies, which (i) by ‘nature are adaptive, participatory and transdisciplinary’ (Head and Xiang 2016), (ii) apply a collaborative rationality (Innes and Booher 2016) and (iii) provide a governance capability, which Termeer et al. (2016) frame with the attributes ‘reflexivity’, ‘responsiveness’, ‘resilience’, ‘revitalization’ and ‘rescaling’. Such strategies are a genuine part of the SSF-Guidelines, and as such make context dependence explicitly part of the basis of its design (Jentoft 2014).



The experiences that underpin the design of the SSF-Guidelines have tuned strategies to handle evolving context dependencies, and as a result, they enable actors to address a shifting context for planning, decision-taking and action. These actors will have to navigate uncertainties and ambiguous situations that they will encounter (Lundström and Mäenpää 2017). As Biermann (2014) suggests for such circumstances, a shared normative framework may help to handle context dependence, uncertainties and ambiguous situations of the behaviour of socio-environmental systems.

Geoscientists have shaped geoethics to handle the context dependence, uncertainties and ambiguous situations as experienced in their professions. This feature aligns the thinking that underpins geoethics and the SSF-Guidelines. Furthermore, it may enshrine the option to interpret geoethics as a contribution to a shared normative framework. Analysed in that perspective, it is essential that geoethical thinking discuss the role of societies, people and individual citizens, their skills and insights, and their activities to appropriate geo-resources (Peppoloni and Di Capua 2015, 2016). As Bobrowsky et al. (2017, p. 36) summarise, ‘geoethics is an orientation tool for geoscientists, able to provide them with the ethical dimension of their actions’. This view encompasses: (i) the responsibilities of individual geoscientists and their services to society, (ii) how to conduct and communicate research, and (iii) the functioning of professional organisations and commercial activities. Peppoloni and Di Capua (2012) offer a definition of geoethics: ‘Geoethics consists of research and reflection on the values which underpin appropriate behaviours and practices, wherever human activities interact with the Earth system. Geoethics deals with the ethical, social and cultural implications of geoscience education, research and practice, and with the social role and responsibility of geoscientists in conducting their activities’ (<http://www.geoethics.org/>). Described in this manner, geoethical thinking refers to the human actor in general. Evidently, the professional geoscientist (of any trade) is the key addressee of the definition.

However, the definition is much wider when describing actors, namely ‘wherever human activities interact’. This essay promotes this view, that is, geoethics addresses any human actor whose activities cause interactions with the Earth system. Such a view deeply entangles geoethics and the SSF-Guidelines.

Common Thread: Agent-centric Approaches to Governance

The definition of geoethics distinguishes it clearly from ‘utilitarian concepts’, ‘ethics of justice’ or ‘conservation for its own sake’, as discussed for ocean ethics (Auster et al. 2009; Ott 2014) or considerations such as ‘to reclaim the concept (ecosystem services) as a useful one in terms of the wider ethical debates surrounding human–nature relations’ (Jax et al. 2013, p. 266). Recent inquiries into geoethics have put the individual, the agent or the human agency at the centre of reflections [Druguet et al. 2013 (geoconservation); Mayer 2015 (integrity); Pievani 2015 (history); Potthast 2015 (technology); Peppoloni and Di Capua 2015 (societal responsibility); Tubman and Escobar-Wolf 2016 (development); Bohle and Ellis 2017 (individual responsibility)].



Such an agent-centric approach to ethical practices may seem obvious for geosciences because the codes of practice for chartered professionals are normally built like this (<http://www.geoethics.org/codes>). Notwithstanding an agent-centric tradition in ethics of chartered geoscience professions, the emergence of the notion of the Anthropocene is challenging many geoscientists. Discussions regarding whether to amend the geological timescale by naming the present times ‘Anthropocene’ have witnessed a related unease (Finney and Edwards 2016; Zalasiewicz et al. 2015). Nevertheless, considering together the notions of Anthropocene and geoethics sharpens the focus on the behaviour of human actors (Hamilton et al. 2015; Schmidt et al. 2016). Therefore, when understanding geoethics as ‘research and reflection on the values which underpin appropriate behaviours and practices, wherever human activities interact with the Earth system’, to be an integral part of professionalism in geosciences (and geo-technologies), then geo-professionals can internalise a wider understanding of the human actor and the societal implications of geosciences. In turn, such a wider contextualisation of professional activities provides for comprehensive assessment practices such as the ‘Millenium Ecosystem Assessment’, the ‘International Assessment of Agricultural Knowledge, Science and Technology’, or the ‘Intergovernmental Platform for Biodiversity and Ecosystem Services’ (Kowarsch et al. 2016).

Referring back to the marine environment and the lenses for inquiry that are used in this essay, regarding the human role Campbell et al. (2016, p. 535) emphasise that ‘actors, scale and knowledge (that) are relevant for efforts to govern new and emerging ocean issues’. Such ocean issues are described, for example, by Huges et al. (2017, pp. 84–85) as ‘[l]ocally, the consumption of reef fish is shaped by a combination of the size, socio-economic status and cultural norms of the human population. By emphasising proximal drivers rather than more distant human ones, we often inadvertently simplify and re-scale a complex social–ecological problem into a subsystem that is entirely biological, which can distract from the underlying causes and ways to address them. A social–ecological approach for sustaining ecosystems is beginning to emerge that explicitly links the resilience of ecosystems to governance structures, economies and society.’ Campbell et al. (2016, p. 356) generalise this example by saying: ‘science has focused on resources and ecosystems rather than human use... partly a[s] function of constructions of oceans as unpeopled and human interest as remote... (or) from framing problems as technical’. In their quest to overcome such limitations they qualify that the ‘SSF-Guidelines stand out as an exception..., attending as much to questions of resource access, human rights and food security as they do to questions of fisheries ecology’ (Campbell et al. 2016, p. 536). Hence, they qualify the SSF-Guidelines as actor-centric and as such an ‘opportunity to create governance regimes that support environmental sustainability and human well-being’ (Campbell et al. 2016, p. 536), notwithstanding that their ‘implementation (that) is likely to be an ongoing, adaptive and iterative process, as small-scale fisheries are dynamic’ (Jentoft 2014, p. 12). Beyond these insights found for governing small-scale fisheries, Biermann (2014, pp. 22–24) argues for an Earth system governance as a common normative approach for handling of socio-environmental systems. This requires a framework that interrelates agency, accountability and legitimacy, and reflects on the central issue



of fair allocation; or as Biermann writes (2014, p. 146) ‘[a] global situation of large inequalities in resources and entitlements... (t)he analysis of agency in earth system governance—that is, of those actors who have the authority to set and enforce rules and norms—requires an understanding of the vast social divisions on our planet... questions of fairness in adaptation arise as well, including concerns about compensation and support by the global community of the most affected and most vulnerable regions’.

The SSF-Guidelines show how to conceive the governance of a particular Earth system through a common normative approach. The actual thinking among geoscientists about geoethics takes a similar approach: ‘It is essential to enrich the roles and responsibilities of geoscientists towards communities and the environments in which they dwell... Human communities will face great environmental challenges in the future. Geoscientists have know-how that is essential to orientate societies towards more sustainable practices in our conscious interactions with the Earth system. Applying a wider knowledge-base than natural sciences, geoscientists need to take multidisciplinary approaches to economic and environmental problems, embracing (geo)ethical and social perspectives. Geoscientists are primarily at the service of society. This is the deeper purpose of their activity’ (Cape Town Statement on Geoethics, <http://www.geoethics.org/ctsg>).

Summarising, this section illustrates how several threads of experiences encourage putting the individual human actor (its needs, preferences, thinking and actions) at the centre of concerns for a context-dependent and path-dependent governance of socio-environmental systems. This shared focus entangles these experiences. It enriches the related frameworks, SSF-Guidelines and geoethics, respectively. Furthermore, it invites use of these frameworks also outside their initial constituencies.

Conclusions

This essay explores characteristic features of the FAO’s ‘Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Food Security and Poverty Eradication’ and ‘geoethical thinking’ (geoethics). These two approaches to governability of socio-environmental systems stem from communities/environments that habitually do not interact. Hence, geoethics and SSF-Guidelines should mutually benefit from their corresponding experiences.

This essay shows that geoethics and SSF-Guidelines embed the idea of participatory governance strategies. The SSF-Guidelines address them explicitly. Some geosciences apply them under the label ‘social licence to operate’ (Buhmann 2016). In geoethics, participatory governance strategies are inherent to its definition and explicit in some practices (Lanza 2014; Nurmi 2017). Participatory governance strategies require conditions that provide not only for the representation of laypersons and for their empowerment but also for capacity building and spaces for deliberation (Kowarsch et al. 2016). Geoethics and SSF-Guidelines can further their practices accordingly.



Sustainable small-scale fisheries would be one contribution to the United Nations Sustainable Development Goals, here the sustainable use of oceans and seas for food and to make a living. The operations of small-scale fisheries within industrialised exploitation provide an example of the complexity of handling anthropogenic global change. This involves (Chuenpagdee and Jentoft 2013, p. 344) ‘overall values, norms and principles that guide institutions and actions’ to handle the never-ending sequence of problems. To cope with this situation, actors need a shared meta-order of values, norms and principles to tackle path dependency and context dependency. When iterating a way forward, such a shared meta-order would equip actors to take better-coordinated choices for behaviours and practices when intervening in socio-environmental systems, even in the absence of formal coordination mechanisms. The essay describes actor-centric geoethical thinking (geoethics) as a contribution to such a meta-order, which is emerging in a different constituency than fisheries, to which it could apply.

The ongoing anthropogenic global change is an intentional act, of which practices and experiences of small-scale fisheries is a powerful example. Hence, for citizens as agents of change who have lost their innocence, a shared meta-order would be helpful to guide them. The perspective of an ‘anthropocentric Holocene’, the Anthropocene, frames the conditions in which to organise sustainable development. Under such circumstances, the geosciences are instrumental for sustainable development (Gill and Bulloch 2017). Hence, thinking referring to an ‘actor-centric virtue ethic’ might offer a meta-order to find appropriate behaviours and practices to develop a sustainable human niche governed by mutually respectful actors. The SSF-Guidelines and geoethics provide two distinct examples to that end.

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