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The “Geoethical Promise”: A Proposal

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The authors think that a geoethical approach to the geosphere-society relationship is necessary in the epoch in which we live. Geoscientists have to improve their awareness of the geoethical dimension and the importance for sustainable development of their work in geosciences. The introduction of a Hippocratic-like oath for young geoscientists - “the geoethical promise” - could be a way for this purpose. A draft text is proposed for discussion.

Geoscientists towards sustainability

The Anthropocene, the epoch in which we live, has been characterized by a rapid growth in the demand for natural resources and an increasing capability of humans to impact on natural processes. For this reason, the main challenge of the future is to contain the growth of population and the consumption of resources within the limits of sustainability for the Planet, a challenge that we expect to persist, even if we assume future great benefits deriving from the development of scientific and technological research. The Brundtland Report of United Nations (1987) and the declaration of UNESCO (1999) indicate an ethical duty for humankind to preserve a livable environment for the future generations. The outcome document of Rio+20 (2012), entitled “The Future We Want”, recognizes (points 39 and 40) the necessity to “promote harmony with nature” and “to lead to efforts to restore the health and integrity of the Earth’s ecosystems”.

Consequently, knowledge of the Earth systems (geosphere, atmosphere, hydrosphere, cryosphere and biosphere), their processes and interactions should be an essential basis for an appropriate management towards sustainability. The close relationship between geoscience and society has been increasingly recognized; “sociogeoscience” (Zhao Xun et al., 1997) has to adopt a prospective approach, looking more to the future. The scientific and technological advance in this field is a major social and ethical challenge.

Are geoscientists aware of the increasing social and ethical dimension of their role? Geoethical practices require a specific approach to the ethical features in the humankind-geosystems relationship (Martínez-Frias *et al.*, 2011; Peppoloni and Di Capua, 2012). The entire spectrum of research and applied work of geoscientists falls within the sphere of geoethics, since any intervention in natural environments, at any scale, affects the basic common goods of humankind: the Earth, the survival conditions for human life and the social and environmental well being now and in the future. A geoethical approach in any activity affecting the territory (from its use - agriculture, livestock, infrastructure, buildings - to groundwater systems and soil management, from the exploitation of the mineral resources to the storage of waste and pollutants, from the prevention and mitigation of geohazards to the control of human impacts on soil, from the conservation of natural and “anthropized” landscape to that of the natural heritage) implies the need to pay great attention not only to the immediate, local-scale consequences of man’s

actions, but also, and especially, to the possible impact on the global natural balance in the medium and long term. For this reason, geoscientists should develop better skills in forecasting the impact of both natural processes on the population and human actions on Earth systems and their evolution over time.

Although geology is a historical science, in a geoethical vision the modern challenge for geoscientists is to foster a change so as to address their main interests from the past to the future (see R. Oberhaensli, IUGS President’s address, 2012); geoscientists have to make good use of their sound knowledge of the Earth history and the laws that govern geological processes and guide the management of local and global use of Earth resources, thus ensuring sustainability of human life in the long term.

Since the decision-making power is not in the hands of geoscientists, it is their ethical duty to represent, with clarity and determination, to policy-makers and the society the reasons for or against any kind of intervention that may affect the natural balance of our environment, the use of the land and the natural resources. Scientific and technical advice represents an essential basis for the important policy decisions and must be routinely adopted worldwide, as it is already the case in some countries (Lambert and McFadden, 2013). Earth Science organizations, at both national and international levels, have the tremendous task of contributing effectively to the correct and timely information transfer at all levels and of working with the utmost determination so as to make the cultural and practical approach of man to the Earth systems more respectful and as forward-looking as possible. The IUGS initiative focused on securing the natural resources needed by future generations (Lambert et al., 2013) is a recent, interesting attempt. It is particularly important to strengthen knowledge and awareness of geological systems and their processes in the population, through the use of information that is both scientifically accurate and understandable by people with different scientific individual backgrounds (Carter Witt, 2011); it is equally, if not more important, to introduce and strengthen geoethical awareness among younger generations, starting from early childhood. Finally, a rapid and substantial change in the training of future geologists is absolutely necessary, with a greater focus on the present and the future issues and a clear vision of the social and geoethical dimension of the geosciences.

A “Hippocratic Oath” for geoscientists?

More and more, the importance of the geoscientists’ work extends beyond its scientific and technical significance, involving issues of social responsibility and a geoethical dimension; and geoscientists must quickly become fully aware of that. Furthermore, in the forthcoming future, the challenge towards a geoethical approach to the humankind-geosystems relationship will be increasingly hard, because of the huge economic and political interests involved.

There is a parallelism between the profession of the physician

and that of the geoscientist from the ethical point of view (Matteucci *et al.*, 2012). The ethical duty of the geoscientist to work for a good use of the land and mineral resources and for the preservation of the Planet and its livability for the present and the future generations is comparable to the ethical duty of the physician to provide patient care and work for the public health and prevention against diseases. The ethical dimension of the physician has been universally recognized for centuries. As in the past, nowadays, young doctors assume their ethical responsibility through a solemn oath, mostly using a modern formula, the deep meaning of which, however, remains the same as the oath originally formulated by Hippocrates in the fifth century BC. We think that the assumption of ethical responsibility by the young geoscientists could have a similar importance, today and in the future: the convinced new geoscientists must conduct all their activities in a geoethical approach and assume a more important role in promoting geoethical culture in the population and among the politicians. A voluntary Hippocratic-like oath will encourage the new generations of geoscientists to become fully aware of their social role and ethical responsibility and of the expectations and reliance of local/global communities on their scientific knowledge and professional expertise. Other implications will be an increased awareness of the need for geoscientists to develop lifelong cultural and professional growth, absolute respect of truth, professional honesty and consciousness of their own limitations as well as commitment to the protection of Earth for the survival and well-being of humankind. Such an approach will enhance the sense of belonging to a special scientific and professional community and reinforce the high value of the social mission of geosciences. The full geoethical awareness of geoscientists will contribute to the overall perception of the challenge implied in the unavoidable transition to a sustainable development.

For all of these reasons, we hope that the community of geoscientists worldwide will take into account the need of greater emphasis on geoethical issues within the university education in geosciences and the opportunity of promoting among young geoscientists a clear perception of the geoethical implications of their work. We believe that the introduction of a Hippocratic-like oath for young geoscientists can help to reach the latter objective. The solemn and voluntary undertaking of one's own personal geoethical responsibility will facilitate the putting into practice of the geoethical principles. The reasons in favor of the introduction of an explicit ethical oath, both for all scientists and life scientists (Roblat, 1995; Revill and Dando, 2006) and for geoscientists (Ellis and Haff, 2009; Matteucci *et al.*, 2012) have already been discussed, but without any proposed basic text. Below, we offer an example of a possible formula of an oath for geoscientists which was presented at the session on geoethics of the 34th International Geological Congress, held in Brisbane in 2012.

The present proposal is an attempt to give a concrete form to a possible "Hippocratic Oath" for geoscientists, with the aim of stimulating discussion and comments for improvements, reflections and insights. We have tried to ensure simplicity and authenticity in the formula, paralleling the simplest formulas adopted for the young doctors in different countries of the world.

In our opinion, the "promise" should primarily represent the expression of the sincere desire of the young geoscientists to assume the geoethical commitment as their own highest duty. Therefore, it is suggested that the "promise" should be presented to the young geoscientists as a purely voluntary act, to be pronounced only if deeply

felt, at the end of their university studies or at the beginning of their professional careers. And, of course, the whole education in geosciences should have a strong geoethical imprint.

THE GEOETHICAL PROMISE

- *I promise I will practice geosciences being fully aware of the involved social implications, and I will do my best for the protection of geosphere for the benefit of mankind.*
 - *I know my responsibilities towards society, future generations and the Earth for a sustainable development.*
 - *In my job I will put the interest of society at large in the first place.*
 - *I will never misuse my geological knowledge, not even under constraint.*
 - *I will always be ready to provide my professional assistance when needed; I will always make my expertise available to decision makers.*
 - *I will continue to improve my geological knowledge lifelong and I will always maintain my intellectual honesty at work, being aware of the limits of my capabilities and possibilities.*
 - *I will act to foster progress in geosciences, the dissemination of geological knowledge and the spreading of the geoethical approach to the management of land and geological resources.*
 - *I will honor my promise that in my work as a geoscientist or certified geologist will be fully respectful of Earth processes.*
- I promise*

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