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Case Study

The nature and management of geotourism: A case study of two established iconic geotourism destinations

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ABSTRACT

Regional and global geopark networks are rapidly expanding internationally. A key impetus for their establishment is local community development through geotourism, or tourism that is based on sites of geological interest. Geotourism can be a powerful tool for sustainable development but, if not managed effectively, can constitute a direct threat to geoheritage resources. This paper articulates the characteristics and challenges of geotourism by examining two iconic geosites in Taiwan and Australia. Management challenges of Yehliu Geopark (Taiwan) are many, the most prominent ones being congestion, depreciative visitor behaviour and excessive management footprint. Depreciative behaviour is also a significant challenge to Pinnacles Desert (Australia), though congestion is not yet an imminent problem. These two cases illustrate that achieving sustainable visitor use at iconic geosites can be challenging despite the presence of infrastructure, site hardening and interpretation. The importance of visitor management at geoparks and implications for geotourism are discussed.

1. Introduction

Geotourism is often referred to as a form of nature-based tourism that focuses primarily on the geosystem (Gray, 2011; Newsome & Dowling, 2010). In doing so it promotes and develops tourism to sites of geological interest (Table 1). An early definition of geotourism as strictly 'geological tourism' was published by Hose (1995, 2000) and has subsequently been refined as a form of tourism that specifically focuses on geology and landscape. It promotes tourism to geosites and the conservation of geodiversity and an understanding of earth sciences through appreciation and learning. This is achieved through visits to geological features, use of geo-trails and view points, guided tours, geo-activities and patronage of geosite visitor centres (Dowling & Newsome, 2006; Newsome & Dowling, 2010). Geotourists can comprise both independent travellers and group tourists, and they may visit natural areas or urban/built areas wherever there is a geological attraction.

As in ecotourism and wildlife tourism the conservation of natural assets, and in this case geo-conservation and protection of geodiversity and geosystem services, is important to its continuance (Gray, 2011). Moreover, the authors believe that the distinctive nature of geotourism needs to be clear so that the tourism industry and practitioners have a clear pathway to follow and understanding of the specific aspects of marketing, protecting and interpreting sites of geotourism interest. An unambiguous definition is also important in the context of the multiple uses of protected areas and natural areas according to a range of actual and potential recreational activities. Natural landscapes are increasingly forming the backdrop to a number of adventure tourism and sporting activities that may be in conflict with geotourism where the aim is to achieve recognition and protection of geological features and processes. Geotourism also needs to be integrated into the entire natural profile of a valued protected area with geology becoming an essential component of existing scenic, botanical, and/or bird watching and other wildlife values and tourism oriented interests.

The aim of this paper is to elucidate the composition, characteristics and management challenges surrounding geotourism. This is achieved by reviewing the relevant literature and by examining the development and management of geotourism in two contrasting locations in different parts of the world.

1.1. Geotourism and geoparks

Interest in geotourism is developing at a very rapid rate around the world (Dowling, 2011; Dowling & Newsome, 2010; Newsome & Dowling, 2010), yet very little has been published about its possibilities, impacts and the implications for protected areas. Much geotourism development is about creating a geotourism product that protects geoheritage, helps build communities, communicates and promotes

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Table 1
The scope and focus of geotourism.

Major category	Example
Landscapes/viewscapes	
Coasts	Great Ocean Road, Australia
Mountain ranges	Himalayas, Nepal
Canyons	Grand Canyon, Arizona, USA
River valleys	Hunza Valley, Pakistan
Glacial environments	Nigardsbreen Glacier, Norway
Dune systems	Ash Sharqiyyah Sands, Oman
Karst environments	Mulu National Park Pinnacles, Sarawak, Malaysia
	Malham Cove, Limestone Pavement, England
Volcanoes	Kilauea, Hawaii, USA
	Mt Bromo, Java
	Mt Cotopaxi, Ecuador
	Eyjafjallajökull, Iceland
Mountains	Mt Kinabalu, Sabah, Malaysia
	Mt Kilamanjaro, Kenya
	Ben Nevis, Scotland
Landforms	Zhangjiajie National Geopark, sandstone towers, China
Weathered landforms	Chamarel weathered basalt, Mauritius
	Bryce Canyon eroded sedimentary rocks, Utah, USA
Depositional landforms	Clew Bay Drumlins, Ireland
	Chesil Beach Pebble Spit, England
Volcanic landforms	Undara Lava Tubes, Australia
Rock outcrops (jointing, strata, folding, faulting)	Bradgate Park, Precambrian volcanic rocks, England
	Lulworth Crumple, complex folding, England
	Zion National Park, desert sand dune bedforms, Utah, USA
	Hill farm Quarry, cross bedded fluvial sandstones, Maxstoke, UK
	High Island East Dam, columnar jointed volcanic rocks, Hong Kong, China
	East Azerbayjan folded faults, Iran
	Zanjan normal faults, Iran
Fossils	Lyme Regis, England
	Boseong, South Korea
	West Coast Fossil Park, South Africa
Sections displaying regolith	Eppleworth Quarry glacial deposits, England
Waterfalls	Iguaçu Falls, Argentina
	Dettifoss Waterfall, Iceland
Caves and speleothems	Niah Caves, Sarawak, Malaysia
	Naracoorte, Australia
	Cango Caves, South Africa
Exposures of crystals	Pulpi Geode, Spain
Meteorite impact sites	Wolf Creek, Australia
	Meteor Crater, Arizona, USA
Soils	Anglesey Soil Trail, Wales
Use of stone and minerals by humans and relics of use for cultural and industrial purposes	Wieliczka Salt Mine, Poland
	Sandstone Temple, Edfu, Egypt
	Building stones of Edinburgh, Scotland

geological heritage and works with a wide range of different people (Dowling, 2009).

Of particular relevance is the relatively recent and rapid rise of the global geopark movement that originated in a formal capacity in Europe and has subsequently spread internationally. Geoparks are different to other forms of traditional parks, such as national parks, in that they foster appropriate sustainable development within their artificially created borders. A Geopark is a nationally protected area containing a number of geological heritage sites of particular importance, rarity or aesthetic appeal (UNESCO, 2006). These Earth heritage sites are part of an integrated concept of protection, education and sustainable development (McKeever, 2010). A Geopark achieves its goals through a three-pronged approach: conservation, education and geotourism. There are now 87 geoparks in 27 countries, with 26 in China alone and 49 from 18 countries in Europe. Outside of China and Europe there are 12 global geoparks in eight countries (Macadam, 2011).

Geotourism of course occurs not only within geoparks but also outside of geoparks in a diversity of natural and built environments (Table 1). In a global context it is viewed as a synergistic form of tourism in which the elements of the landscape and landforms together create a tourist experience that is richer than the sum of its parts, appealing to visitors with diverse interests. It also involves the community when a combination of local businesses and civic groups work together to promote and provide distinctive, authentic visitor experiences. Geotourism may also provide economic and other benefits to local residents such as job creation and income generation as well as added services, products and supplies. When the local community understands the beneficial role of geotourism it becomes an incentive for wise destination stewardship (Dowling, 2009).

2. Global trends and issues in geotourism

Places like the Grand Canyon (USA), Uluru (Australia) and the southern coastline of England (Lyme Regis, Lulworth Cove) have been tourism (now geotourism) destinations for more than 100 years (Sheail, 2010). Since the early 1900s many other geologically interesting places and features have become attractions, but none of these areas was originally specifically identified as geosites as they might be today (Tables 1 and 2). Hose (2010), in writing on the aesthetic appreciation of landscapes in Britain, noted that the interest in geology 'was part of a wider fascination with general natural history in Australia, Europe and North America' (Hose, 2010, p. 15). Guidebooks that specifically catered for those people interested in learning about geology started to emerge around the middle of the nineteenth century. Hose (2010) also noted that these were originally German and British and by the end of the nineteenth century detailed accounts of geology and geological guides were available in England.

In recent years there has been a rapid expansion of tourism interest in geological features and landscapes, both within existing protected areas, and due to the recognition and identification of geosites via geo-conservation activities, governmental recognition of geo-heritage and the emergence of a complex tourism demographic that is more demanding of new, unique and educative experiences (Tables 1–3). Various aspects of geodiversity have been comprehensively explained by Gray (2004) and three books that explore the nexus between tourism and geological features have been published in recent times (Dowling & Newsome, 2006, 2010; Newsome & Dowling, 2010).

In addition, in Europe there is a rapidly expanding geopark movement, as well as the establishment of a number of organizations that actively promote geotourism and the conservation of geodiversity (Table 3). This is evidenced by UNESCO's Global (unesco.org) and European (europeangeoparks.org) Geoparks Networks, the International Association for Geotourism [IAGt] (iageotour.com), ProGEO, The European Association for the Conservation of the Geological Heritage (sgu.se/hotell/progeo), and Geologia e Turismo, the Italian Association of Geology and Tourism (geologiaeturismo.it).

Interest in geodiversity, geoconservation and geotourism, and promoted via the geopark movement, is also well established in many countries around the world (Dowling, 2008). For example, in Greece a research study and field survey on Lesvos, carried out by the Natural History Museum of the Lesvos Petrified Forest and the Department of Geography of the University of the Aegean, has resulted in a better understanding of the geological evolution of the island and the origin of a petrified forest. A number of geosites were identified, mapped and assessed (Zouros, 2005, 2007). As well as fossil sites, geosites within the volcanic terrains of the Lesvos Petrified Forest Geopark include active and evolving geomorphological landforms, tectonically active fault scarps, geothermal fields, karst and caves, and coastal and fluvial landforms. All geosites are included in the Lesvos geosite database and are accessible to the visitors through internet