A MARIÑA NATURAL

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GEOTOURISM IN A MARIÑA LUCENSE

MINI-GUIDE FOR OBSERVERS

A MARIÑA LUCENSE
MORE THAN JUST A GEOLOGICAL SHOWCASE

On a visit to this area, **its rocks tell us everything that happened millions of years ago,** enabling us to understand the **immense changes that occurred on our planet.** When we take a closer look at its geology, it is possible to understand **the reasons behind this landscape.** Visiting each of the **16 places of geological interest** is an **unforgettable experience** that will not only transport us back to the past but also allow us to experience the present and at times the future that awaits such a place. That is why you cannot ignore such an **enjoyable, different and enriching way of seeing the sights in A Mariña Lucense.**

We propose visiting different geological sites, where the **beauty of the surroundings,** easy and convenient access and, of course, the **striking rock formations,** ensure that they are of **significant** tourist **interest.**

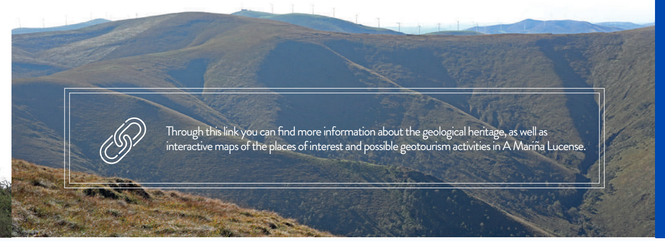
Now all you have to do is visit each of these 16 places to observe and understand first-hand this wonderful geological heritage A Mariña has to offer. **We can assure you that from this moment on, the way in which you see its landscape will change forever.**

GOOD PRACTICE
FOR GEOLOGICAL OBSERVATION

- Care for and maintain the landscape as we have found it.
- Use appropriate clothing and equipment.
- Prioritise our safety during the visit.
- Keep to authorised trails and paths.
- Collecting rocks and minerals is prohibited.

GEOTOURISM ACTIVITIES

Different town councils in A Mariña promote a variety of proposals to discover their geological heritage. Some of them can also be done in a self-guided way. In addition, guided routes are occasionally organised in a pleasant and didactic way by Galician geology experts.



Through this link you can find more information about the geological heritage, as well as interactive maps of the places of interest and possible geotourism activities in A Mariña Lucense.

amarinalucense.gal

Tourism Sustainability Plan in A Mariña Lucense

A Mariña Lucense Mancomunidade de Concellos

XUNTA DE GALICIA

GOBIERNO DE ESPAÑA · MINISTERIO DE INDUSTRIA Y TURISMO · SECRETARÍA DE ESTADO DE TURISMO

Migmatite

Sienite

Block stalactites

Slates and quartzites

Periglacials deposits

Aplite

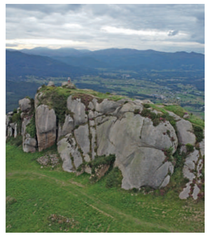
Tafoni in granite

Panholes in granite

Pegmatites

Quartzite

GEOLOGICAL SITES OF TOURIST INTEREST



ALFOZ - FOZ

A FROUSEIRA VIEWPOINT
The Galician Pão de Açúcar

This vantage point, **similar in origin to the Pão de Açúcar** in **Brazil,** is the result of the **intense erosion** of the adjoining rocks. The **panholes** and **rills** were created by the weathering of the **granites** in this area. On its approach, visitors will come across **sienites,** which are **very unusual pink rocks,** created by the interaction of hydrothermal waters with the granites.

The uneven landscape of **high mountains and wide valleys** is the result of **piano key modelling,** a geological process that began **70 million years ago** on account of the **collision between Europe and Africa.**

ALFOZ - O VALADOURO

O ESCOURIDAL WATERFALL
When the rivers are the stonemasons

Highly resistant and barely fractured **granites** can be found in the O Escouridal waterfall. However, water will always find **weaknesses,** and in the **initial section** of this spectacular river there is a **fracture,** making it more **linear and narrower.**

Further along, the waterfall opens up much more due to the lack of fractures, giving rise to some lovely examples of **bowl-shaped hollows,** called **panholes** when they are **small** and **potholes or giant's kettles** when they are much bigger in size, created by the **rotation** of rock particles on small **protuberances** on the river bed.

BARREIROS

CORVEIRA POINT
Order out of chaos

This part of the coastline boasts a **varied series of rocks and geological structures.**

On the one hand, minerals originating from marine sediments appear, folded and transformed into **slates and quartzites 350 million years ago** as a result of the collision of tectonic plates, which also generated a **huge 10-kilometre-long fold,** the part with the **maximum curvature** visible here.

And on the other hand, the **aplites, pale-coloured linear sheet bodies that cut across everything that was there before,** formed by the cooling of the magma at a maximum depth of 8 kilometres **280 million years** ago.

BURELA

PORT OF BURELA
Where the rocks were made of plasticine

This area is of **internationally renowned geological interest,** given the presence of a defined **system of** continuous **folds** on **quartzites and slates,** which are the result of the **tremendous collision** between two supercontinents **350 million years** ago.

Above the folds, there is a **sediment deposit dating back a million years,** which can be interpreted as **old streams.**

Furthermore, the port area marks the spot where the **types of rocks change.** From **Burela to Ribadeo quartzites and slates** can be found, whereas from **Burela to Viveiro** only **granites** appear.

CERVO

ATALAIA POINT
A mine for the stonemasons

This place is a **tombolo,** a term that defines a **small peninsula with a narrow isthmus** –often sandy– and an important human settlement from pre-Roman ages. **It originated when marine action came across a rocky obstacle** surrounded by water, leading to the accumulation of sediments and creation of a passage that joined it to the continent.

There is also a notable **presence of old ornamental granite quarries,** where rocks in linear and narrow shapes, known as **pegmatites** can be seen. They are **unique** on account of the large size of their minerals, some of interest in gemmological terms or in the electronics industry.

MONDOÑEDO

COVA DO REI CINTOLO
A journey into the heart of the mountain

In Galicia, the natural caves are exceptional, and are only to be found in its easternmost region. **One of the biggest is the Cova do Rei Cintolo.**

These caves were formed by the **dissolution of limestones** when they interacted with **rainwater.** In the Cova do Rei Cintolo, there are a **significant number of joints** in the rocks, which further facilitates their dissolution and lends them a more **irregular morphology.**

With regard to their formations, **draperies, soda straws, coralloids** or **sinter terraces** appear alongside the classic **stalactites, stalagmites and columns.**

OUROL

A XESTOSA WATERFALL
The rocks that saw the birth of Galicia

This waterfall sits on **rocks that are 580 million years old,** considered **the most ancient in Galicia.** They are called **migmatites** and present **characteristic bands** of dark and light-coloured minerals. But they were, in fact, **marine sediments,** subsequently transformed by extreme pressure and temperature conditions.

Just a few metres away from the waterfall, we come across **Viveiro´s fault,** a geological structure which was **the origin of the estuary** of the same name and which extends for almost **200 kilometres.** This huge scar on the land is the **result of a major collision** between tectonic plates.

A PONTENOVA

CONSUELO MINE
Where iron was everything

Iron-rich layers of rock, the result of the accumulation of **marine sediments** near the coast **450 million years** ago, were **mined** in A Pontenova. As these **layers** were almost **vertical,** the galleries were **extremely high,** with **steep gradients.** The natural degradation of the iron minerals gave rise to **black stalactites.**

The **raw mineral was transformed into pure iron,** or iron with very little oxygen, in **kilns.** This was possible because the iron mineral reacted with the combustible fuel, eliminating the oxygen.

RIBADEO

OLLOS DE RINLO
The sea's eyes on land

The so-called ***Ollos*** (eyes), as they are known in the Ribadavia area, refer to the **circular coastal shapes** where the **collapse** of a **marine cavity in weakened environments** has occurred. They form a part of a **process of erosion** that, on occasions, **culminates in the creation of arches.** In Rinlo, several of these *Ollos* were taken advantage of to install **shellfish or seafood farms** for almost 90 years.

Also seen in this area of the coast sometimes are **green and/or brown-coloured rocks,** known as **diabase stones,** linked to the **opening of the Atlantic basin** some **200 million years** ago.

AS CATEDRAIS BEACH
Past and future in the hands of the Cantabrian coast

The geological importance of this famous sandy coastline lies in the fact that it is a **living example** of the natural evolution of its **creative process,** allowing us to know each of the stages involved.

It all began with a **fracture** in the **slates and quartzites,** where **marine erosion** was more intense, giving way to a marine **cave, a collapse hole, an arch** and finally an **islet.** The whole **process** could take **thousands of years,** although it could be accelerated by changes in the intensity of marine action.

O VALADOURO

O CADRAMÓN
The trace left by ice in the mountains

The **last significant ice age on the planet,** some **50,000 years ago,** left its mark on the higher lying parts of **O Xistral,** in the shape of **glacial erratics or glacial deposits.**

After this period, an episode of **water freeze-thaw cycles** developed, causing **fractures in the rocks** and their subsequent **accumulation on the hillsides.**

The climate in this area of A Mariña was conducive to the formation of **important peat deposits,** which is almost unique in southern Europe, where a drier and hotter climate is prevalent.

O VICEDO

O CHAMADOIRO BEACH
The Sor, a powerful sculptor of the landscape

On the left bank is an important **quartz vein,** one of the **largest in the world,** which is currently being mined. This vein was formed by the intense and continued circulation of **hydrothermal water loaded with silica several kilometres underground.**

The River Sor, similarly to all other rivers on the planet, transports sand sediments towards its mouth, forming in this case a **large and pretty sand bar.** In each tidal cycle, strong currents develop, evidenced by the **substantial undulations of sand,** called **megaripples.**

SAN ROMÁN BEACH
A volcano hidden among the cliffs

The rocks of this sandy stretch formed a part of a **series of underwater volcanoes measuring more than 600 km,** with **explosive and violent eruptions.** This was something that actually occurred **near the South Pole.** Their remains take the form of **rocks called *Ollo de Sapo,*** or *Toad's Eye,* in reference to their **strange texture.**

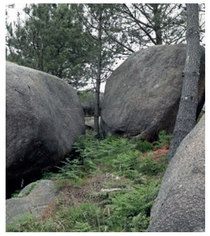
The **geological interest** of this area **is completed by** the presence of **folds and faults,** due to the collision of tectonic plates, as well as to the existence of **iron-oxide ores,** both in the rocks as well as in the sand on the beaches.

VIVEIRO

SAN ROQUE VIEWPOINT
The fault that creates an estuary

Viveiro estuary, unlike other estuaries, was formed by the presence of a **fault almost 200 kilometres** long that separates **different materials on each side.** To the **west** can be found **slates and quartzites,** defining a low-lying coast but with **sheer cliffs;** and to the **east migmatites, granites and pegmatites** appear, forming a more uneven coastal landscape with **gentler** cliffs.

This fault originated in the final stages of the **major collision** between the **continents** of Larussia and Gondwana **300 million years ago.**



CASTELO MOUNT
The spheroids, masters of the landscape

The term **spheroidal shapes** refers in geology to the **round shapes** of the **granitic rocks** that occurred during the **erosion** process. Although it may not seem so, this shape is the result of the **continuous interaction** between the **granite** and the **groundwater.** Sometimes, their **layout** is **haphazard,** for example, when we come across the so-called ***penas caballeiras,*** or balance rocks. The shapes that occur due to **weathering** are **panholes** or **rills.**

The surrounding landscape of the **Viveiro estuary** allows us to understand that a **fracture** in the ground gave rise to its formation.

XOVE

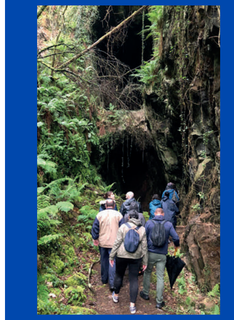
MORÁS CLIFFS
Made from salt and time

The cliffs at Morás, also known as the paper cliffs, are a place of **geological interest,** due to the **shapes the granite rocks have formed as a result of erosion.**

These **rocks** were formed from **magma 300 million years** ago, as a consequence of the **collision** of **two supercontinents,** a geological milestone which would also give rise to the famous **Pangaea.**

The **shapes** of these cliffs are the result of the **interaction** between the microdrops of **salt water** that exist in the coastal environment and the **minerals in the granite.** These shapes formed by erosion are called **tafoni, panholes** and **rills.**

A MARIÑA



Geotourism visits in A Mariña Lucense