Foundations & Examples: How to tackle [Geo]ethical Dilemmas?

I like to thank Silvia and Eduardo. Much of the material that is shown here originated from their work.

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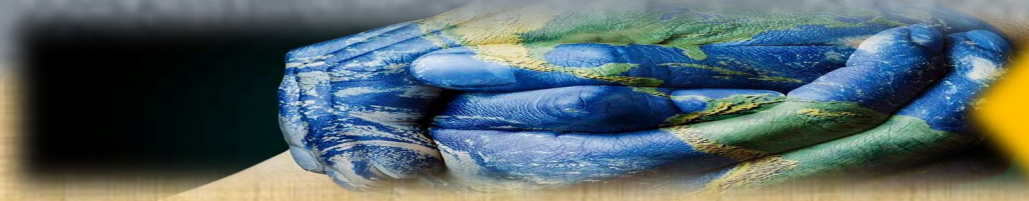
A Take Home Quandary

Ethical Dilemmas

Ethical dilemmas (the truly ones) are situations in which there is a choice to be made between two or more options, neither of which resolves the situation in an ethically acceptable fashion.

(ethical paradoxes)



…we cannot walk away from them, we have to tackle them !

A Preparatory Narrative & Context

This talk is about less-than-satisfying circumstances. I present in the following some concepts and examples how to tackle **[geo]ethical dilemmas**. A little background & context:

- The **human niche** is the planetary network natural and cultural landscapes.
  - Bundled by global supply chains humans restlessly alter their niche; be it through engineering, production or consumption.
- **Geosciences** study the human niche from am earth-centric perspective.
- **Geoethics** is a field within geosciences that explores cultural substrates to support sense-making and action of human agents.
  - Initially, geoethics was conceived for geoscientists, that is, for their professional functions in various societal contexts.
  - Subsequently, geoethics evolved to support any **citizens** when interacting with the Earth system.
  - Geoethics may be amended by Kohlberg's hierarchy of moral adequacy (1981) and Jonas's imperative of responsibility (1984) leading to a **'geoethical rational' ***;
    - namely, to act: '*agent-centric, virtue-ethics focused, responsibility focused, knowledge-based, all-agent inclusive, and universal-rights based*'.

(* Bohle, Martin. 2020. "Geoethics for Operating in the Human Niche." In *Advances in Geoethics and Groundwater Management: Theory and Practice for Sustainable Development*, edited by Manuel Abrunhosa, Helder I. Chamine, and António Chambel. Cham: Springer International Publishing (in print))

What does mathematical theory and experience teach (about limits of proofs)?

NO: neither to experiences, nor to *GÖDEL's THEOREMS* !

- see: https://plato.stanford.edu/entries/goedel-incompleteness/ -

Gödel's incompleteness theorems concern the limits of what can be proven.
The first theorem states that in any consistent formal system "*F*" there are statements, which can neither be proven nor disproven **in** "*F*".
They can only be proven in a lager system that is including *F*.

A suite of remarks

- An **ethical dilemma** offers an alternative between two or more options, none of which is fully acceptable in practice or both have negative consequences.
- Dilemmas involve a conflict between ethical duties, in which to follow one would result in violating another; we do not have a satisfying solution.
- In geosciences, when faced with a possible [geo]ethical dilemma, geoscientists have to answer questions like:
  - *• Can we solve the dilemmas that appear in the practice of our professions? • What if we cannot? • What must we do, then?*
- A geoscientist usually makes choices, that is, trying to look at the best consequences (or at least the less worst) of a decision. Sometimes bad consequences must be carefully evaluated and even accepted.
  - *However: • Who has to decide whether to accept bad consequences?*
- It is not always the duty of a geoscientist to take a decision among those options that appear in a given [geo]ethical dilemma.

A practitioner's remark

- Deontological theories (social contract) may deny that consequences are of any concern, provided the intention was good (compliance with social contract).
- However, not all geoscientists will feel comfortable if their actions, although approved by deontological codes and in spite of their good intentions, result in harm to other people (society) or the environment.
- **Thus,** deontological codes <u>are not the last step</u> for an ethical assurance, facing ethical dilemmas, whatever the consequences;
  - Peppoloni and Di Capua (2017): '*… tendency to confuse "the ethics of responsibility" with "the ethics embodied by the tool" …*'.
- **Therefore,** when we are confronted with a [geo]ethical dilemma, it could be good to think according to the Gödel theorem*, namely that truth in a given system may not be definable within the system.
  - In the case of geosciences, this means that we have to accept the limitation of geosciences ***(= our system***) in offering true solutions to [geo]ethical dilemmas based solely on geoscientific knowledge.

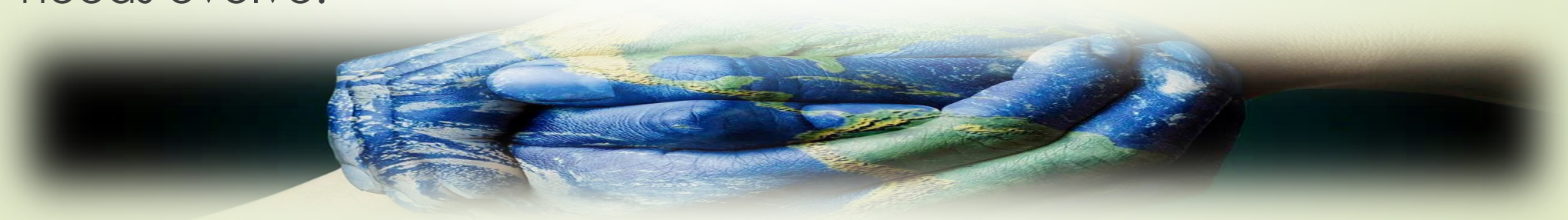
* van de Poel, I. & Goldberg, D. *Philosophy and Engineering:* 2, (Springer Netherlands, 2010)

Another practitioner's remarks

- As real [geo]ethical dilemma is a problem with no perfect solution in absolute terms; however, acceptable solutions may concern specific contexts.
- As there is no perfect solution; ***what has to be our professional attitude?***
  - **First,** we must accept that we offer (only) options & scenarios.
  - **Next**, we shall explain possible choices and their consequences;
    - We recall: *Geoscience knowledge is not universal so to solve a [geo]ethical dilemma based on it, only.*
  - **Further,** we justify decisions (only) from a scientific / technical point of view, indicating pros and cons (also in societal and environmental terms) and analyse probabilities and uncertainties.

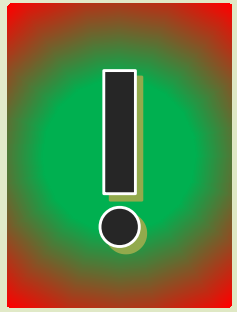
An Example: The difficulties of "*Mining et al. …*"

- Mining comes at the price of environmental and social impacts. Hence, it is dotted with [geo]ethical dilemmas.
- While the requirements to minimise environmental impacts is a regular procedure in the management of mine business (in many places but not any place), this is not necessarily so the case for social impacts.
- Best Practice: A sustained and sustainable mine development requires the collaboration with the host communities concerned, which means to develop a process commonly called ***'social licencing to operate'***.
- However, a 'social licence' will not be granted once and for ever, but in fact is outcome of an evolving process, as the communities and their needs evolve.



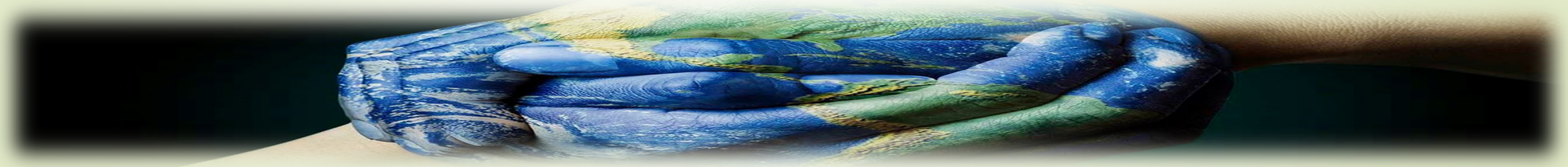
Example: What's the Geological Time-Scale Quandary ? A case study(1)

- Insight (***not questioned***): Human activity has altered the dynamics of the Earth system.
- 1. Issue: Therefore, naming the current times the ***'Holocene'*** may be insufficient to characterise the altered state of the Earth system.
- Action (*proposed)*: Amend the Geological Time Scale; add the epoch ***'Anthropocene'*** at the end of the geological time scale (= 'GTS amendment').
- Comment: The GTS amendment looks like an ***'intra-geoscience'*** proposal, that is, adjusting a scientific method.
- 2. Issue: Well, to name the current times 'Anthropocene' is a statement about the 'human condition' (= ***'extra-geoscience'***).



Example: What's the Geological Time-Scale Quandary? A case study (2)

- Geoscientists have a particular societal responsibility because of the corpus of expertise that they can offer.
  - Their responsibility includes truthful messages to society such as those that would be given by amending the Geological Time-Scale (= GTS amendment: 'Anthropocene').
- Since more than a decade geoscientists debate vigorously whether / how a 'GTS amendment' may be accommodated within the methods to established the Geological Time-Scale.
  - It is a crucial issue in these debates how to keep ***methodological rigour*** (of the scientific ways and means of Chronostratigraphy).



The ‘GTS amendment’ assessed by the ‘Geoethical Promise (GP)*’

* ***The GP is a kind of Hippocratic Oath of geoscientists. It proposes a set of nine normative statements to guide their sense-making and action; six apply to the GTS amendment.***

(I) I will practice geosciences being fully aware of the societal implications, and I will do my best for the protection of the Earth system for the benefit of humankind.

(II) I understand my responsibilities towards society, future generations and the Earth for sustainable development.

(III) I will put the interest of society foremost in my work.

(IV) I will never misuse my geoscience knowledge, resisting constraint or coercion.

(V) I will always be ready to provide my professional assistance when needed, and I will be impartial in making my expertise available to decision makers.

(VII) I will always maintain intellectual honesty in my work, being aware of the limits of my competencies and skills

(VI) I will continue the lifelong development of my geoscientific knowledge. (VIII) I will act to foster progress in the geosciences, the sharing of geoscientific knowledge, and the dissemination of the geoethical approach. (IX) I will always be fully respectful of Earth processes in my work as a geoscientist.

A truthful message to the society is our professional responsibility !

The rigour of scientific method is never compromised to achieve a given outcome !

The Geoethical Promise struggling with the Geological Time-Scale Quandary

Insight: The Erath System got altered !

Action: Amend the GTS (Anthropocene)

The statements IV, V, VII of the GP are contravened **if** the GTS is amended

NO

Are the methods of Chronostratigrafy (ChM) applied?

Yes

NO

Is the GTS amendment made?

The statements I,II, III of the GP are contravened **if** GTS is <u>not</u> amended.

All statements of the GP are met (= no quandary)

What to do?

Should we adjust the "ChM" to avoid the quandary or because… we dislike the 'GTS amendment'?

Should we adjust the Geoethical Promise (= method) to avoid the quandary?

?

How to escape, thanks to Gödel & Company ?

- Experience teaches: When a '*given method*' leads to confusing results, then a remedy may be found going beyond the framework of the '*given method*'.
- The GTS is a '*given method*' to interpret the stratigraphic record (a set of scientific procedures). Also, the GP is a '*given method*' to guide actions.
- The Geological Time Scale includes at least one specific feature that has no geological meaning, the 'zero-point' from which the years of the past are counted, wherever the 'zero-point' is placed in the recent (historical) past.
  - That feature may provide a stepping-stone for a remedy to the Geological Time Scale Quandary (that is, somewhat distinct methods for the geological past and geo-historical present).

Ethical dilemmas of the citizen 'professional Geoscientist' (1)

adapted from: **Eduardo Marone[1] & Luis Marone[2]** [1] IOITCLAC-FUNPAR & CEM-UFPR, Curitiba, Brazil, [2] ECODES, IADIZA, CONICET & FCEN, UNCuyo, Mendoza, Argentina

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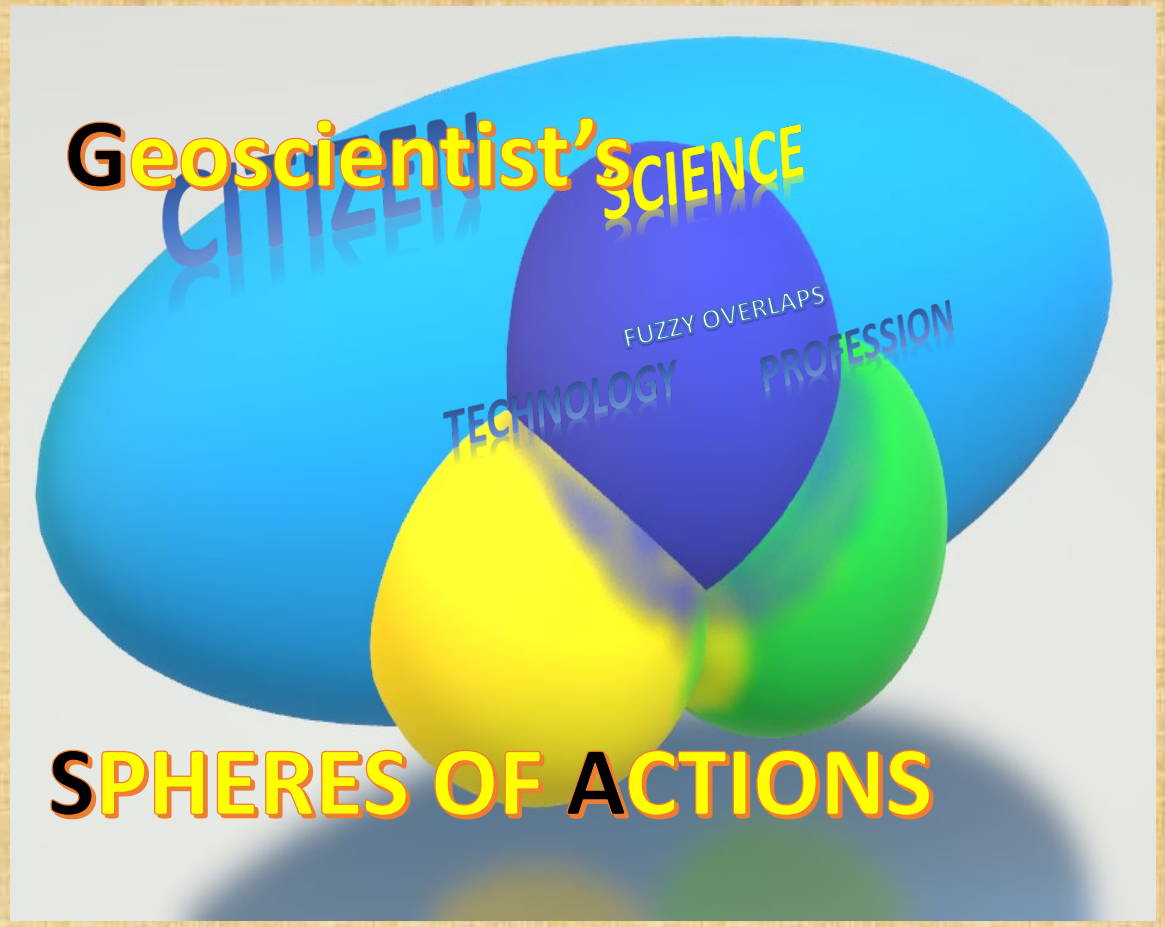

- Geoscientists can act in three different spheres: (i) doing science, (ii) developing technology, or (iii) applying the knowledge that is developed in the first two spheres in societal contexts in a professional manner.
- Any geoscientists is also a citizen; hence, is situated in societal contexts.
- What happens when confronting ethical dilemmas across the four spheres of action?

How to gauge 'societal context'?
Kohlberg's * Ideal-types of "Moral Adequacy"

- **Pre-Conventional:** the morality of actions is judged by its direct consequences; **(1)** Obedience and Punishment (blind egoism), **(2)** Self-interest orientation (instrumental egoism)
- **Conventional:** the morality of actions is judged by comparing them to society's views and expectations; **(3)** Interpersonal accord and conformity (social relationships), **(4)** Law and order morality (social systems)
- **Post-Conventional:** individual's morality may take precedence over society's morality, principles include basic human rights as life, liberty, and justice); **(5)** Social Contract orientation, **(6)** Universal Ethical Principles (principled conscience of mutual respect)

* Kohlberg, L. *Essays in Moral Development and the Idea of Justice*. (Harber & Row, 1981).

Ethical dilemmas of the citizen 'professional Geoscientist' (2)

Each sphere of action has different goals, actions products, tools, results & problems, therefore dilemmas differ across spheres

(Fuzzy Overlap)

FEATURES	SCIENCE	TECHNOLOGY	PROFESSION
MAIN GOAL	TO KNOW	TO CONTROL	TO CONTROL
TYPICAL ACTION	TO RESEARCH	TO RESEARCH & DESIGN	TO APPLY SCIENCE & TECHNOLOGY
PRODUCTS	HYPOTHESES & LAWS	NEW DEVICES & PROTOCOLS	CHANGES of citizens' 'REAL' WORLD
TYPES OF TOOLS & RESULTS	INTELLECTUAL ARTEFACTS	TECHNOLOGICAL ARTEFACTS	PROFESSIONAL ARTEFACTS
METRIC OF SUCCESS	GENERAL TRUE	GENERAL EFFICACY	LOCAL EFFICACY

- Ethical dilemmas (of geoscientists) appear as conflicts of interests between (their) professional duties and (their) convictions as citizens.
- Geoscientists, as citizens, must explain what makes (their) intra-professions decisions justified given impacts on natural and social environments.
- The Jonas' "Imperative of Responsibility"* applies differently in each sphere of action. Therefore, dilemmas are not easy to deal with given the complexity of the world.

*Jonas, H. *The Imperative of Responsibility*. (University of Chicago Press, 1984).

An attempt of a synthesis; a rationale for handling [geo]ethical dilemmas ?

- Recall: Geosciences co-shape the human niche, that is, the planetary network of natural and cultural environments.
- Recall: Geoethical thinking explores cultural substrates that nurture the skills of human agents and the operational circumstances that they encounter in the human niche.
- Next: ***Combining geoethics*** with Kohlberg's and Jonas's work about moral adequacy and (intergenerational) responsibility, respectively, leads to a method (= 'geoethical-rationale'), namely to act:

1. agent-centric, 2. virtue-ethics focused, 3. responsibility focused, 4. knowledge-based, 5. all-actor-inclusive, and 6. universal-rights based.

Categories of the Geoethical Rationale

Category	
agent-centric	To apply a normative framework that invests (empowerment) an individual /group to act to their best understanding in the face of given circumstances, opportunities and purposes;
virtue-ethics focused	A corpus of personal traits (honesty, integrity, transparency, reliability, or spirit of sharing, cooperation, reciprocity) of an individual/group that furthers operational (handling of things) and social (handling of people) capabilities of the individual/group;
responsibility focused	The outcome of a normative call (internal, external) upon an individual /group that frames decisions/acts in terms of accountability, as well for the intended effects as for unintended consequences and implications for future generations;
knowledge-based	In the first and foremost instance, (geosciences / Earth system) knowledge acquired by scientific methods; experience-based (indigenous/traditional/local*) knowledge is a secondary instance; reproducibility of knowledge by third parties supports any claim of trustworthiness instead of allusion to faith or 'authorities'; [* a wording to reconsider]
all-actor inclusive	Achieve a practice of a 'shared social licence to operate' between various individuals/groups by mitigating differentials of power, voice etc. using participatory processes and capacity building;
universal-rights based	Guide affective and rational sense-making of individuals/groups by universal [human*] rights (life, liberty, justice) to strengthen secondary normative constructs such as utilitarian, sustainability or precautionary principles; [*discussion is ongoing whether to add]

...we cannot walk away from them, we have to tackle them !

Some useful references

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