

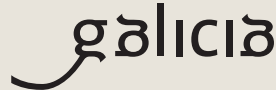
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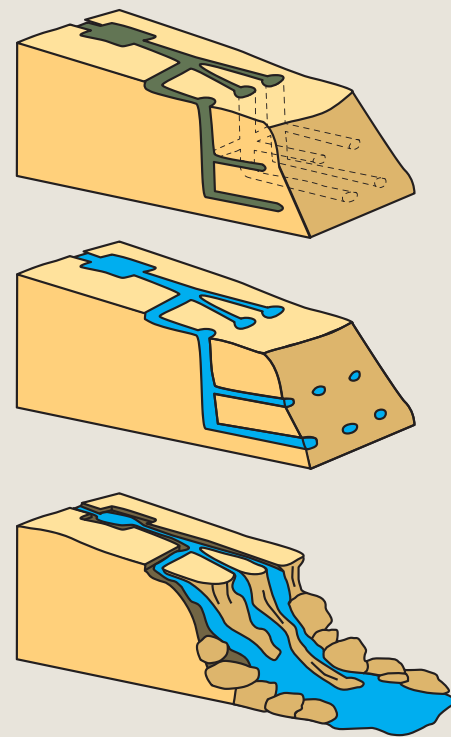
UNESCO Global Geopark Project COUREL MOUNTAINS

Geological Routes

COUREL MOUNTAINS UNESCO Global Geopark Project



Routes Geological



Different phases of the *ruina montium* technique



8 Margaride mining zone

In this small village, a small Roman gold mine is preserved. It offers the possibility to enter in the ancient cavities of the ruina montium mining technique, as well as to walk through the mine stripping ("desmonte") left behind by the Romans.

Montefurado Roman tunnel



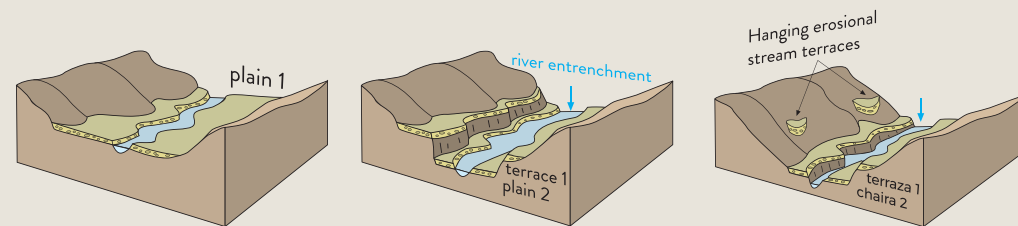
One of the big works of Roman engineering built in the 2nd century to deviate the river Sil and exploit the gold contained in its sediments. The Montefurado Roman tunnel is the biggest structure from the Antiquity in the Iberian Peninsula.



Venta Nova Viewpoint



It allows pilgrims to approach the geological value of the name of this route: the Winter Pathway. The entrenchment of the river Sil allows them to reach Santiago de Compostela without crossing the snow-capped peaks of the Galician eastern mountain ranges. In the same place, the Figueiredo Roman gold mine uses the technique of ruina montium on the deposits of the stream terrace for the exploitation of gold.



Summary

A CARBONATE ROCKS

RECUMBENT FOLD

A SEARA VALLEY:
ICE, WATER AND HUMANS

THE RIVER SIL AREA

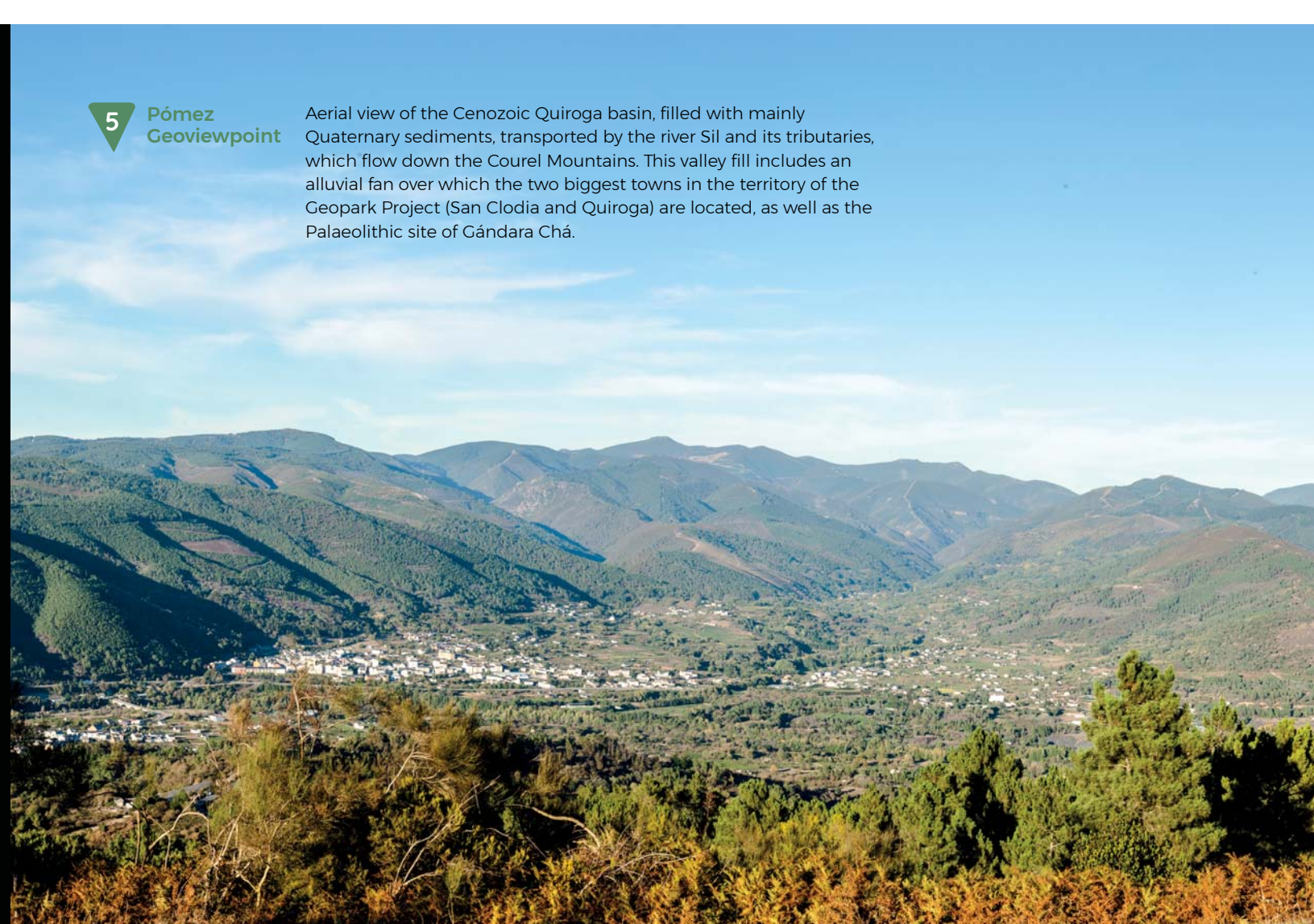




Carbonate rocks

Even though carbonate rocks do not abound in the Courel Mountains, the path allows for a journey through calcareous stones which form valleys in the North of the territory, interpreting their origin, getting to know the fossils embedded therein, admiring the internal and external erosion landforms, their characteristic vegetation, and, of course, the use human have given them from the past to the present.

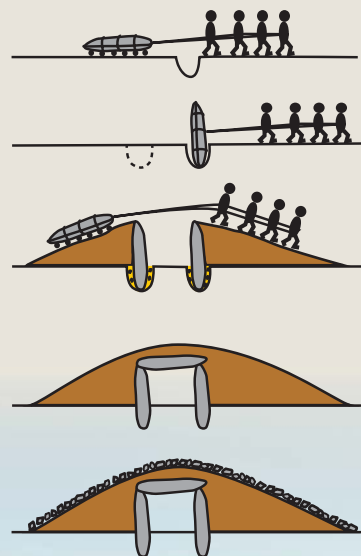
Aerial view of the Cenozoic Quiroga basin, filled with mainly Quaternary sediments, transported by the river Sil and its tributaries, which flow down the Courel Mountains. This valley fill includes an alluvial fan over which the two biggest towns in the territory of the Geopark Project (San Clodia and Quiroga) are located, as well as the Palaeolithic site of Gándara Chá.





3 Ruidos Necropolis

Neolithic megalithic graves
(c. 5000 years BC)



4 As Fontes Geowiewpoint

The entrenchment of the rivers Sil and Lor: the mountains grow and the rivers entrench. The Ordovician quartzite layers affected by the Castro Dares fold in the Sil Syncline (first and third phases of the Variscan orogeny) exemplify the internal structure of a mountain.



1 Covas de Meiraos interpretation centre

This facility will offer the possibility to approach the underground world and to discover all its charms from 2018 onwards. Audiovisual means, interpretive panels, photographs and other materials will show the underground geological heritage of the Courel Mountains, including the formation of the caves and speleothems, the archaeological remains they treasure, and practical information about the practice and speleological value of the zone.



2 Val das Mouras

This place, known by the evocative name of "Val das Mouras", is made of big calcareous stone blocks, small cavities and underground passages which form a chaotic landscape of ruinous appearance. It is the perfect place to show the different processes of dissolution and collapse which take place in calcareous terrains in a playful way. In recent times, a grove for the production of chestnuts (the traditional staple food) has also appeared in this beautiful valley.





3 Carbedo Castle

It is a good example of the leitmotif of this proposal. The most ancient known reference of this construction dates back to 1181 and it is known that, in the late 16th century, the fortress was already in ruins. It was used by the Order of Santiago for the surveillance of the river Lor valley. It is located on calcareous stones (Lower-Middle Cambrian) and built using pieces ("cachotes") of this material.

4 Rogueira Meadow

One of the most important and internationally recognised native mountain forests in the Iberian Peninsula. Located over the vestiges of the Formigueiros old glacial cirque, the rocky substrate of slabs, quartzites and calcareous stones, and its almost thousand-metre altitude range, allows for the identification of twenty-one kinds of forests, with 80-90 % of the non-coastal vegetal species of Galicia present in just 310 ha. By the village of Moreda, the Nature Center, where you will find information about the fauna and flora of these mountains and this forest in particular, was created.



Nature Center

5 Visuña Valley Viewpoint

It is the quintessential calcareous valley in the territory and it concentrates an enormous scientific, educational and leisure potential, especially with regard to the five caves that can be found therein. It consists of materials from the Neoproterozoic (east), Lower Ordovician to Cambrian (west), the calcareous stones of Vegadeo from Lower-Middle Cambrian and the calcareous stones of the Cándana range from Lower Cambrian (centre). Humans occupied the lower parts of a valley which was modelled by the ice of the last Quaternary glaciations.

1 Pena do Ladeiro Geoviewpoint

It offers a view over the Vilachá Anticline and the Sil Syncline, both Variscan, and the confluence of the river Lor and the river Sil and how it formed an alluvial fan of which some red coloured deposits are preserved. They contain gold resultant from the erosion of the upper basin of the river Lor.



2 Geoviewpoint from Louxoá to Cubela

The spectacular beauty of the Sil Canyon towards the west and the meander of A Cubela. In A Cubela, located over the plain resulting from a Roman gold mine, the houses are built with the rocks from the surroundings (toad eye gneiss, quartzites and slabs) and river boulders from the old mine (Murias).



The river Sil area

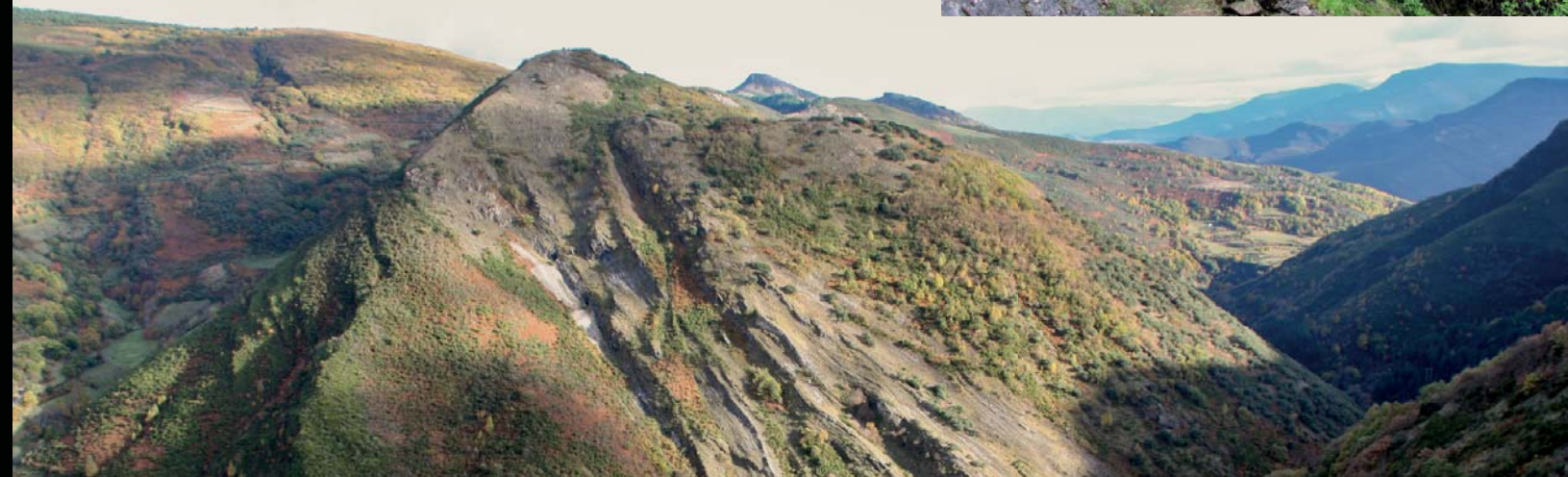
The entrenchment of the river Sil can be considered as the sole natural corridor enabling central crossing from the eastern mountain ranges of Galicia to the centre of the region through its central part. The European fauna entered through this path when climate became tougher in the past and was followed by hominids and, some thousands years later, by Romans and pilgrims travelling to Santiago de Compostela since the Middle Ages.

Nowadays, this entrenchment lets us study the tectonic structures of the first and third phases of the Variscan orogeny, such as the Sil Syncline and the Vilachá Anticline. To the SW of the territory, the singular toad eye gneiss, as well as the most extended quartzites, slabs and schists surface. At the bottom of the valley, Cenozoic sediments containing gold exploited by the Romans are preserved.

Entrance to the cave Buraca das Choias in Visuña

6

Accessible using caving techniques. It is a 182-metre long calcareous cave (it can be expanded using cave diving techniques), located at 992 m high, to the NE of the Courel Mountains. Its name evokes the word "hole" ("buraco") and choughs (birds of the Corvidae family). It constitutes a singular element of local tradition and was explored and topographed by Galician cavers. The Buraca das Choias cave is located on the calcareous stones of Vegadeo (Middle-Lower Cambrian), which extend towards the SW. It is a cave of high geomorphological and hydrogeological interest. From a geomorphological point of view, the cave is formed by horizontal galleries crossed by an underground river. From an hydrogeological point of view, the Buraca das Choias cave is the main calcareous landform in the territory of the Geopark project. Finally, from the point of view of geological heritage, it stands out because of its natural, scientific and educational value. Along its 182 metres, 14 erosional and sedimentary formations typical from karst landforms can be recognised.





The Recumbent Fold

It occupies the central and northern part of the territory of the Geopark Project: the tectonics and stratigraphy of the great recumbent fold of the Courel Mountains, Geological Place of International Relevance, from the Variscan orogeny. The substrate materials, from the most ancient (Montes or Soldón slabs, Middle Cambrian) to the most recent ones (quartzites, calcareous stones and slabs from the Devonian) will accompany you during your journey.

A Colada Observation Point (A Seara)

5

This location serves to contextualise glacialism in the lower part with regard to the headers of the glacial valleys. From this interpreted observation point, some of the most spectacular erosional landforms can be seen: glacial cirques, rocky riegels, glacial valley shoulders, glacial hanging valleys, polished stones and transfluence saddles. Among these landforms, where the terrain was more favourable, humans created the village of A Seara and exploited the surrounding rich sedimentary soils to guarantee food supplies.



4

A Seara Till

The trench resulting from the construction of the road at the entrance of the village of A Seara shows, in a very accessible place, how glaciers were true transport mechanisms for disorganised sediments at their front, on their sides, on their base and inside. This is the case for this glacial deposit, which includes quartzite, slabs and dolerite boulders from the header of the valleys which form this glacial complex mixed with mud and sand.



Rehabilitated village of A Seara

6

The plain produced by the ice in the confluence of two terminal moraines from the upper parts promoted human settlements, at least since the Middle Ages, in the rehabilitated village of A Seara.



2 Vieiros waterfall

It is a great example of how the entrenchment of the river network, produced by the Alpine orogeny, generated a large amount of waterfalls and ravines, resulting from differential erosion of the elements they cross: slabs, schists, quartzites and even calcareous stones. Its use is threefold: its landscape value, its importance for the explanation of geomorphological processes and the practice of abseiling and canyoning.

3 Vieiros flour mill

The restoration of a flour watermill, one of the most important elements of the ethnographic heritage, offers the possibility to contemplate one of the most frequent human uses in this zone: the force of the water of numerous streams that flow down the mountains.



1 Quiroga Geological Museum

In this museum, you can find plenty of information on different aspects:

- ▶ The geological formation of the territory: rocks and geological structures.
- ▶ The history of life in the territory of the Courel Mountains.
- ▶ The most important glacial evidences preserved in zones less than 1500 MAMS in southwest Europe.
- ▶ The first local hominids in Galicia: state of the art. The colonisation of the territory and the geological materials they used.
- ▶ Mining: gold, iron, antimonite, copper, galena and building stones (slabs, calcareous stones...): what they are like, where they can be found and how they are exploited from Prehistory till the present time.



2 Geoviewpoint of Campodola

The most well-known and spectacular image of the Courel Mountains (GLOBAL GEOSITE) Recumbent Fold was formed during the Variscan orogeny. From the Geoviewpoint, the hinge of the fold can be seen due to the entrenchment of the river Ferreiraño, which is equipped for the practice of canyoning. Here, between the villages of Campodola and Leixazos, the fold presents minor folds on its flanks, well-marked by the quartzites from Lower Ordovician.





Village of Ferramulín 1

Located on the point where the river Visuña flows into the river Selmo, it is a small group of houses which share roofs and walls, with narrow streets. Some groves surround the location to shade it and provide it with wood and food. The name of Ferramulín evokes the iron ("ferro") which was transformed in the nearby forge ("Ferrería de Hórreos"), one of the most important in these mountains.





A Seara valley: ice, water and humans

The existence of valleys with irregular surface and a lot of ruptures is the result of the complex formation process throughout time, the differential erosional processes of the rocks and the ample network of fractures. There, the ice from the last glacial period played a decisive role in their modeling, leaving numerous sedimentary deposits in the lower part of the valleys. Three villages, A Seara, Vieiros and Ferramulín, are an example of the transformation of the rough environment into an habitable environment through the use of rocks, water, iron and wood.





3

Pacios da Serra Quarry

Surface mines of slabs from Middle Ordovician in the core of the great Courel Mountains fold. These mines are a driving force of the regional economy and allow for an approach to the process of use and transformation of a material which is fundamental to construction from Prehistory to the present time and is exported to the rest of Europe.

4

Penaboa Viewpoint

At 1457 m, it offers an excellent panoramic view over the territory. Located on Silurian slabs, which form the core of the Courel Fold, it is useful for a better understanding of these mountains, which received their last push forward during the Alpine orogeny, the entrenchment of the rivers, and how they were modelled by glaciers during the last glacial period. From here, you can admire the most ancient rocks in the territory. The Montes or Soldón slabs (Middle Cambrian), the calcareous stone of Vegadeo (Lower and Middle Cambrian), the transition zone and the Cándana group (slabs, quartzites and calcareous stones from Lower Cambrian) and the Vilalba series: slabs, gneissic rocks, schists and sandstones (Neoproterozoic).



10 Folgoso do Courel Tourist Office

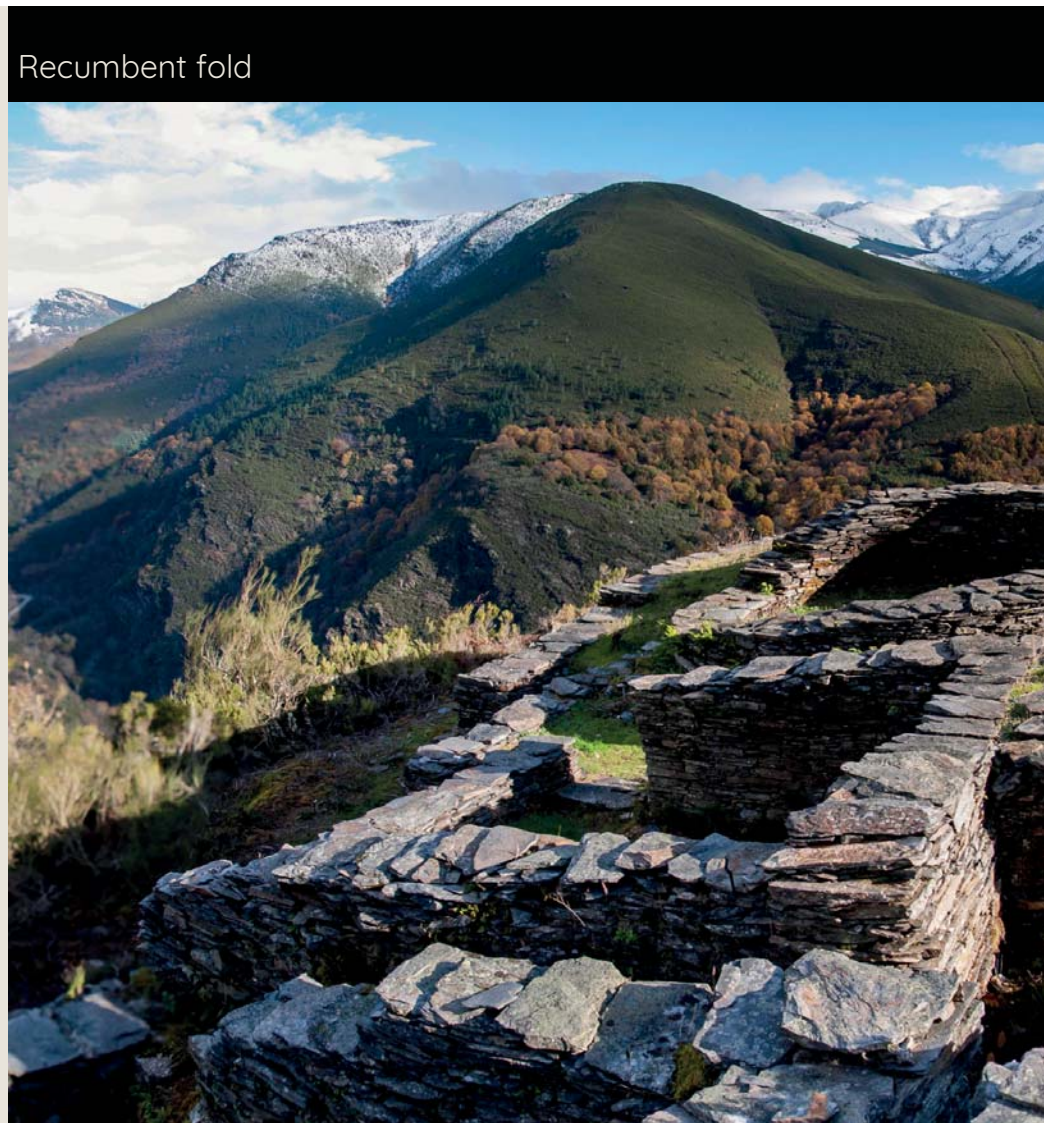
Visitor reception centre, featuring fossils from the Courel Mountains at the entrance.



Torre iron age hillfort (Castro da Torre)

11

Mining settlement built by the Romans in the 1st century within the spatial planning to exploit the local gold resources. Humans, since prehistoric times, exploited the gold deposits in the river Lor, which were transported from higher gold-bearing veins and, in many cases, were caught up in sedimentary deposits from the river.



Lucenza Meadow

6

The Lucenza glacial trough is a small hanging valley, in which the Lucenza tarn was formed. This tarn represents the clearest evidence of the erosive action of the glaciers on low mountains in southern Europe.

5

Lucenza Tarn

The traces of ice from the last glacial period in the Courel Mountains are useful for a better knowledge of erosional landforms and glacial sedimentary deposits. This location fully explains the ice movement in the Lucenza glacial cirque, which joined Porto Murelo and Forgas glaciers, towards the end of the Seara valley.





7 REXIU WATERFALL

Great example of how the entrenchment of the river network, caused by the Alpine orogeny, generated a large amount of waterfalls and ravines, resulting from differential erosion of the elements they cross: slabs, schists, quartzites and even calcareous stones. Its use is threefold: its landscape value, its importance for the explanation of geomorphological processes and the practice of abseiling and canyoning.



8

VILAMOR IRON AGE HILLFORT (CASTRO DE VILAMOR)

An international youth work area was developed to rehabilitate one of the most spectacular archaeological sites from the Castro culture. This castro can also be included among the Roman settlements built since the 1st century for the exploitation of the mineral resources of the river Lor valley. There, the Romans used natural relief to build a fortified settlement with rocks from the surroundings, making even sharp slab barriers.

9 VILLAGE OF FROXÁN

It is one of the sites featured in GLOBAL GEOSITES because it is located on the Courel Mountains recumbent fold. It was declared a Heritage of Cultural Interest ("Bien de Interés Cultural") of Galicia and it is a perfect place to show the traditional systems of human adaptation to the (Palaeozoic) geological substratum.

