

The Contribution of the Geotourism to the Sustainable Development: The Role of Geoethics

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Abstract

Geosciences have allowed society to appreciate that the geological landscape, geodiversity and geological heritage are important cultural values. However, the professional duties of geoscientists go beyond scientific knowledge and skills, due to the fact that ethics must be an important part of the professional responsibility of geologists. Thus, geoethics emerges as a response to this need, and in this geological context, the geotouristic activity has been proven to contribute not only to the sustainable development of a territory, but also to the training in the scientific and ethical values of the population. In this formation, the local geotourist guide is proved to be a key actor responsible of the effective transmission of knowledge and information. Moreover children are a stratum to be focused, because of the fact that they will be the future managers.

Keywords: Geoethics; Geosciences early learning; Geotourism; Geotouristic guide sustainable development

Introduction

Geosciences have allowed society to appreciate that geological landscape; geodiversity and geological heritage are important cultural values. Taking this into account, and by strengthening the relationship between the communities and the land they inhabit, teaching geology could contribute to the economic development of an area while preserving nature in a sustainable way [1].

In this context of sustainability, geotourism, the tourism based on geological, paleontological and landscape aspects emerged in the 1990s based on 5 key aspects: geologically based, sustainable, geologically informative, locally beneficial, and provision of tourist satisfaction [2].

On the other hand, due to the fact that population has a low level of knowledge of the environment and understanding of natural resources and their exploitation, the scientific community is promoting the need of reintroduction of geoscience education, in both formal and informal learning, with a new approach based on field activities. Given this scenario, it has been reported that geoparks and geological parks linked to geotourism are useful tools to deal with the ineffectiveness in natural resource management in modern society. In geoparks and geologic parks, geoscience education can be easily combined with geotourism in a natural environment connected with rural culture. This strategy would allow us to reintroduce geological and biological knowledge at various educational levels, and in informal education programs. Studies focused on the understanding of the geological sites (with relevant outcrops, geology or geomorphology); show that

geotourism is an useful tool for providing a valuable empirical evidence of the visitor's understanding of the site. This information can be indispensable not only to know how to conveniently inform visitors, but also to ensure that they can understand and gather information about geosciences, land management and protection of territories [3].

Geological Park of Aliaga: Its Geomorphological Context

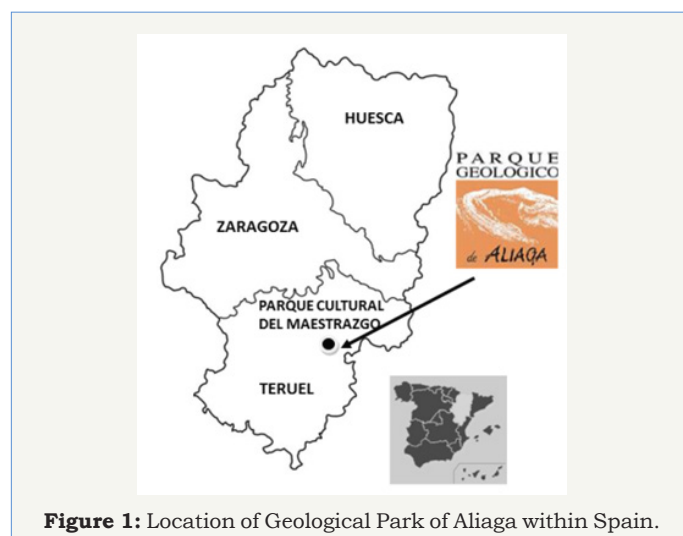


Figure 1: Location of Geological Park of Aliaga within Spain.

The Geologic Park of Aliaga is situated in Teruel Region of Spain (Figure 1). It was created in 1996 with two main objectives- to teach

about and promote geology, by guiding visitors along several points and signed routes of special interest. It provides a sound overview of the last 200 million years of Earth history. Some of its geologic formations and structures, modeled into impressive landforms, have been valued by scientists as unique examples of geology [4]. A number of outstanding outcrops provide a complete stratigraphic record from Upper Triassic to the Quaternary, with special attention on Cretaceous and Tertiary formations. In addition it comprises a variety of tectonic structures including the superposition of two North-South and East-West fold systems, which may be related to Tertiary unconformities, as well as a spectacular landscape shaped by selective erosion [4]. The geologic park of Aliaga allows us to investigate the history of the Earth through its superimposed rock layers where the history of our Planet are written.

During the Alpine Orogeny two fold systems with different trends developed in the Aliaga region. The formation of a large NNW-SSE anticline between Campos and Villarroya de los Pinares continued during most of the Eocene and Oligocene. At the beginning of the Miocene new ENE-WSW trending folds were superimposed on the former. In the northern part only, a conical syncline formed on the western limb of the first anticline. In the southern sector, where the anticline crest had been already denudated by erosion, the vertical eastern limb underwent independent shortening folding giving rise to spectacular meandering, vertical axis folds.

The summits of hills and plateaus surrounding Aliaga are remains of an old erosion surface uplifted to altitudes between 1400 and 1500 meters. Slopes have undergone different degrees of erosion depending on the rock types exposed on them. Generally, the more resistant limestone, dolomitic and conglomeratic beds form crests and cliffs, whereas clay, marl and sandy beds coincide with gentle slopes. In this way, the complex folding structures, which were completely leveled by the erosion surface, have been revealed again by selective erosion (Figure 2).



Figure 2: Panoramic view of “La Olla”, spectacular meandering fold with an international relevance because of its singularity and dimension.

Geoethics Applied to Geotourism

The professional duties of geoscientists go beyond scientific

and technological knowledge and skills. Ethics is part of the professional geologists' responsibility [5].

Geoethics consists of research and reflection on the values which underpin appropriate behaviors 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 (IAPG).

Therefore, geoethics is postulated as a way to sustainable development [6], and on this way, geotourism is involved. According to the geoethics approach, geotourism contributes to sustainable development as it uses geology and landscapes within tourism, aiding the conservation of geodiversity and building a greater understanding and appreciation of the geological sciences by tourists, and those communities living and working around geological features [7]. However, little attention has been paid to the role of geotourism in enhancing principles of geoethics among its stakeholders and participants [8].

The Role of Geotouristic Guide

The need of a multidisciplinary approach of the professional working in education and promotion is being highlighted in natural sciences. In this context, geology, paleontology, history, environment, research, education and other professional skills are combined. Likewise, a holistic approach to conserve a territory is recommended by the founders of European Geoparks- supported by UNESCO. According their guidelines, geoheritage and cultural heritage must be joined in every promotion and conservation of any area.

This statement has been supported and validated in studies carried out in the Geologic Park of Aliaga, in which a multidisciplinary approach, offered by a local company that is in charge of Geotourism for more a decade- Jumidosiv- has been successfully evaluated with regard to the Earth science learning [3]. Likewise, a local approach is relevant, since rural populations, which are more connected with nature, showed significant differences in environmental knowledge compared to urban populations [9]. Although the modernization paradigm that dominated the past policy is now being replaced by a new rural development paradigm [10], a wider social scientific approach should be implemented that could lead to a “cultural turnaround” acknowledging the importance of traditional knowledge of landscapes.

A value enhancement strategy and use of this local knowledge would underpin the involvement, and the connection between local communities and the geotouristic activity, which are both required for a successful geotourism development [8].

In this way, the development of a network of local professionals in the territory of geoparks, with the key skills identified, would pursue the aim of improving the sustainability by supporting activities related to Earth Sciences, as well as seeking to strengthen institutional and individual relationships when addressing multidisciplinary issues.

Geoethics Early Learning

Today's children will be tomorrow's land managers, and the early acquisition of knowledge in Geology will allow them to begin to interpret their environment. It has been observed that the initiation of geoscience teaching can be promoted to children of early ages, with satisfactory results in terms of geological, biological and cultural knowledge transmission, and in terms of territorial management repercussions [3]. This early acquisition of skills and the interpretation of geodiversity and biodiversity will contribute to a more interventionist and critical society (Figure 3).



Figure 3: Primary school students working during a course in the Geologic Park of Aliaga.

The educational community believes that teaching geoethics could help students to understand the ethical dilemmas of geosciences and to develop strategies to address sustainability issues [11]. In this way, early immersions in the learning of geological abilities linked with other transversal disciplines can outline long-term attitudes toward the interdisciplinary, beyond the mere geological work [3,6].

Conclusion

The geotourism activity and the active and multidisciplinary role of the local geotourism guide are proved to be a key factor not

only in the sustainable development of a territory, but also in the formation of scientific and ethical values of the population. It is also worth highlighting the teaching in these concepts from earlier ages, as they will be the future managers. If children learn geoethics, they will manage (as adults) to carry out any development project, obtaining a local benefit based on sustainability for future generations.

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