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ORIGINAL ARTICLE

Geowatching, a Term for the Popularisation of Geological Heritage

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Abstract Some fields of environmental protection have developed terms and communication tools to be effective and have a direct influence on non-specialists. Two outstanding examples of such terms are 'whalewatching' and 'birdwatching', which condense the concept of conservation, protection and the use of natural and fragile resources for scientific and cultural purposes. Even if only for a shorter time compared to other scientific disciplines, the same case of generation and refinement of a new terminology is in process in Earth sciences. Some neologisms could be introduced to develop an identity related to the dual and symbiotic activity of conservation and the appropriate use of geological heritage. In this paper, the author presents data and statistical analyses concerning knowledge in the Italian population of the term 'geopark'. The term 'geowatching' is also defined, making historical comparisons and analogies whilst stressing differences with similar terms. A definition, specifically intended for Earth sciences, is proposed in order to avoid, as much as possible, future confusion in the use of this term.

Keywords Geotourism · Geowatching · Geological heritage · Popularisation · Birdwatching · Whalewatching

Introduction

In the last few decades, Earth scientists have realised that the subject of their studies can be considered as a resource from new perspectives, one of the latest being tourism. Geological landscapes, phenomena and objects can be valuable assets that could attract a new generation of culturally and scientifically oriented tourists. Tourism, however, can also present new threats to geological resources, but it can also generate an awareness that geological heritage should be conserved (Wilson 1994). The reasons for conservation are many, and even selection criteria are still under discussion (Zagorchev and Navok 1998; Barettino et al. 1999, 2000; Osborne 2000). Actions for conservation can take many forms and may take place at different levels within society. One of the approaches that can be considered is to generate a sense of responsibility for geological heritage within a general population. The means to convey this sense of responsibility are various. One of the tools that can be used is language. Some terms can communicate synthetically the key concept that an activity can let someone use a resource and help conserve the resource at the same time. In geology-related scientific communication to non-scientists, no term currently exists to describe the act of observation and preservation as in other science fields such as biology. In this paper, we introduce such a neologism—geowatching. After giving a precise definition and conceptualisation of the term, the author makes a comparison with similar words that are in use in other scientific fields.

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Communication as a Tool for Protection

The activity of observation gives one the opportunity to learn and better understand the subject being examined. Following this basic principle, some groups of scientists, especially biologists, have introduced a concept where the observation of animals in their own habitat can provide an opportunity to better explain them to non-scientists.

Frequently, this activity of observing the environment and fauna is organised into small groups led by properly equipped and trained experts. Before and during the observation activity, scientific information is provided by the leader to the participants as well as safety information and how to behave.

In most of the time, this communication gives to the leader the opportunity to discuss the conservation status of the observed fauna and the survival chances of the species. In this role, the scientist is a communicator working to improve the protection of a species or an environment in a bottom-up way.

New words have been created to describe this new type of observation of a specific natural phenomenon or subject. Let us analyse in particular two words. The first, and likely the best example of a recent definition, is *whalewatching*. Whalewatching is the practice of observing whales and other cetaceans in their natural habitat. Whales are most commonly watched for recreation, but the activity can also serve scientific or educational purposes. Organised water-based whalewatching dates back to the 1950s on the eastern coast in the USA. In its first years, the spectacle attracted thousands of visitors. The industry spread throughout the western coast in the USA over the following decade, and in the 1970s, the first commercial whalewatching activity on the eastern side of North America began. In the 1980s, a rapid growth occurred in the New England area, probably due to the relatively dense population of whales and to the close proximity of large cities.

Whalewatching tourism has grown substantially since the mid-1980s and the International Fund for Animal Welfare (IFAW) has commissioned three worldwide surveys of the whalewatching industry: in 1991, 1999 and, the latest, 2009. This last report (O'Connor 2009) estimated that, in 2008, 13 million people went whalewatching, 6 million more then 10 years earlier. Commercial whalewatching operations were identified in 119 countries. Direct revenue from whalewatching trips was estimated at US$872.7 million with an indirect revenue of US$2.1 billion per annum in tourism revenue worldwide whilst employing around 13,000 workers (Fig. 1).

Whalewatching is also considered of particular importance to developing countries. Coastal communities have started to profit directly from the presence of whales, significantly adding to popular support for the protection of these animals from commercial whaling.

Another example of the observation of animal species is *birdwatching* or 'birding', the observation of birds as a recreational activity. Some studies have been carried out to understand the growth of birding, with most of the data from the USA.

By the mid-1980s, independent surveys suggested about one out of every four Americans could be considered as a 'birder', and 11 % of the US population watched birds during at least 20 days per year (Kellert 1985). Birding was suggested to be worth $20 billion dollars a year in the 1980s for all of North America (Kerlinger 1993), and this figure included bird seed, travel and birding paraphernalia.

One of the most comprehensive and up-to-date surveys about birdwatching was conducted in 2001 in the USA by the National Survey of Fishing, Hunting, and Wildlife-Associated Recreation (Pullis La Rouche 2003). In 2001, there were 46 million birdwatchers or birders, 16 years of age and older, which is more than one in five of the US population. From the economic point of view, the results of this analysis in the USA indicated a benefit of US$32 billion in retail sales, US$85 billion in overall economic output and US$13 billion in state and federal income taxes, with 863,406 jobs created (Fig. 2).

From Science to Communication: Neologism in Earth Science

Earth science research approaches can be considered, now and in the past, as generally non-protective. It is typically based on a survey where sample collection is necessary due to the lack of field instrumentation and the time needed for a complete analysis of the samples. The same approach is also applied by collectors who have become used to removing fossils and minerals. For some, the act of collecting these objects is also related to a possibility to exchange or sell them and to watch and touch these beautiful objects as many times as desired.

The modification of a geological heritage as a result of scientific research is justified by a limited number of samples which are usually returned to the community by being deposited in museums. In addition, scientific research gives new geological knowledge to the community in return. On the other hand, collectors who collect for non-scientific reasons are removing a common asset and transforming it into a private possession.

In the last decades, there has been recognition of geological resources as a heritage, which has been accompanied by a change in perspectives on geological science itself. This recent change has lead to the generation of neologisms for geological heritage conservation and of its use by the tourism industry. Some of the more widely recognised and used neologisms are *geotourism*, *geoheritage*, *geodiversity*, *geoconservation*, *geoparks* and *geosites*. Each of these words has a unique history, and some are still in the process of gaining a widely accepted definition. Geotourism, for instance, after many modifications acquired, for geologists, is the meaning of tourism related to geology (Hose 1995, 2000, 2008; Dowling and Newsome 2006; Garofano 2003, 2010). The most recent definitions also take into account aspects of conservation of the geology as landscapes and geosites (Newsome and Dowling 2010).

This paper, as described by the title, is focused on the impact that words have on the wider population and their capability to become the key for the popularisation of a new phenomenon (Bezzi 1999). The words analysed here are considered to be tools, and their effect on a general public is considered.

Fig. 1 Whalewatching is practised in many countries across the world and can create a significant economic benefit (data for 2008)

Statistics About Geoparks and Their Popularity

Economic and numerical evaluation about geotourism (Garofano and Govoni 2012) and related disciplines are lacking, so it is hard to make comparisons between them and long-term established activities in tourism that are related to culture and biotic nature.

For this reason and to evaluate a recent phenomenon related to geological heritage and geological popularisation, the author, in 2011 and 2012, collected and analysed data about the knowledge in the Italian population of the term 'geopark' and its meaning. The questionnaire used was based on simple questions, the first to investigate if the person knew about geoparks, at least enough to understand the term. In case of an affirmative response, a second question was asked about the name of one geopark, to check if the interviewee really knew about geoparks. The other two questions concerned age and gender. The total number of people (416) that responded to the questionnaire was split into the groups: general population, students and experts.

The first group was composed of people (130 people) who were given the questionnaire at a shopping centre, the second was composed of students (216 students) aged between 14 and 18, and the questionnaire was completed during classroom activity. The expert group (70 people) had participated in a geotourism activity such as a course.

The same questionnaire was used with these same three groupings in two different places: less than 100 km from a United Nations Educational, Scientific and Cultural Organization (UNESCO) Geopark and more than 100 km from a UNESCO Geopark, to verify the influence of the proximity of geopark on the study.

The results show that within the *general population*, 76 % declared that they do *not* know what a geopark is, the remaining 24 % is subdivided into three groups that show that 57 % (13.7 % of the total) is not able to provide the name of a

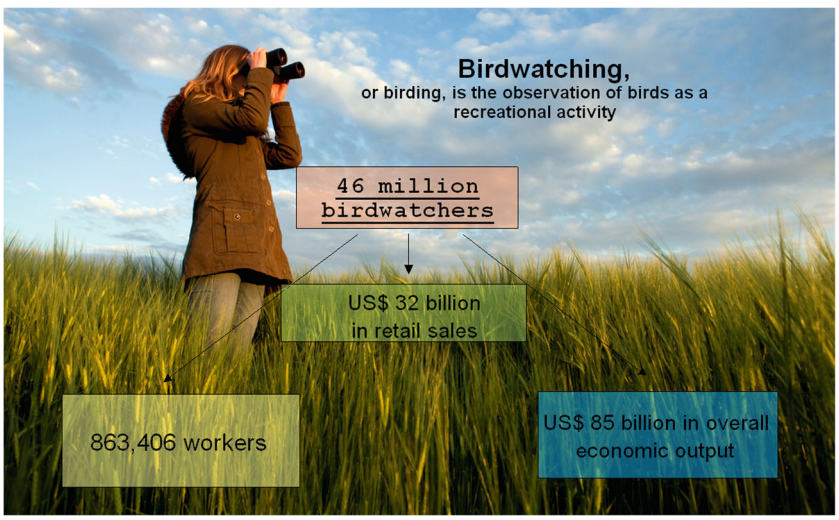

Fig. 2 Birdwatching is a long-established activity, with available demographic and economic data (figures from 2001)

geopark, 35 % (8.4 % of total) provided an incorrect name, and the remaining 8 % (1.9 % of total) provided the correct name of a UNESCO Geopark (Fig. 3).

With the *student* group, 87 % did not know what a geopark is, the remaining 13 % was subdivided into three groups that show that 70 % (9.1 % of total) was not able to provide the name of a geopark, whilst 30 % (3.9 % of total) provided an incorrect name, and the remaining 0 % (0 % of total) provided the correct name of a UNESCO Geopark (Fig. 4).

With the *experts*, 31 % stated that that they did not know what a geopark is, the remaining 69 % subdivided into three groups that show that 17 % (11.7 % of total) was not able to provide the name of a geopark, 13 % (9 % of total) provided an incorrect name, and the remaining 70 % (48.3 % of total) provided the correct name of a UNESCO Geopark (Fig. 5).

Among the general population and students, only 2 % are clearly aware of the existence of geoparks. The distance from an existing geopark does not seem to influence the results. Even if the sample is small, the data clearly shows that the concept and knowledge about geoparks in Italy remains confined to a small group of experts with very little awareness within the rest of the population.

A Geowatching Definition Proposal

The author introduced the term 'geowatching' in the first edition of the Italian book *Geoturismo*, *scoprire le bellezze della terra viaggiando* (Garofano 2003), later translated into English (Garofano 2010). It was an invitation to the geotourist to practise a respectful behaviour during their geotourism activity. The text was as follows:

> Among nature lovers it is increasing the sensitivity towards the preservation of the environment and there are more and more people who tend to observe and

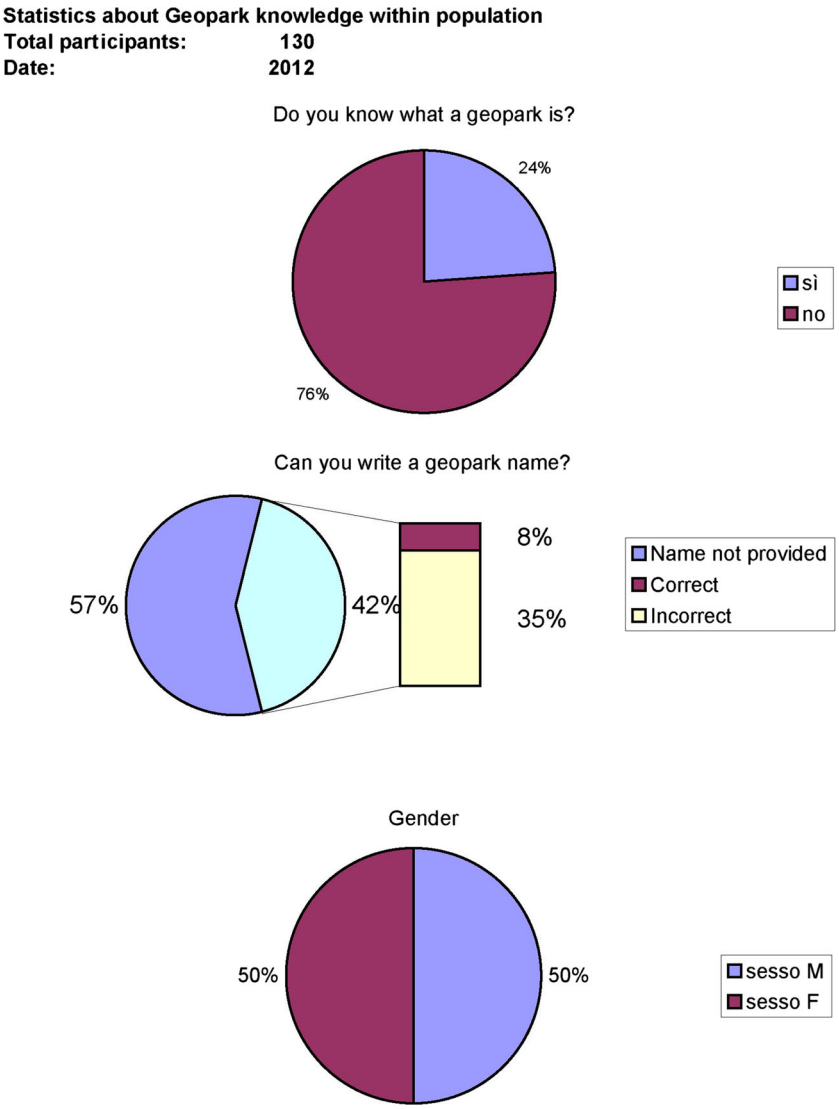

Fig. 3 Questionnaire results the *general population*

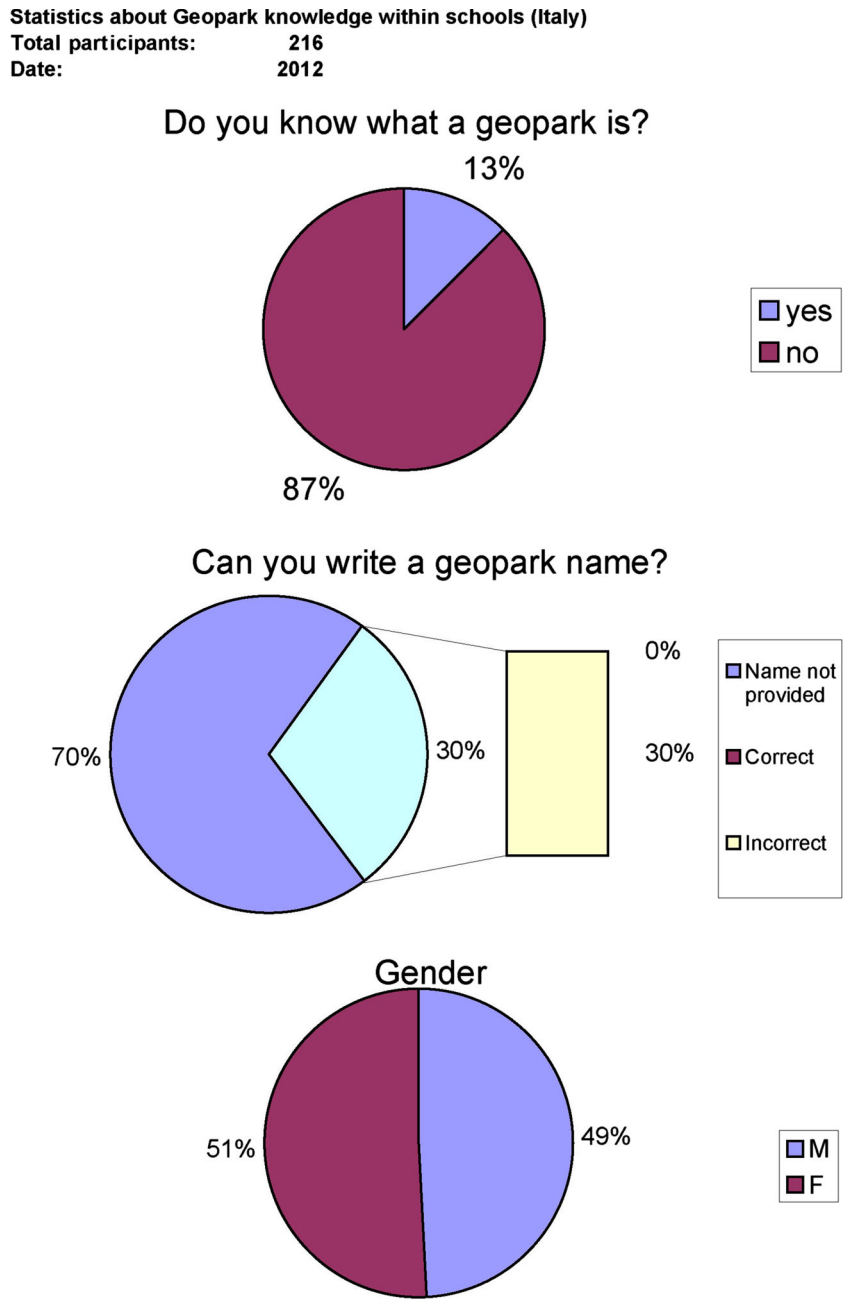

Fig. 4 Questionnaire results for *students*

photograph instead of capturing and carrying away items and animals. In this way they keep their emotions and not the objects themselves. We must also take into account that some animals and objects reveal their full value only in their natural home, where they are born and live or are placed by natural processes. Moreover, the removal of fossils, minerals or plants and the killing of animals eliminate forever these wonders of nature from the possibility of observation by others. At this wavelength are the birdwatching (bird observation), the whalewatching (observation of whales) and other activities practised outdoors. Here, therefore, it is made the invitation to all who love nature, to practice geowatching! Observe the geological beauty but not remove them from where they are placed, being especially careful to preserve fossils and minerals which are often rare.

Here, the author proposes a short definition to the community working on geological heritage and geotourism, in order to clarify the meaning of the term and to avoid confusion in the future use.

Geowatching is the activity of observation of geological features in place, i.e. 'in situ'. The key aspect of geowatching

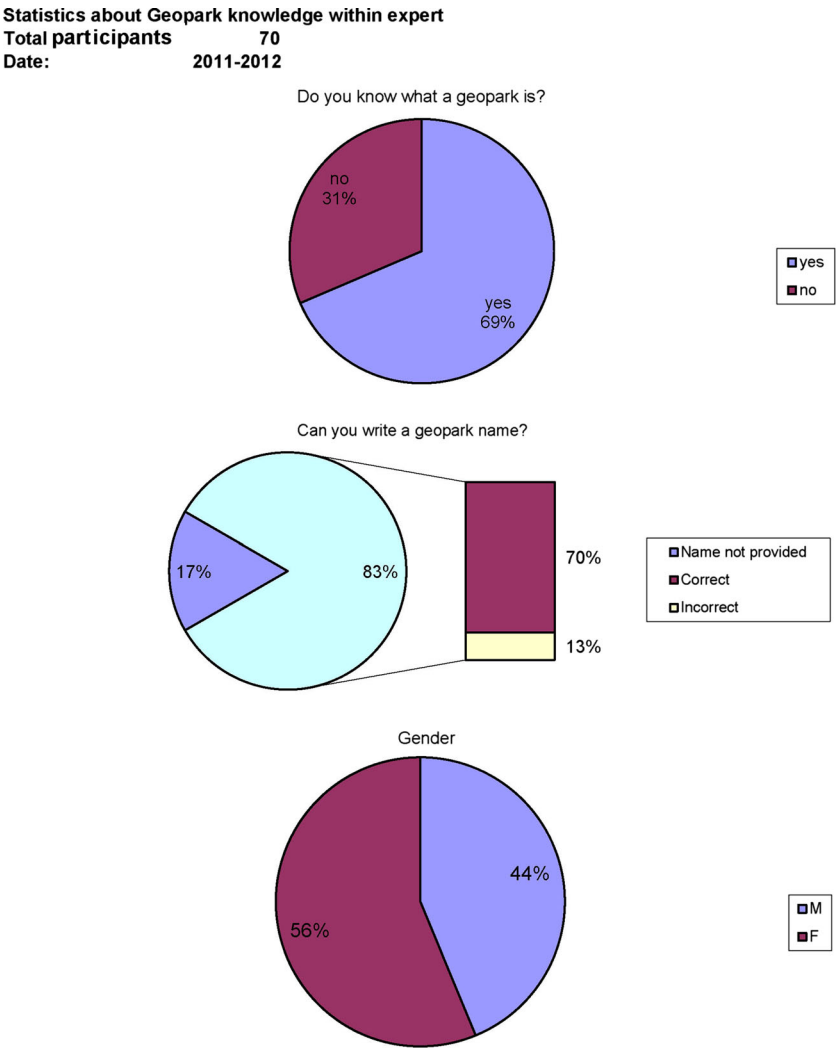

Fig. 5 Questionnaire results for *experts*

is the clear intention—not to remove or damage the object or alter the phenomenon and to allow their conservation in a natural and unaltered condition for future observations.

The definition is activity-oriented (Figs. 3 and 4) and could be useful for geotourism guides during their work to explain to geotourists what are they doing. In this perspective, a profile of technical and cultural requirements could be outlined. For instance, some geowatching tools could be suggested to geowatchers, such as binoculars to let them expand their view to wider landscapes and magnifiers or hand lenses to observe small objects. A camera is also useful and can provide geowatchers with a collection of images of geological features without removing the object so others cannot observe it in place. The definition could also be used to identify a special area where protection of the geological heritage is at a high level, where only observation is allowed, perhaps within a larger area where some sort of collection is allowed. It is important to underline that, even if similar to some recent definitions of 'geotourism', the term geowatching stresses the conservation aspect (Figs. 6 and 7).

Comparisons with Similar Terms

Taking into account the terms with the closest significance to the geowatching, it is clear that it has overlapping areas with the term geotourism, one of the most recent definitions of

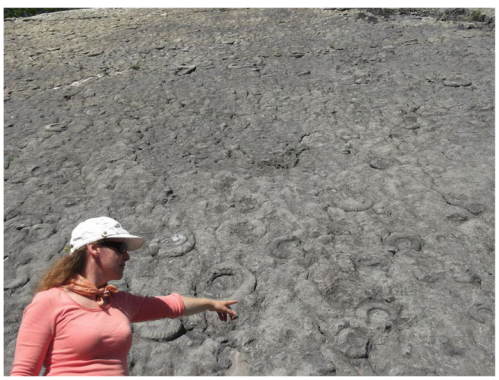

Fig. 6 Geowatching within the Reserve Géologique de Haute Provence Geopark, France. This famous fossil-rich limestone bed is a place where geowatching takes place

Fig. 7 The observation of the mushroom-shaped 'Ciciu del Villar' in Villar San Costanzo, Piedmont, Italy. Many aspects of geology can be observed (objects, phenomena and processes); this activity is 'geowatching'

which is as follows: "A form of natural area tourism that specifically focuses on landscape and geology. It promotes tourism to geosites and the conservation of geo-diversity and an understanding of Earth sciences through appreciation and learning. This is achieved through independent visits to geological features, use of geo-trails and view points, guided tours, geo-activities and patronage of geosite visitor centres" (Newsome and Dowling 2010).

This definition of geotourism is the result of the work of several researchers and many refinements and proposals; it involves many aspects that, in turn, include different actors and activity, for instance, *geological heritage* (i.e. conservation), geosites (i.e. research and mapping), geoparks (i.e. assets and protection), guides and staff (i.e. work and tasks), tour operators (i.e. logistics and business), geotourists (i.e. activity and observation). Only the last category, however, can be considered as geowatching (Fig. 8).

The main purpose of the definition of a new term is to delimit a specific area of application within the wider scope of geotourism as shown in Fig. 8.

Some terms, such as birdwatching, whalewatching and *photosafari*, can be considered to be similar to the

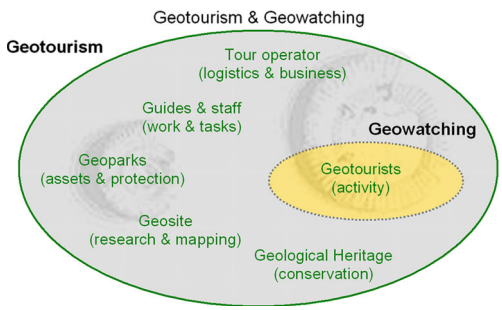

Fig. 8 A specific meaning could be assigned to the term 'geowatching', as it already has a role in the geotourism

geowatching as discussed above. Geowatching differs from such terms, however, in some aspects but also has key similarities that could be important for the popularisation of geological communication and geological heritage conservation. The relevant aspects of geology that diverge and show analogies with the biology-related fields are outlined below.

Differences between whalewatching/birdwatching and geowatching:

- Living organisms: Abiotic objects
- Moving subjects (need a 'hunting' or 'fishing' activity): Stationary subjects (need a search)
- Birdwatching/whalewatching is a specific reference to a restricted (bird, whale) context (animal); geowatching is a generic reference to a context (geological) which includes objects (fossils, minerals, rocks) and processes (exogenous and endogenous).
- Birdwatching/whalewatching is a reference to a specific context within existing ecosystems; geowatching may be a reference to ancient and/or current contexts that are representative of the evolution of the Earth (e.g. rocks, minerals, structures, landforms) and ecosystems (i.e. fossils).

Analogies among whalewatching/birdwatching and geowatching:

- Can damage or destroy the organism (or even make it extinct as it is fragile). Can damage or destroy the object (which may be unique//fragile)
- Aesthetic aspects of the subject (colours, shapes, size)
- Scientific comprehension provided by a science communicator/guide, the need for an expert to properly understand/explain the natural subject and its environment.

Conclusions

This paper analyses some areas of ecotourism and science communication and outlines the concept of a two-sided approach to conservation and the use of the natural resources. In biological fields, these activities are well identified by specific terms ending with the suffix '–watching', whose effectiveness is due to the fact that they contain both the subject of the observation (e.g. bird, whale) with the term 'watching', indicating the activity of pure observation. These activities are in contrast to hunting, fishing or capturing and collecting approaches. The author proposes to expand the popularisation of geology by introducing the neologism, geowatching, which indicates the activity of observing geological objects and phenomena without damaging them.

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