

THURSDAY TECHNICAL FIELD TRIP

Geological, biological and paleontological wonders of the Sobrarbe Geopark

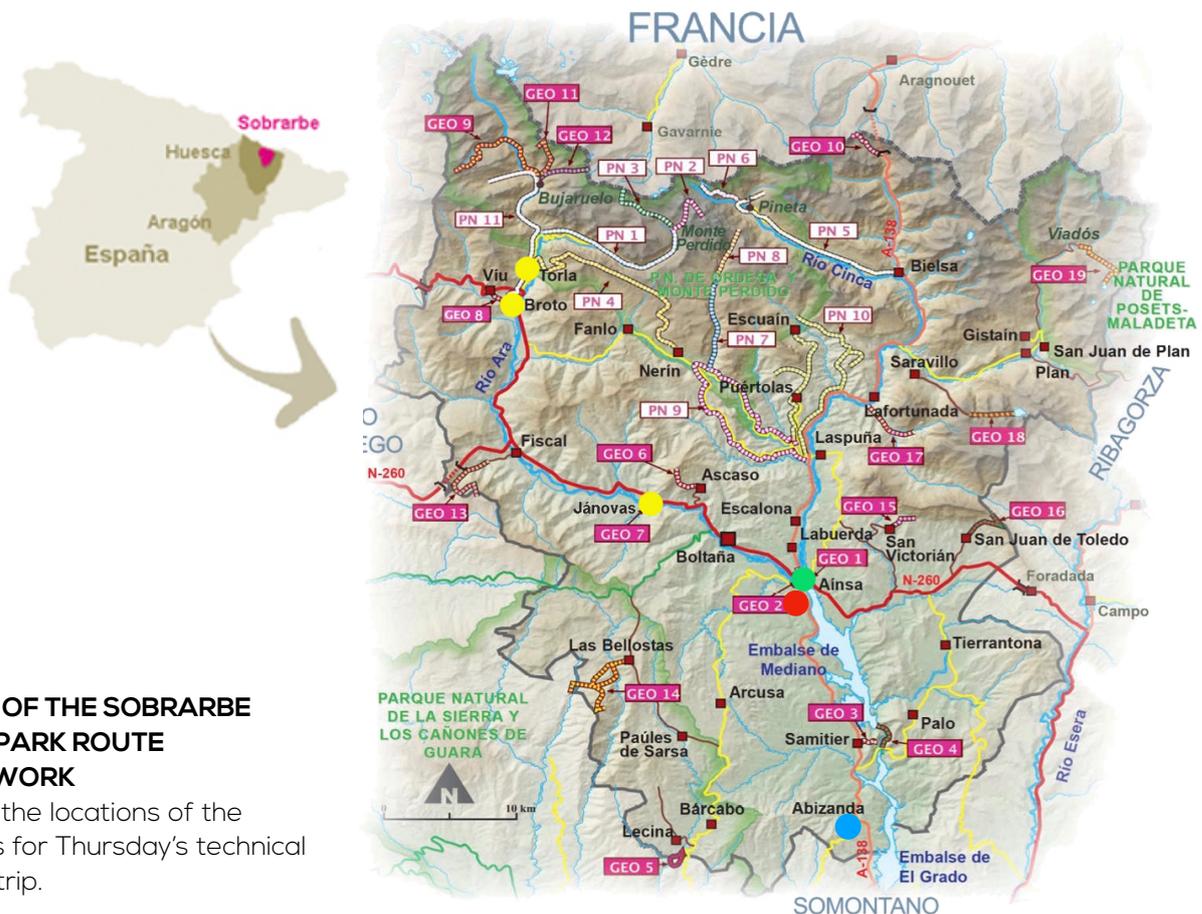
The Sobrarbe Geopark contains more than 100 geological sites of special interest, most of which have been inventoried and can be visited on the Geo-Route network, a set of 30 signposted, self-guided routes that allow visitors to easily access the most outstanding geological features in the area, and to learn about their origin, history and significance.

Today during our technical field trip we will visit several of these **geological sites**:

1. The Ara riverbed as it passes by the abandoned town of Jánovas.
2. The Sorrosal Waterfall in Broto.
3. The Ordesa Valley (entrance to the Ordesa y Monte Perdido National Park) seen from the town of Torla.

Besides these three geological visits, there will be an elective activity, different for each group. The three **elective activities** are:

- Visit to the Ainsa Eco-Museum and Bird Center (BUS 1 - Green)
- Visit to a feeding site for wild scavenger birds (BUS 2 - Red)
- Visit to the Sobrarbe Museum of Paleontology (BUS 3 - Blue)



MAP OF THE SOBRARBE GEOPARK ROUTE NETWORK

With the locations of the stops for Thursday's technical field trip.

- Geology Sites
- ● ● Elective Activities
- PN 1 Geo-Route in National Park of Ordesa and Monte perdido
- GEO 1 Geo-Route

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Due to the large size of our group we cannot visit each site all together. We will be distributed in 3 buses that will follow various itineraries and arrive to the sites at different times. You should choose your bus in advance, according to your interests.

SCHEDULE:

	BUS 1 (GREEN)	BUS 2 (RED)	BUS 3 (BLUE)
10-10:30	Travel to Site 2 (Broto)	Travel to Aínsa town	Travel to Site 1 (Jánovas)
10:30-11		RED ELECTIVE ACTIVITY Visit to the feeding site for wild scavenger birds	SITE 1 Visit to the Ara Riverbed
11-11:30	SITE 2 Visit to the Sorrosal Waterfall 45'		
11:30-12	Travel to Site 3 (Torla) 15'		Travel to Site 2 (Broto)
12-12:30	SITE 3 Visit to the National Park Information Center	Travel to Site 3 (Torla)	SITE 2 Visit to the Sorrosal Waterfall 45'
12:30-13			Travel to Site 3 (Torla) 15'
13-13:30	Lunch in Torla	SITE 3 Visit to the National Park Information Center	SITE 3 Visit to the National Park Information Center
13:30-14	Travel to Site 1 (Jánovas)		
14-14:30		Lunch in Torla	Lunch in Torla
14:30-15	SITE 1 Visit to the Ara Riverbed	Travel to Site 2 (Broto) 15'	Travel to Lamata (Abizanda)
15-15:30		SITE 2 Visit to the Sorrosal Waterfall 45'	
15:30-16	Travel to Aínsa Castle	Travel to Site 1 (Jánovas)	
16-16:30	GREEN ELECTIVE ACTIVITY Visit to the Eco-Museum and Bird Center	SITE 1 Visit to the Ara Riverbed	BLUE ELECTIVE ACTIVITY Visit to the Sobrarbe Paleontology Museum
16:30-17			
17-17:30	Return to Hotel	Return to Hotel	Return to Hotel

The **Green Elective Activity (Eco-Museum and Bird Center)** requires walking for 2-3 minutes (200 m).

The **Red Elective Activity (Feeding Site for Wild Scavenger Birds)** requires walking for about 1 hour on a dirt road, with some steep parts. This site does not have restrooms.

The **Blue Elective Activity (Paleontology Museum)** requires walking for 5-10 minutes (400 m).

The **Geology Site 1 (Jánovas)** requires walking on a dirt road. This site does not have restrooms.

The **Geology Site 2 (Broto)** requires walking on a narrow trail, with steep and slippery parts. There is a restaurant with restrooms close to the start of the trail.

The **Geology Site 3 (Torla)** does not require walking. This site has public restrooms at the National Park Information Center, and restaurants and stores in town.

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GEOLOGY SITE 1 - JÁNOVAS

Rivers carry water, sediments and nutrients from the mountains to the valleys. The river Ara is a major fluvial corridor of the Pyrenees and the best example to explain the hydrological and geomorphological function of the Pyrenean rivers because no dams have been built along its 68 km length. The source of the Ara river is located at an altitude of 2500 m and the first part flows through ancient glacial valleys. Later, its valley widens but when it reaches the abandoned town of Jánovas, the riverbed narrows again as it crosses the Boltaña Anticline, creating a spectacular canyon.

Some significant features to observe at this stop are:

A limestone outcrop full of foraminifera fossils

The small elongated, fusiform, and spiral structures found in this rocks are the fossilized remains of unicellular marine organisms called foraminifera. Although foraminifera are tiny and soft (like amoebas), they build hard shells of different shapes and sizes that can fossilize and are used to classify them. There are many different types of foraminifera which inhabit different marine environments.

What does it mean that we find foraminifera fossils in this area?

Geologists pay special attention to foraminifera fossils. Why?



The Boltaña anticline

This spectacular 25-km-long fold can be seen from many kilometers away (for instance, from the Aínsa Castle) but here we can observe the details of its layers, which used to lay horizontally in a marine environment and now stand almost vertically in the Pyrenean mountains.

What happened?

The Ara riverbed

The features at the Ara riverbed will show us how rivers transform and sculpt natural landscapes. Check the stones deposited on the flood plain. What are they made of? Where did they come from? Looking downstream from the hanging bridge, do you see any signs of fluvial erosion?



Karst formations (stalagmites) in an artificial tunnel

Stalagmites and stalactites are formed by slow precipitation of minerals previously dissolved in water. They are typical of natural caves but they can appear also in human-made structures. What is the significance of finding stalagmites inside an artificial tunnel excavated a few decades ago?

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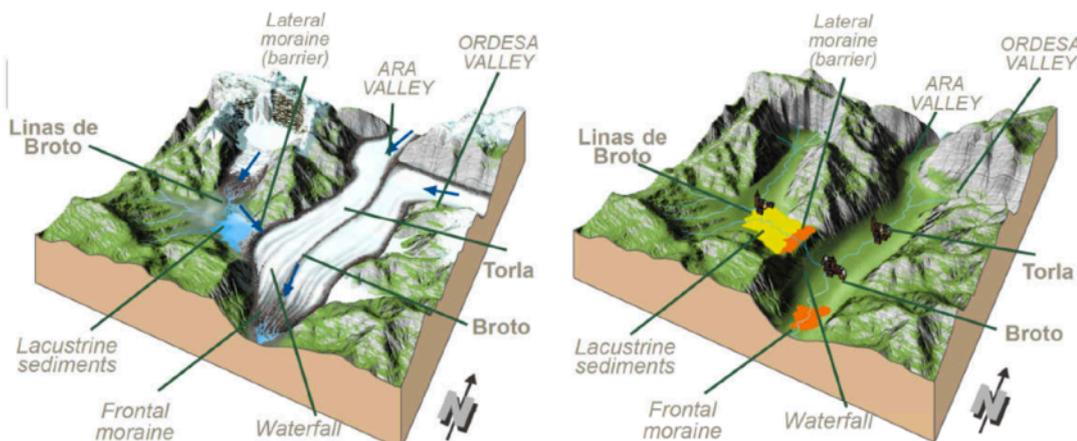
GEOLOGY SITE 2 - BROTO

THE SORROSAL WATERFALL

Besides its outstanding beauty, this spectacular 125-meter high waterfall provides significant geological information about its origin and the history of the Pyrenees. You can discover it if you observe carefully and "listen" to the rocks.

Here are some clues:

- Notice the rock wall behind the waterfall. Does this structure look familiar? Where have you seen these types of rock formations before? How are they called? In which environment were they formed?
- Pay attention to the foldings affecting the rock layers. What could have caused them?
- Look carefully at the surface of the blocks of rock laying at the foot of the waterfall, on the river bed, and along the trail. Do you see any familiar structures? How are they called?
- Finally, think about the reason why the waterfall exist. The Sorrosal waterfall is located in the confluence point between two rivers: the Sorrosal and the Ara, and the height of the waterfall marks the drop between their respective river valleys. Can you imagine why two river valleys in the same area of the Pyrenees have so different depths? (Find some tips in the diagram below)



The model on the left shows a reconstruction of the area surrounding the waterfall during the Ice Age. The model on the right shows the current landscape. By the way, do you know what a moraine is?

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GEOLOGY SITE 3 - TORLA

Torla is the town located at the entrance of the Ordesa y Monte Perdido National Park. Here we find the Visitor Center, with permanent exhibits on the national park, the geology of the Pyrenees, and the Pyrenean fauna and flora. We will visit the center and watch a short documentary on the Geological history of the Pyrenees. We will also eat our sack lunches during this stop.



Due to logistic and time reasons, we will not go further into the park but this stop will give us the opportunity to contemplate a magnificent view of the Ordesa valley. Looking at the background, we see mountains formed by horizontal bands of various colors and aspects. Although these rock layers do not seem to have suffered too much deformation, the spectacular fold on the left suggests that the geologic history of this region may be quite complex. In fact, some of these layers are located in a peculiar order, with the older materials on top of the younger ones. How can this happen?



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ELECTIVE ACTIVITIES

GREEN: Aínsa Eco-Museum and Bird Center

Located inside the Aínsa castle, this old stone building includes 12 exhibition areas on the Pyrenean natural environments, fauna and flora, and a small wildlife shelter for injured endangered birds that cannot be returned to their habitats. For more information:

<https://quebrantahuesos.org/the-eco-museum-visitor-centre-pyrenees-bird-center-of-the-ainsa-castle-huesca/?lang=en>



RED: Feeding Site for Scavenger Wild Birds

This activity, organized by the Foundation for the Conservation of the Bearded Vulture (FCO in Spanish), will allow us to observe and photograph several species of scavenger birds of prey while they are fed at a special site just outside Aínsa. The most common guests of the feeding site are vultures, red and black kites, and Egyptian vultures. After most of the food is already gone there is the possibility of seeing endangered bearded vultures coming for the remaining bones.



For more information: <https://pirineosbirdcenter.quebrantahuesos.org/?lang=en>

BLUE: Paleontology Museum

This museum, located in the small town of Lamata, exhibits a collection of fossils found in the Sobrarbe area, including a large variety of invertebrates, vertebrate fossils of special scientific interest such as the unique Lamata crocodile (photo), and a few plants. For more information: https://www.geoparquepirineos.com/contenidos.php?niv=&cla=_20A1CD0KM&cla2=_20B01I0KN&cla3=&tip=2&idi=3

