# GEOPARK

## GEOPARK VALLEY´S OF CANTABRIA PROJECT

The territory of the Geopark is characterized by a wide variety of geomorphologic elements, with great interest (scientific, educational, landscape...) international and national, regional and local relevance. Among these, forms and processes of glacial origin, river, fluvial, karstic, littoral and wind scape must be pointed out. An Initial inventory has been carried out, including, at the moment, 66 geologic interest sites.

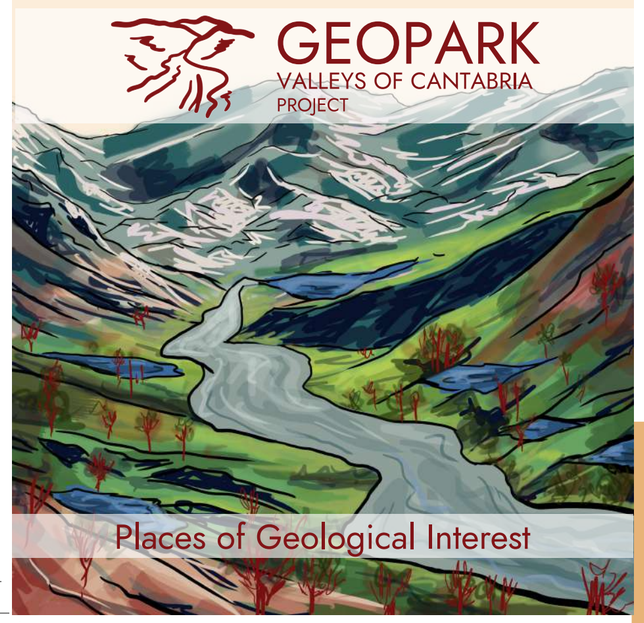
Eight of those geosites are of great relevance at an international level: Miera glacial Valley, iron mineralizations in paleokarst of Peña Cabarga, Matienzo´s Poljé, Mortillano hydrogeological system, Liendo's diapir, Sonabia's dunes, Asón's estuary and Covalanas Cave.

The high ecological value of the natural heritage existing in the territory of the proposed geopark, stands out by the presence of some enclaves with the greatest biological diversity in Spain. It has protected natural areas ( integrated into the ecological European network 2000) special conservation areas ( ZEC : coastal, river and eastern mountain) and a special protection birds' area (ZEPA). Santoña's marshes are listed as international important wetlands from Ramsar list (Ramsar agreement).

These spaces house more than 30 geosites in their territorial area, and through their management compose plans, which constitute, through their management plans, the protection legal entities, as well as those linked to the catalogue of relevant Cantabria's landscapes.

It's very important the underground heritage that exists in the Geopark, where there are a large number of caves. In many of those caves, or in their immediate environment, extremely valuable archeological remains have been found, which contributes to its declaration as a place of cultural interest. In this territory there is a UNESCO figure represented by the Covalanas cave, that were declared, for their cave paintings, a World heritage site in 2008.

The georoute proposed attempts to show some of the best geological- geomorphologic elements present in the future Geopark.



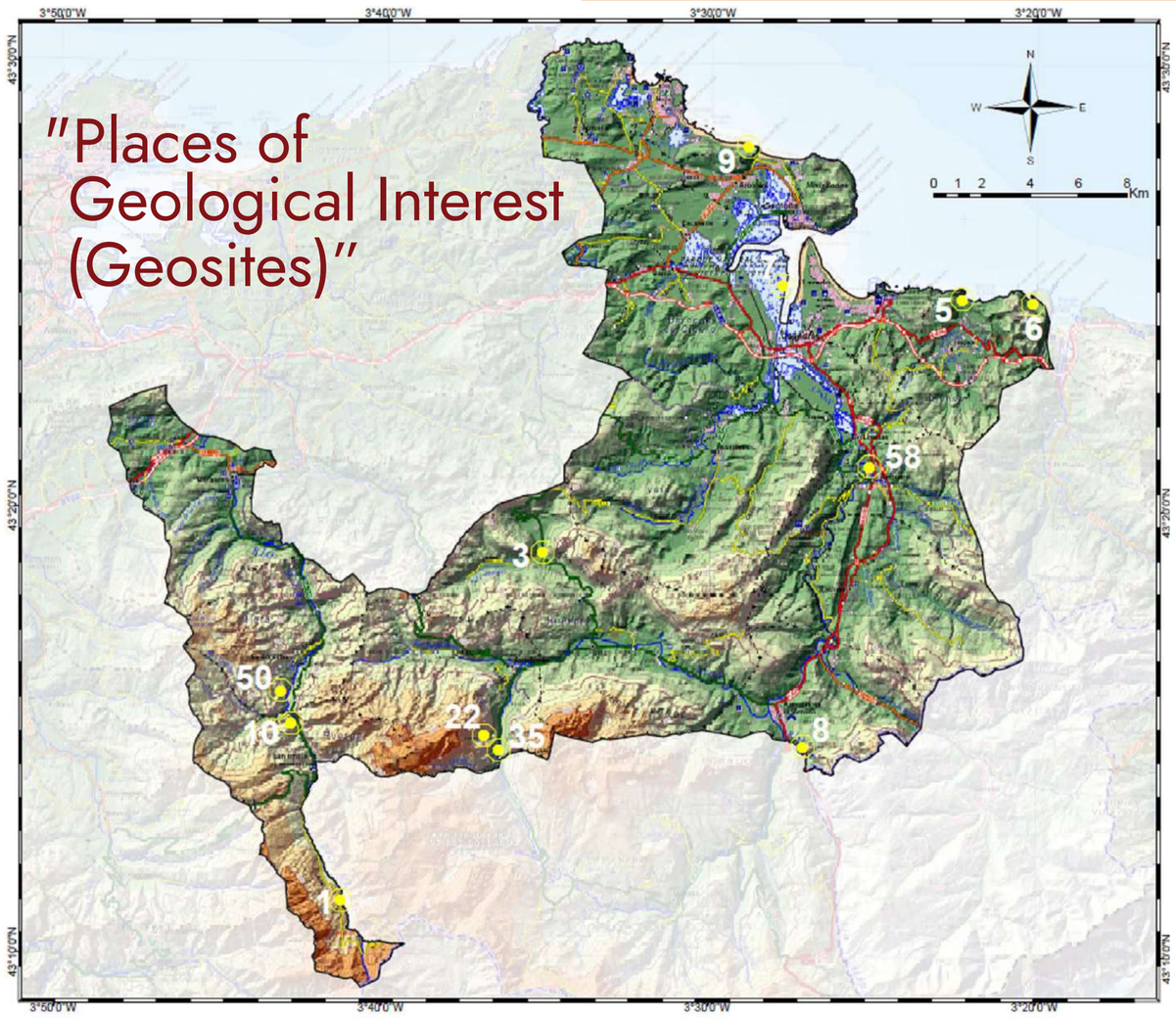

## WHERE ARE WE?

## DEVELOPERS

The "Valleys of Cantabria" Geopark project, UNESCO World Geoparks applicant, promoted by "Mancomunidad de Municipios Sostenibles" of Cantabria, with the Cantabrian Government and University of Cantabria support, is being currently promoted within the framework of the European Project ATLANTIC-GEOPARKS, co-financed by the Transnational Cooperation Programme Interreg Atlantic Area through the European Regional Development Fund.

## PARTICIPATING ORGANIZATIONS

Councils, the Cantabria Network of Rural Development, GAL Asón-Agüera-Trasmiera, GAL Valles Pasiegos, "GAC Oriental de Cantabria", "Mancomunidad de Municipios del Alto Asón" and "Mancomunidad de Municipios de los Valles Pasiegos".




## GEOROUTE

With a short description on the back.

1.- Miera´s Glacial Valley
3.- Matienzo´s polje.
5.- Liendo´s diapir.
6.- Sonabia´s dunes.
7.- Asón´s estuary.
8.- Covalanas cave.
9.- Trengandín beach fossil forest
10.- Ajanedo´s landslide.
22.- Cueto-Coventosa System.
35.- Asón´s sink.
50.- Linto´s geologic fault.
58.- Meander of Asón river

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## PLACES OF GEOLOGICAL INTEREST

1 Valle glaciar del Miera
2 Mineralizaciones de hierro en paleokarst de Peña Cabarga
3 Poljé de Matienzo
4 Sistema hidrogeológico y lapiaces del Mortillano
5 Sistema estructural del diapiro y depresión de Liendo
6 Sistema de monte Candina y Dunas de Sonabia
7 Estuario del Asón
8 Cueva de Covalanas
9 Bosque fósil de Trengandín
10 Deslizamiento de Ajanedo
11 Deslizamiento de Ampuero
12 Deslizamiento de Laredo-Liendo
13 Deslizamiento de Rocías
14 Entorno de las Tetas de Liérganes
15 Entorno de Montehano
16 Entorno de Torca del Carlista
17 Entorno del Buciero
18 Poljé de Llueva
19 Poljé de Secadura
20 Sierra del Mullir
21 Sierra de Hornijo
22 Sistema Cueto-Coventosa
23 Sistema hidrogeológico de Cueva del Valle
24 Sistema hidrogeológico de Porracolina
25 Sistema kárstico de Limpias
26 Torca del Porrón, Gran Pozo MTDE
27 Karst de La Alcomba
28 Hoyo Masayo
29 La Pared del Eco
30 Karst en torres en Noja
31 Macizo hidrogeológico de La Enguinza-Mortesante
32 Margen de plataforma carbonatada de Ranero
33 Ojos del Diablo y Hoyas en Monte Candina
34 Pico Candiano
35 Sumidero del Asón
36 Sumidero Ojo de Rocueva
37 Surgencia del río Clarín
38 Depresión de Liendo
39 Sistema glaciar de Alto de La Porra
40 Sistema glaciar de Alto de Sama
41 Sistema glaciar de Hornillos
42 Sistema glaciar de La Canal
43 Sistema glaciar de Matanza
44 Sistema glaciar de Mortero
45 Sistema glaciar del Porracolina oeste
46 Minas de Fe en Monte Candina
47 Ofitas de la Atalaya de Laredo
48 Yesos de Rasines
49 Estratos verticalizados de Gibaja
50 Falla de Linto
51 Captura del Gándara-Asón
52 Yacimiento de Ostreidos de Liendo
53 Turberas de Porracolina
54 Aguas termales de Liérganes
55 Llanura aluvial de Ampuero
56 Llanura aluvial de Ogarrio
57 Llanura aluvial de Udalla
58 Meandro del río Asón
59 Ria de Limpias
60 Ria de Rada
61 Playón de Cicero
62 Marismas de Victoria y Joyel
63 Sistemas de arenales y dunas: playa de Ris
64 Sistemas de arenales y dunas: playa de Berria
65 Bosque fósil de Berria
66 Sistemas de arenales y dunas: Playa del Puntal

## 1.- Miera's Glacial Valley

This glacial valley is one of the best preserved and southernmost in Europe. A spectacular valley view can be enjoyed from Covalrruyo viewpoint. This is one of the best glacial morphologies international examples, which is included in the IGME geological sites list (LIG-59003). It extends from La Concha to Portillo de Lunada (1316 MASL) and Castro Valnera foothills (1718 MASL). Several glaciations occurred in this area, like the Riss and the Wurm glaciations, over the Pleistocene and Holocene. During the last incident, these glaciations originated glacial deposits at levels of 600 meters, one of the lowest in the Iberian Peninsula. Consequently, very well preserved erosive forms appear such as: the U-shaped valley; glacier cirques located in high areas such as Portillo de Lunada or Castro Valnera; deposit forms affected by displacement, such as the moraine sediments; or the characteristic damming lakes.
This valley has a well-preserved morphology and it has already been cited several times in international literature for its geomorphologic and landscape values.

## 5.- Liendo's Diapir

The Liendo diapir, a Triassic age structure, can be observed on San Julian beach, which is also included in the geological interest sites list (LIG-36001). Due to the types of materials and the constant upward movement, the cliff is suffering continuous displacement processes. Volcanic rocks or ofites rocks intercalations are also noted.
This saline dome constitutes a structural barrier that separates the sea from the Liendo´s depression. Its surface is crossed by streams that flow through karstic upwelling criss-cross, and this endorheic fluvial network flows out to the sea taking advantage of the frequent existing sumps. Therefore, a karstic origin has been allocated to this depression, also called polje.
However, the latest information, still under development, suggests that this is not the case, since from the measurement of almost 100 metres depth, several levels of sands, clay and peat have been found, which is contrary to the karst origin thesis.

## 9.- Trengandín Beach Fossil Forest

In Trengandín Beach (Noja), located in a big karstic origin depression and supported by karstic limestones that emerge on the beach, a good fossil forest outcrop with many tree trunks, some of them in a living position, can be observed. The dates made by C14 date it between 2900-4000 years.
This forest presence indicates that about 3000 years ago (sub-boreal period) the sea position was below the current position (2 meters approximately).
These conditions were appropriate for the forest developing, although later the sea level rose and buried it. The deposit quality, its coastline relative position, make this field one of the best to establish the evolution of vegetation and the climate as well as the variations of the sea level on the Cantabrian coast during the Holocene.

## 35.-Asón Sink

Karstic morphology is very well represented throughout Geopark's territory, where shapes on the surface can be found, such as big developments inside it. The Asón River runs through this valley to Arredondo in a South-North direction, where it turns towards the East and continues the route of the Arredondo-Ramales fault. Soon after its source, so close to Asón district, where its flow is low, this river disappears. In its riverbed, you can see how the water filters between the round edges, making the flow disappear through a camouflaged sink. The water runs in the subsoil for 1 km approximately, where a river course that consists of big edges is observed. Throughout that process, the riverbed is a section where there are only round edges. Beside Cubera Bridge, the river flows again on the surface collecting the underground water that has run through the karstified aptian limestone massifs existing in the environment, the Mortillano and Cueto-Coventosa system.

## 22.- Cueto-Coventosa System

Inside an authentic mass of limestone rock, such as Peña Lavalle in the Arredondo municipality next to Asón, one of the most spectacular cavity systems in our country is located, the Cueto-Coventosa system.
Its characteristics and peculiarities, becomes it one of the most impressive places to enjoy speleological activity in any of its modalities where a world of vertical wells, large stone blocks, huge galleries, some narrowings and, more than anything else, a formidable amalgam of formations of the most beautiful fractures. This system, thirty five kilometers of development approximately, is structured inside the mountain along five levels of galleries.
The Cueto - Coventosa system is very important in the world of speleology and despite not being one of the systems with the greatest development, its prestige means that more and more people are entering this underground world to discover and enjoy its spaces.

## 6.- Sonabia's Dunes

On Sonabia Beach (Liendo), one of the biggest tiered dune complexes in Europe can be observed. Because of the prevailing winds directions and because it is kept under two strong reliefs that protect it, Yesera Peak and Sonabia Peak. The sands are distributed forming a complex dune field, where different types of dunes (transversal, longitudinal, mixed, erosional, etc.) of very different ages can be found. The dormant remontant dunes are spectacular, which climb the Candina Mount steep slope, forming an orthogonal framework. Furthermore, these steep slopes are made up of crescent and longitudinal dunes. The coexistence of both dunes types, that are interconnected, is a singular fact in the world.
Candina Mount is one of the most spectacular sectors in the Cantabrian coast as it can obtain a splendid view from its summit. Here, there is an Urgonian limestone dissolution structure, "Los Ojos del Diablo", a natural window, that allows to look out over the Cantabrian Sea. This massif has the only vulture located over a sea cliff in Spain.

## 50.- Linto's Geologic Fault

This geologic fault can be seen on the left slope of Carcabal river valley, before its mouth in the Miera River. The CA-260 road should be taken from Liérganes following the Miera valley, once Linto town is passed and before reaching the Merilla-Ajanedo main road detour, although it can be seen also from the road that climbs the valley.
The Lower Cetraceous limestone (Aptian) have been affected by several subvertical geologic faults, generating what is known as "Bloque pinzado de Linto". In these fractures surroundings, a rock brittle behavior has occurred, giving rise to the limestone folding-deformation in the fault plane vicinity.

## 8.- Covalanas' cave

The urgonian limestone, from the half Aptian-Albian period, emerges around "Ramales de la Victoria", giving rise to a stronger relief such as Mount Pando or San Vicente peak, that constitute the most emblematic massifs in the area. On the northeast of the Mount Pando´s slope, an important prehistoric complex is located, The Covalanes cave, that was declared a World Heritage Site in 2008. This is a small cave with two galleries, but just one of them has a Palaeolithic decoration, there are specifically 22 characters, 18 of them are hinds as well as some horses, a reindeer and an aurochs, and also black strokes. The drawing has been dated in the end of the Solutrean around 20000 BC. "El Mirón" cave, which is next to Covalanas, is one of the most important Palaeolithic burials. Here is where the Red Lady remains were found, dated in 18000BC corresponding to the lower and middle Magdalenian, although humans inhabited it at least from the Middle Palaeolithic to medieval times.

## 3.- Matienzo's Polje

It is another point included in the places list of geological interest (LIG-59001). It is located in Matienzo (Ruesga).It is a karstic origin depression where three main branches about 25 km2 can be found: Ozana, la Vega and Las Secadas, which constitute one of the largest Polje in Europe. The heavy dilution of the Cretaceous limestones, between the lower Aptian and Cenomanian ages (urgonian limestones and sandy limestones, with clays and sandstones) has produced at the bottom of the valley, a large deposit of red decalcification clays (terra rossa), which constitutes an excellent area of plant production where Matienzo town is settled.
The polje of Matienzo has a highly developed karstic system that gives rise to a large number of chasms, gorges and caves.
The poljé is crossed by small streams of little distance, since they disappear through sinks, feeding the rivers that flow in depth.
All the entire karst has produced an enormous wealth of great speleological interest caves.

## 7.- Asón's Estuary

It covers an area about 70 km 2, significant proportion corresponds to the estuary of de Asón river, it is one of the most important wetlands in Europe. It is declared a special protection birds area and it is included on the Ramsar lists of wetlands. It is a lithological control estuary (Triassic outcrops, Jurassic, cretaceous and Quaternary materials stand out) and tectonic (affected by folds and faults) in whose formation static operations have worked (rises and falls in sea level in the Quaternary).
The erosive process that resulted in the excavation about current estuaries, came from the last episode of marine descent of the WURM glaciation, with a much lower sea level than the current one. This marine descent caused the union of the hydrographic network, the strong incision of the river valleys, under the sea level, fore some low resistant materials and very fractured. In the Flandrian (Holocene), at the end of ice age, a rise in sea level occurred that would cause the flooding of the coastal lowlands (diapir origin depressions) and final sections of the river mouths that became estuaries, and intense sedimentation process began with continental and marine contributions.

## 10.- Unstable Zone Ajanedo-Merilla

In the area of Merilla and Ajanedo the slope processes are more intense than others that take place in the valley.
Particularly, on the road that goes from Merilla to Ajanedo, an unstable area can be observed where a big complex landslide, a rock falls or avalanches area can be identified.
At the base surface sandy limestones, clays and sandstones of the lower Aptiense (125 m.y.) and about them there are limestone of the lower Cretaceous (130 m.y.).
The area is located between two large faults, the "Frente Cabalgante del Escudo de Cabuérniga" and Selaya- Arredondo fault, their movement gives rise to the fracture of the rock depth, improving the landslides of deep break level.

## 58.- Meander of Asón river

In the municipality of Ampuero, the Asón River, already close to its river mouth, develops an important, very flat alluvial plain (very flat), where the river acquires a meandering path with a horseshoe shape. It is the largest meander in the territory.
The plain has been occupied by human activity in the last few years, these activities are generating flood problems, with corresponding financial losses. These are several causes that improve this natural hazard. On the one hand, a few meters away, in Marrón town, it begins to produce a mixture with fresh water and salt water, and when the tide coefficient is high, it causes the rebound effect; in addition, it is also in this area, where the river course has little slope, the flow that comes from the heavy rains in the basin as well as the water that comes from the snowmelts in the high parts. And, of course, the human occupation of a territory classified in its greatest extension as a floodable area.