Coupling Geoethics to Sustainability

Maria Angela Capello, OSI
Executive Vice-president Red tree Consulting LLC
Geoscientists

- **Geoscientists** are often not thought of as having multiple opportunities for jobs.
- **Geoscientists have a privileged perspective** about time and Earth processes.
- **Geoscientists can and do play a pivotal role** in sustainability
Landfill of non-recyclable fiberglass blades from Wind Turbines, at Casper, Wyoming.

Photo by Benjamin Rasmussen, downloaded from Hot Fashion News, Feb 2022 © Maria Angela Capello, Cav. OSI, 2022
What is Ethics?

[ˈeTHiks]

NOUN

1. Moral principles that govern a person's behavior or the conducting of an activity.
   "medical ethics also enter into the question“, "a code of ethics"
   
   synonyms: moral code, morals, morality, moral stand, moral principles

2. The branch of knowledge that deals with moral principles.
   "neither metaphysics nor ethics is the home of religion"
   
   synonyms: fairness · justness · fair play · fair-mindedness · equity · equitableness ·

...from Greek (hē) ēthikē (tekhnē) ‘(the science of) morals’, based on ēthos.
The Purpose

Geoethics may help to re-define approaches to work and everyday life, to “increase human awareness for alternative ways of living or even to redirect economic models of growth and development”\(^1\).

In short, behaviors to contribute to achieve the SDGs.
Lo Hueco

Lo Hueco, in Central-East Spain, is a site of extraordinary geological interest, as it yields a Late Cretaceous, enormous, new, and unexpected concentration of dinosaurs.

It was discovered in 2007 as a result of works in infrastructure development.

Lo Hueco is one of the best-documented case studies of how to solve a conflict between infrastructure construction and the preservation of the fossil heritage, with benefits either for the administration and to the scientific community.

Photo by Francisco Ortega, via Twitter @Fran_ortega
Vienna’s Water Supply

The city of Vienna enjoys one of the purest spring water supplies in Europe, coming directly from the Alps, since 1873.

The main factors affecting the quality of spring water are:

1. **Forestry Management**, for maintain the land cover as barrier and filter

2. **Use of the land** for recreational/tourism purposes, like hiking, and mountain huts.

3. **Mountain Pasture and Cattle**

Several measures are in place:

- Real-time measure devices for the Snow depth are in place in the high Alps, for an exact estimate of the precipitation.

- Vienna Water Works organization is in possession of the catchment area for the two main springs that source city’s consumption.
Earthquake Prediction: Geoscientists sent to Prison

The 6.9 magnitude earthquake in the town of L’Aquila, Italy, in 2009, left 309 people dead and injured more than 1,500 others.

6 Experts - three seismologists, a volcanologist, and two seismic engineers- were firstly on trial for manslaughter and sentenced to 6 years in prison for insufficiently warning victims.

The experts appealed, and on October 10th, 2014, the six geologists were acquitted.

The case had global repercussions

Will the scientists gain their courage back?

“I think the Italian case emphasized the importance for seismologists to be very careful in communications with the press and public.”

Dr. John Anderson, Geophysics Professor
Former director of the Nevada Seismology Laboratory at the University of Nevada.

Source: Erasmus Program, GOAL educational Resource. Authors: Sebastian Handl, Gunter Langergraber, Susanne Schneider, and Markus Fiebig.

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Chile Geoheritage Law

1. Any meteorite found in Chile will be declared as a **geological heritage** natural object.

2. The proposed public institution for the implementation of the protocols established by the law is the SERNAGEOMIN. This institution will hold the official meteorite repository as well.

3. The protocol will include the requirement of an **official permission to conduct search of meteorites**, for any kind of national or foreign missions, as well as for the possession of them. There will be **fines for people found with meteorites** without the correspondent permission.

4. Illicit traffic will be penalized with **prison and fines**.

5. For meteorites of a special value (for its rarity or size), the donation to the official repository will be of 50% of each rock.

6. The research done with the Chilean meteorites will have to be communicated before 2 years after the findings.
Case 4

Chile Geoheritage Law

Is the dialogue between society and science healthy enough?

How do we better communicate scientific data and facts to society?

How does this verdict affect the science community?

From The Highest Desert On Earth — Partial Slice Of An Imilac Pallasite With Peridot
Stony Iron – Pallasite (PAL)
Atacama Desert, Chile (24°12' S, 68°48' W)

Photo Source: Sotheby’s, 2020
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Look-Up movie

Communication from Scientists can be complex, unreachable, not easy to understand.

Having to communicate your geo-results, reports or analysis comes naturally for you?

How to simplify scientific communication so it is understood by all?

What effects will have on the legislation a closer liaison between scientists, policy makers?
Geoethical Values

- Respect for the scientific method
- Professionalism and competence
- Training and life-long learning
- Sharing knowledge at all levels as a valuable activity
- Verifying sources of information and data
- Working with a spirit of collaboration and reciprocity
- Respect for natural systems and dynamics
- Protection and enhancement of geodiversity for Sustainable Development
- Promotion of sustainability
The Sustainability Concept

Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs.
Next Step: Building a sustainability Atlas for all Geosciences

- **Raise** the awareness about the pivotal role of Geoscience and Geoscientists among practitioners and for society at large
- **Elevate** the understanding of how Geoscience advances the 17 SDGs by showcasing real projects
- **Share** the enthusiasm about Geoscience career prospects for the future
- **Establish** a platform of communication about the value of Geoscience and a framework for future contribution to sustainability
Creating a Geosciences Sustainability Atlas

"Geoscientists are pivotal in progressing the UN 17 SDGs for the Planet. This Atlas will exemplify how."

Iain Stewart

Sustainability Atlas

"We are progressing an initiative to enhance the awareness about the contributions of geoscientists to the UN 17 SDGs."

Anna Shaughnessy

Sustainability Atlas

"All regions of the world benefit from understanding how geosciences help in their sustainability goals."

Emer Caslin

Sustainability Atlas

"The creation of a geosciences sustainability atlas will raise the awareness about the role of geoscientists in reaching the SDGs for 2030."

Estella Atekwana
Sustainability Atlas

“The Geosciences advance important individual and collective efforts toward sustainability.”

Denise Cox

Sustainability Atlas

“This is the right moment to join efforts to understand how geoscientists advance the 17 UN SDGs.”

Heather Handley

Sustainability Atlas

“Collaborating across silos is essential to meeting global challenges. I’m very proud to be working with an amazing multidisciplinary team to spotlight People, Prosperity and Planet in geosciences.”

Ludivine Wouters

Sustainability Atlas

“This is the right moment to join efforts to understand how geoscientists advance the 17 UN SDGs.”

Ted Bakamjian

Sustainability Atlas

“All regions of the world benefit from understanding how geosciences help in their sustainability goals.”

Kombada Mhopjeni

Sustainability Atlas

“Including geosciences in every effort to advance sustainability is not only smart, but necessary to achieve the UN SDGs.”

Miriam Winsten
The examples capture the diversity of initiatives in which geoscientists are engaged across the sustainability spectrum, from water-resource management, reducing natural-hazard risk, accelerating decarbonization, through to confronting gender disparities and discrimination.
Global Examples

Examples demonstrating how geoscientists are contributing to achievement of the goals were obtained through a public call to the global geoscience community via social media and professional platforms.

*Structural geology, seismology, remote sensing, GIS, seismic hazard modelling*

The sustainable extraction of water supplies from floodplains to supply millions of people. Use of mapping and imaging techniques.

*Geological and geomorphological mapping, aquifer mapping, electrical methods, hydro chemical assessment.*

Mapping mass graves and escape tunnels from Holocaust victims in Poland & Lithuania to preserve the sites.

*Geophysical Mapping, magnetometry, drone-based mapping, data processing*
The Geophysical Sustainability Atlas

- **Detect opportunities** to advance sustainability
- **Identify the main SDGs** involved in specific geo-processes and geo-sectors
- Envision potential partnerships to further geoscience activities
- Raise the awareness about the importance of Geoscience in the subject at stake

*Source: Maria A. Capello, et al, (2023 in press), “Geoscience in Action; Advancing Sustainable Development" Published by UNESCO and AGU*
My Case
The Geophysical Sustainability Atlas applied to SDG 7 and SDG 13: Oil and Gas

© Source: M. A. Capello and D. Maguire, The role of the geophysicist in supporting the economically viable and sustainable hydrocarbon business, IMAGE 2021.
Mapping geophysics to the 17 UN SDGs can better communicate Geophysics and Geophysicists as VALUE CREATORS

...What are the next steps?

We need to share the findings of *Geoscience in Action: Advancing Sustainable Development*, published by AGU and UNESCO
Coupling Sustainability with Geoethics