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GEOTOURISM BASED UPON THE GOTHIC CATHEDRAL OF SANTA MARÍA, VITORIA-GASTEIZ, SPAIN

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Abstract: The identification of the rock types used in the construction of the Cathedral of Santa María, a gothic monument in Vitoria-Gasteiz in Spain, has enabled the reconstruction of the entire building process, from the extraction of stone from the quarry to the current restoration. Furthermore, the substrate of the building is used as a reference to narrate the "full history" of the Spanish city of Vitoria-Gasteiz since the Campanian, 80 million years ago. In this multidisciplinary study, the *geotic* aspects of low heritage value are combined with other *biotic* and *anthropic* features, and these constituents facilitate the dissemination of information about the cathedral and associated geotourism, in supporting the cultural and nature tourism. This simple methodology (geological history of the substrate followed by building process) can be easily applied to tourist areas that have poor geoheritage.

Key words: geotic aspects, biotic aspects, anthropic aspects, cultural tourism

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INTRODUCTION

In their less simplistic and more general view, Newsome & Dowling (2010) divide the environment into *abiotic*, *biotic*, and *cultural* attributes, and include sites of geological interest as well as cultural and historical assets. Another non-exclusive division, based on areas of knowledge, considers *geotic*, *biotic*, and *anthropic* characteristics (Martínez-Torres, 1994). *Anthropic* characteristics include didactic, cultural, and patrimonial themes; from this perspective, tourism activities are framed within the anthropic aspect because of their interactions with the environment and human activities (Reynard et al., 2017). Tourism that is oriented towards the knowledge and enjoyment of biotic environmental features is often called ecotourism or nature tourism. Ecotourism, and cultural tourism in general, are firmly established and are well provided for in terms of access to information and infrastructure. In contrast, geotourism, or tourism related to geodiversity or geotic aspects in general, is a more recent development. In this paper, the way in which geotourism can be related to cultural tourism and ecotourism is explored, using the Cathedral of Santa María in Vitoria-Gasteiz, Spain, and its surroundings as an example.

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LOCATION AND TOURISM

The Spanish city of Vitoria-Gasteiz, situated on the wide plain of the Llanada Alavesa at an altitude of 550 m above sea level, has a population of 250,000 and is the capital of both the Province of Alava and the Autonomous Community of the Basque Country (Figure 1). It has an abundant availability of public land, which has been progressively occupied in a process of discreet urbanism that is closely regulated by the local government. The support of all political parties and successive town councils towards its development into a sustainable and environmentally responsible city was recognized in 2012, when the city received the *European Green Capital Award*. From an historical/heritage perspective, the restoration of the Cathedral of Santa María was recognized in 2002 with the *Europa Nostra Award for Cultural Heritage*. Since 2015, the cathedral has been listed as a *UNESCO World Heritage Site* within the *Routes of Santiago de Compostela: Camino Francés and Routes of Northern Spain*. These distinctions have focussed the city's official tourist policy towards ecotourism and cultural tourism. Information collected by the city council shows that 140,000 tourists visited Vitoria-Gasteiz in 2014. The typical visitor of the city is aged 35–64 years and is from a neighbouring Spanish region, and 8% are from France. The average stay is 2 days, during which other destinations are visited, such as the Rioja Alavesa, a centre of wine-based tourism. The most valued touristic aspect is gastronomy, followed by nature (Council of Vitoria-Gasteiz, 2016).

Ecotourism in the area focuses on the *Anillo Verde* (Green Ring), a route of 30 km around the city perimeter, along which the *Salburua Lagoons* are the main highlight. These lagoons cover an area of 206 ha and are included in the Ramsar list of *Wetlands of International Importance* and the *Natura 2000 European Network* as a *Site of Community Importance* (SCI). The main historical and cultural heritage tourist attraction is the Cathedral of Santa María, a visit to which is considered mandatory in travel guides.

METHODOLOGY

The proposal of geotourism here described derives from three researchs developed in the Cathedral of Santa María: excavation of the foundation, recognition of the building materials and its provenance. In relation to the rocks of the substrate the geological history of the city is narrated. From the building materials and its provenance, the construction process is described: ancient quarry, transportation and placement of the stones. Moreover, the environmental characteristics of the transportation route are described. Geotourism has already been proposed in other cities such as Rome (Heiken et al., 2005), Lisbon (Pinto et al., 2011, Rodrigues et al., 2011) or Brno (Kubalíková et al., 2017). Likewise, specific urban geotourism apps have been developed (Pica et al., 2017). In this work we use a single monument and its building process, to link geotic, biotic and anthropic aspects as a unique geotourism resource.

GEODIVERSITY AND GEOHERITAGE

The city of Vitoria-Gasteiz has an area of 277 km^2 and is set on Upper Cretaceous rocks with some discordant quaternary deposits. The relief is very smooth and outcrops are scarce (Figure 1). On the few slopes where the substrate does crop out, a monotonous series of marls and marl limestone are visible, dipping gently to the south (Figure 1). Fossils of *Micraster* and *Inoceramus* have been found in the area. The Geological Service of Spain has identified 144 important sites as part of the Global Geosites Project (Instituto Geológico y Minero de España, 2011), of which only the *Ámbar de Peñacerrada II Geosite*, approximately 30 km away, is close to Vitoria-Gasteiz (Martínez-Torres, Alonso & Valle, 2011). Of the 150 Sites of Geological Interest of the Basque Country (Mendia et al., 2013), only one site in Vitoria-Gasteiz is mentioned: the *Wetland and Quaternary of Salburua*. The wetland comprises a system of lagoons that protect the city from floods, but it is best known for its outstanding ornithological richness. The hydrogeological aspects, therefore, are secondary to its exceptional biotic aspects. The lack of geological heritage in Vitoria-Gasteiz is a reflection of its low geodiversity. The very monotonous series of Upper Cretaceous layers on which the city rests is more than 6 km thick in places; in geomorphological terms, it has no outstanding features of interest (Ramírez-del-Pozo, 1973). As the relief is very smooth, outcrops are scarce (Figure 1).

Figure 1. Location of Vitoria-Gasteiz and the slope of highway A-1 (42.827634, – 2.761958), Characteristic Upper Cretaceous marly limestone, The series dips toward the south and shows small sedimentary extensional faults and a gentle angular discordance at the base of the limestone (Overview is from Google Street View. Accessed 13 Dec 2017)

THE CATHEDRAL

The Cathedral of Santa María, generally known as the Old Cathedral, is a gothic Catholic edifice with characteristic pointed arches that was built mainly in the 13th and 14th centuries (Figure 2). It is located in the centre (and the highest point) of the city.

Figure 2. Southern facade of the Cathedral of Santa Maria. The ashlar is composed of Paleocene limestone (*Lumaquelas de Ajarte*). The masonry is Campanian calcarenite (*Calcarenitas de Olárizu*)

The northern and eastern facades form part of a medieval wall that surrounds the ancient city. The western façade lies beneath the cathedral's tower and the southern facade is defined by a square that was originally destined to be a cloister. The cathedral was closed in 1997 because of the risk of collapse. Thereafter, it was completely examined from the foundations up, and both the interior and exterior were excavated to the substrate, thereby facilitating an archaeological interpretation of the entire history of the city up to the cathedral's construction. Likewise, analysis of its structure has enabled the phases of construction and subsequent reconstructions to be determined, as far as the current restoration. This information has been summarized in a restoration plan (Azkarate et al., 2001). The restoration works continue today under the motto *Open for Works*®, and an exhibition of the history of the cathedral and the city has been installed at the site.

LITHOLOGICAL MAP OF THE CATHEDRAL

The building stones of the cathedral and their source locations were documented during the overall analysis of the cathedral. Of the 18 lithologies identified (Figure 3), the most plentiful were Paleocene bioclastic limestone used in ashlar and sculpture, and Campanian calcarenite used in masonry (Martínez-Torres, 2001). Other analytical techniques used to investigate the walls included 41 drillholes, and geophysical techniques such as radar, electric profiles, thermographs, and X-ray analysis (Bell et al., 2012).

The provenance of the stones was identified by delimiting the identified rocks to areas with the same lithology and fossil content on geological maps. Within each geological level, the *lithotecto,* or level able to be quarried, was delineated. From this information and other details documented in the cathedral archives, the likely quarry sites of the stones were determined, and these were later visited. Field studies of these old quarries produced very different results in terms of ages, locations, and typologies of extractions (Martínez-Torres, 2007, 2009a). The ashlar and sculpture stone used in the cathedral came from the town of Ajarte; hence, the defined lithotype is termed *Lumaquela de Ajarte*. The lithotype used in the masonry is termed *Calcarenita de Olárizu*, as it originated from the mountain of that name (Martínez-Torres, 2001). The available information on each element of the building was collected and processed in a GIS. An analysis of the lithological maps and mechanical drillholes revealed that 4,922 tons of *Lumaquelas de Ajarte* and 5,437 tons of *Calcarenitas de Olárizu* were used in the cathedral. In an additional study conducted to investigate the alteration of the construction stone over time, complex maps were drawn. Now, visitors can learn about the alteration processes and consequent restoration criteria in specialized guided visits.

Figure 3. Example of a lithological map (width 10 m) showing the northern façade of the Cathedral of Santa Maria, 1. Campanian calcarenite (*Calcarenitas de Olárizu*); 2. Paleocene limestone (*Lumaquelas de Ajarte*); 3. Paleocene dolomite; and 4. Campanian marly limestone of the substrate (Image of the Fundación Catedral Santa María)

THE ROUTE OF STONE

After the rocks used in the cathedral and their origins had been identified, the entire construction process was modelled, from the extraction of the rock in the quarry to its placement. A guide was written to disseminate this information, *La Ruta de la Piedra: camino medieval desde las canteras antiguas de Ajarte hasta la Catedral Vieja de Santa María en Vitoria-Gasteiz* (Martínez-Torres, 2009b), known in English as "The Route of Stone: the Medieval Road from the Ancient Quarries of Ajarte to the Old Cathedral of Santa María in Vitoria-Gasteiz".

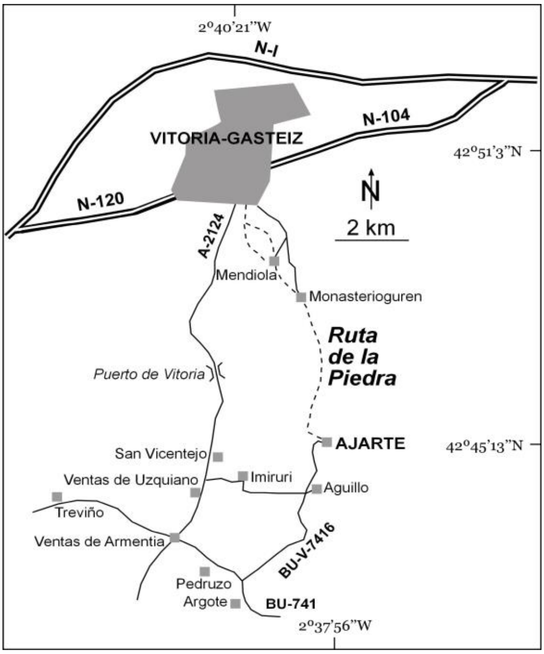

Figure 4. The Route of Stone (Ruta de la Piedra) from ancient quarries in Ajarte to cathedral in Vitoria-Gasteiz

The guide outlines a rugged 14 km walk that has been designed to give information about the cathedral construction process and other geological, biological, and historical features. Geotourism, ecotourism, cultural tourism, and active tourism have therefore been integrated into a single attraction. The first stop along the route is in the town of Ajarte (Figure 4), where the rocks used in the stonework of its houses are described, and special attention is given to the abundant fragments of lamellibranchs. The next stop is an old quarry front, where the paleontological features are noted and the different extraction and loading systems are explained. In the sections where the medieval road is preserved, its construction and erosion processes are discussed. Along the walk, the structural relief and its influence on the distribution of the vegetation are also considered. On arrival at the cathedral, visitors can see the stones used in its construction and inspect the fossils found in them, and verify their origins. They can also learn about how the ashlar was carved and placed. The cathedral administration organizes guided tours along The Route of Stone. One of the most requested dates coincides with the reenactment of a medieval market around the cathedral on a weekend in September, when a *Lumaquela de Ajarte* ashlar is transported in an ox-pulled cart along the last 4 km of the route. After the walk, visitors are invited to enter the cathedral.

THE FULL STORY OF VITORIA-GASTEIZ

The tour of the cathedral commences next to the eastern wall, where the foundations and the rock that supports them are visible in an old pit that has been excavated. The substrates are Campanian limestone and marly limestone. A map of the Campanian world at the beginning of the visit shows the location of Vitoria-Gasteiz at a depth of 200 m in the Tethis Sea. Bivalves (*Inoceramus*), ammonites (*Parapuzosia*), and sea urchins can be identified in sediments that are now visible. A *Micraster echinus*, 80,000,000 years of age and the first inhabitant of Vitoria-Gasteiz, has been proposed as a logo for the city (Figure 5).

Figure 5. The first inhabitant of Vitoria-Gasteiz, a *Micraster* that is 80,000,000 years old, shown in a logo project

Figure 6. The façade of the old school that later became the Hospicio of San Prudencio, built in 1589, is a good example of the neoclassical style and comprises the main types of stone used in masonry and sculpture in Vitoria-Gasteiz, 1. Paleocene limestone (*Lumaquela de Ajarte*); 2. Upper Cretaceous limestone (*Caliza Negra de Anda*); 3. Albian sandstone (*Arenisca de Sierra Elguea*); 4. Miocene sandstone (*Arenisca tipo Fontecha*).

The museographic narrative continues with information about the foundation of the city on the hill of Gasteiz, the superposition of different walls, and the antecedents of the cathedral. Information about the different rocks and their origins is presented in the explanation of the medieval constructive typologies, and the tools used by the stonemasons are on display. The different construction phases and their links to various historical events and the history of art are explained as the visit progresses, and the tour concludes with a visit to the tower, the highest point of the city. The history of the city, as displayed in the cathedral, including the alpine orogenic cycle, is presented in the *Historia de Gasteiz y Vitoria. Geodiversidad incluida* (Martínez-Torres, 2013), known in English as "History of Gasteiz and Vitoria. Geodiversity included". As well as the full history that is shown in the permanent exhibition in the cathedral, there is a route of the main squares of the city that allows visitors to see its buildings, history, and stonework (Figure 6). The visit concludes in the Natural Sciences Museum of Álava where visitors can view interesting collections of Iberian mineralogy and paleontology, and visit a special room dedicated to the amber deposit of the Peñacerrada II Geosite. Sites of geological interest in the Province of Álava are also mentioned, including the Haya de Ponata Cavern that extends for 70 km; the Délica and Gujuli Waterfalls that have drops of 220 and 110 m, respectively; the 47 eolic lagoons of Laguardia; the Salinas de Añana salt production facility and its Salty Valley; and the South Pyrenean frontal thrust in Sierra Cantabria.

DISSEMINATION

Both tours conducted around the cathedral, The Route of Stone and the History of Gasteiz and Vitoria, consider geotic aspects of the city and its surroundings. Biotic aspects such as vegetation and fauna, and anthropic aspects such as geography, archaeology, history, architecture, construction, and transport, are also considered. The integration of these themes into a single discourse has added value both to the themes as combined, and individually. For example, the rocks used in the construction of the cathedral are not particularly special in terms of local geodiversity, but the old quarries from which they were extracted are now of interest, and some are being considered as possible archaeological heritage sites (Martínez-Torres, 2009a). In an attempt to integrate geotourism, ecotourism, cultural tourism, and active tourism around the cathedral, the publications discussed in this article have been distributed to guides and tour managers. To date, the real impact of the guides has not been evaluated and their contents have not been modified since their publication. However, it has become apparent during the training of the tour guides that some of the aspects mentioned above are emphasized more than others, so it might be necessary to revise the guides to highlight the geological contents (Pasquaré Mariotto & Venturini, 2016). This case study demonstrates how geotourism can be successfully integrated into discussions about the history, culture, and construction of the cathedral.

CONCLUSION

The proposed geotourism centred around the Cathedral of Santa María in Vitoria-Gasteiz integrates the geotic, biotic, and anthropic aspects of the monument and its surroundings. The guide *La Ruta de la Piedra* (The Route of Stone) outlines the entire construction process of the cathedral, from extraction of stone from the quarry to their eventual placement, and the full history of the city from the Campanian era is related in the *Historia de Gasteiz y Vitoria* (History of Gasteiz and Vitoria). Through the rock and stone used in the construction of the Gothic temple and its foundation, geotourism has been integrated with ecotourism, cultural tourism, and active tourism. The rock types used in the cathedral construction are not of special geological relevance; however, value has been added by combining various aspects and individual geotic features that are not usually shown in traditional visits. To enable geotourism to be linked to conventional tourism, tour managers have been provided with geotourism guides. The criteria and methodology used in this example can be exported easily to other locations that do not enjoy a rich geodiversity.

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