

TUESDAY WALKING FIELD TRIP

Speaking Stones

Luke 19:40 is one of the favorite Bible verses of many Geologists because it states that rocks and stones can speak in certain circumstances. Although completely out of context, Bible-believer geologists may refer to this text to illustrate a great truth: as if they actually spoke, we could get a lot of information about the origin and history of rocks just by carefully looking at them. Yet, unfortunately, most people do not speak Rock. The goal of this field trip is to start looking at rocks, stones, and geological features with different eyes, getting familiar with their language.

INSTRUCTIONS:

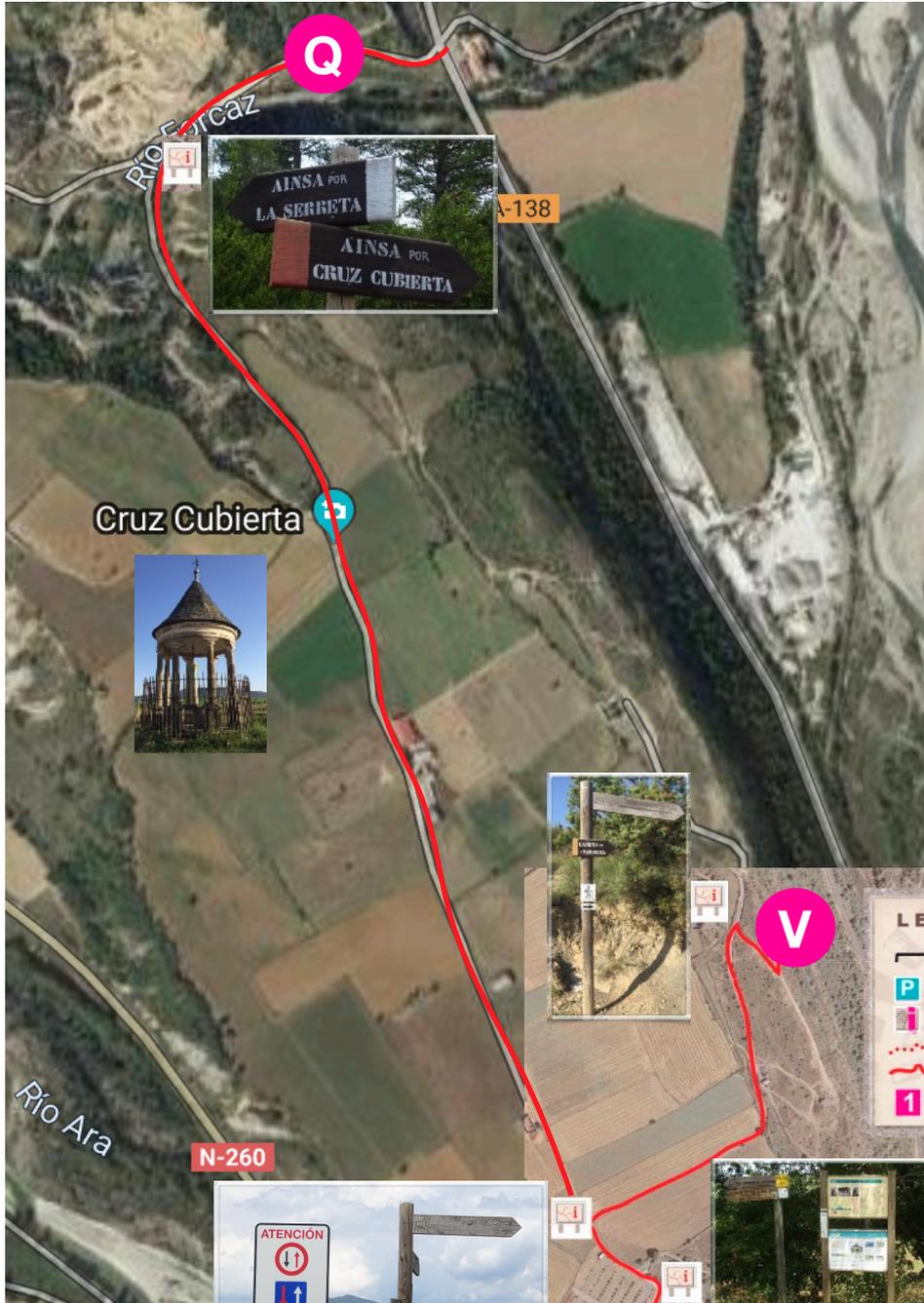
In groups of 20-25 people, we will walk from the hotel Peña Montañesa to the town of Aínsa, following a signposted hiking trail (25-30 minutes). We will stop at two sites along the way (QUARRY and CINCA VIEWPOINT) to observe some geological features and discuss them with the group. Once in Aínsa, we will visit the Sobrarbe Geopark Information Center and follow an urban geology trail.

Each group will do these activities in a different order, according to the schedule below. It is very important to follow the schedule strictly so everybody has enough time to enjoy each part of the field trip without rushing or disturbing others.

	GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6
9-9:30	QUARRY	QUARRY	Walk to town	QUARRY	Walk to town	QUARRY
9:30-10	Walk to town	Walk to town	VIEWPOINT	Walk to town	VIEWPOINT	Walk to town
10-10:30	SOBRARBE GEOPARK*	VIEWPOINT	Free Time in Aínsa	VIEWPOINT	AÍNSA URBAN GEOLOGY TRAIL	VIEWPOINT
10:30-11	AÍNSA URBAN GEOLOGY TRAIL	SOBRARBE GEOPARK*		Free Time in Aínsa		AÍNSA URBAN GEOLOGY TRAIL
11-11:30	Free Time in Aínsa	AÍNSA URBAN GEOLOGY TRAIL	SOBRARBE GEOPARK*	Free Time in Aínsa	Free Time in Aínsa	AÍNSA URBAN GEOLOGY TRAIL
11:30-12		Free Time in Aínsa	AÍNSA URBAN GEOLOGY TRAIL			SOBRARBE GEOPARK*
12-12:30	VIEWPOINT	Free Time in Aínsa	Walk back	AÍNSA URBAN GEOLOGY TRAIL	SOBRARBE GEOPARK*	Free Time in Aínsa
12:30-13		VIEWPOINT	Walk back	Walk back	AÍNSA URBAN GEOLOGY TRAIL	Walk back
13-13:30	Walk back	Walk back	QUARRY	Walk back	QUARRY	Walk back

* The Sobrarbe Geopark Information Center is a small building with limited capacity. Each group has to be at the door at its assigned time and finish the visit in 25 minutes.

TUESDAY WALKING FIELD TRIP - Speaking Stones ITINERARY



1. Cross the road and follow the dirt road in front of the hotel.
2. In 100 meters you will find the stop called QUARRY (Q). There is an actual quarry at the end of the path.
3. At the end of the path, cross the stream and follow the signs for "Aínsa por CRUZ CUBIERTA".
4. The entire path is signposted with white and yellow bands.



5. To go to the CINCA VIEWPOINT (V), leave the main road and follow de signs for CAMINO DE LA SERRETA and MIRADOR DEL CINCA. After the visit, return to the main road.



6. The rest of the stops are located inside the town of Ainsa. The Sobrarbe Geopark Information Center is located in the Ainsa castle and the urban geology trail (1-5) starts at the Ainsa castle, as well.

TUESDAY WALKING FIELD TRIP - Speaking Stones QUARRY*

Just across the street in front of the hotel, there is a dirt road. Following for about 100 m you will see that the rock wall on the right shows a curious structure. Look around carefully, to the stream on the left and to the wall on the other side of the stream. What do you see?



Ask your geologist about these rock formations? How are they called? Where and how were they formed? Why are they significant?

A closer look to some spots on the right wall will show that the layers are not only tilted but also folded and severely deformed in some spots. Take a picture of some of these deformed materials (remember to use a scale!).

The layers of sediment that end that forming layered rocks are laid down flat, but most of them are later folded and deformed. The folding can occur a short time after deposition, when the sediment is still soft, or after a prolonged time, when the sediment is hardened and the whole unit of rock is being deformed. What clues can you look for to distinguish between these 2 scenarios? Which of the 2 options seems more appropriate for this outcrop?



* SOME GROUPS WILL STOP HERE AT THE BEGINNING OF THE FIELD TRIP, WHILE OTHERS WILL DO IT ON THEIR WAY BACK TO THE HOTEL. PLEASE, RESPECT THE SCHEDULE.

TUESDAY WALKING FIELD TRIP - Speaking Stones CINCA VIEWPOINT*

To arrive to the Cinca Viewpoint you have to leave the main road and follow the signs for CAMINO DE LA SERRETA and MIRADOR DEL CINCA. After the visit, go back to the main road.



As indicated by its name, the Cinca Viewpoint (Mirador del Cinca) offers a magnificent view of the Cinca river. Behind the river you can see a very prominent mountain. Does it look familiar? Do you know its name? If the day is clear you can even see the Monte Perdido massif in the background, which contains the peak of Monte Perdido (3355 m), and one of the few glaciers that still exist in the Pyrenees.



There are several information panels at this stop. One of them explains the river "braided" structure. Do you know what that means?

Rivers are both erosional and depositional agents and the depth of their course changes with time depending on which processes (deposition or erosion) prevail. Can you distinguish former river levels in this landscape?

Tip: They are called "River Terraces"

* SOME GROUPS WILL STOP HERE ON THEIR WAY TO AÍNSA WHILE OTHERS WILL DO IT ON THEIR WAY BACK TO THE HOTEL. PLEASE, REPECT THE SCHEDULE.

TUESDAY WALKING FIELD TRIP - Speaking Stones SOBRARBE GEOPARK INFO CENTER*

The Sobrarbe Geopark Information Center is located in the south-east tower of the Aínsa Castle. The space is organized in 4 floors crowded with information about the the Sobrarbe geopark and its geological heritage, as well as on the geological history of the Pyrenees. Panels, geological maps, 3D models, interactive displays, videos, and rock and fossil samples will help you get familiar with most of the topics that we will cover during the conference but wait... ALL THE INFORMATION IS IN SPANISH! And that is why you should have at least 2 Spanish-speakers in your group. Put them to work!!!



This are some of the questions that you should be able to answer after leaving the building :

What is the geological name for the processes related with cave formation?
What is a glacier? How do glaciers sculpt the landscape? How would you recognize an ancient glacier that is not there any more?



FLOOR 3
THE ICE AGE



What is a fault (geologically speaking)?
What is a fold? Can you see a giant fold through the windows of the building?
What is Plate Tectonics? How does it relate to the Pyrenees?



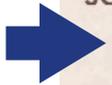
FLOOR 2
THE PYRENEES RISE FROM THE SEA



What are some of the most the most common rocks in this area? Which geologic periods are they assigned to?

What are TURBIDITES? Why are they important?

Why do we find so many marine fossils in the Pyrenean rocks?



FLOOR 1
SOBRARBE BEFORE HE PYRENEES



How is it possible that sea beds became mountains and vice versa?

Which are the oldest rocks found in the Sobrarbe area and where are they?

What do the words Paleozoic, Mesozoic and Cenozoic refer to?



FLOOR 0
THE WORLD OF GEOPARKS



* PLEASE CHECK THE SCHEDULE AND BE ON TIME AT THE DOOR OF THE BUILDING.

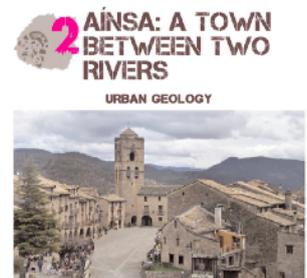
* **The information at this site reflects the conventional explanations for the geological history of our planet, including deep time (millions of years) and evolutionary interpretations. We do not agree with these interpretations and will offer you alternative explanations during the conference that fit the Biblical model.**

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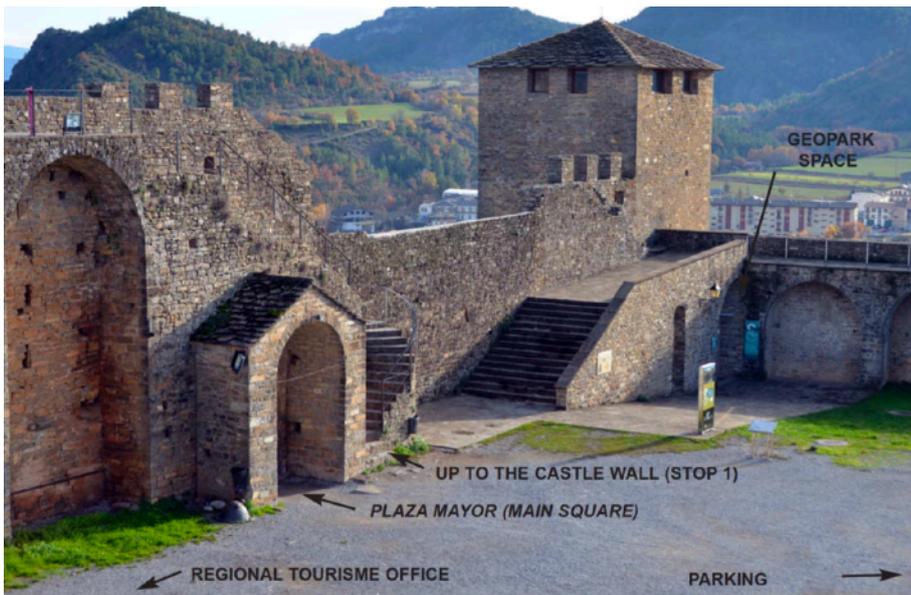
URBAN GEOLOGY AÍNSA 1

The Aínsa Castle

This urban geology itinerary through the streets of Aínsa corresponds to the Route 2 of the Sobrarbe Geopark Geo-Route Network. The information and many of the photos for each stop were obtained from the guide **Geo-Route 2: Aínsa, a town between two rivers**, designed by the Sobrarbe Geopark team and available at the website geoparquepirineos.com.



The first stop of the itinerary is the AÍNSA CASTLE.



Take the stairs to go up to the top of the castle wall. If the day is clear you will be able to enjoy magnificent views of the area surrounding Aínsa. The view of the landscape from this point is similar to the one from the Cinca Viewpoint. When you arrive to the second location, take advantage of the repeated observations to review what you already learned.

Besides a prominent (and hopefully familiar) mountain in the foreground which name you should know by now, you can see:

Looking north, a series of high peaks covered in snow in the background. These are part of the Monte Perdido massif, one of the highest in the Pyrenees and the core of the Ordesa y Monte Perdido National Park. We will visit this area on Sabbath afternoon.



Looking west, a large dome-shaped fold in one of the mountains. That structure is called an anticline, and you are looking at the Boltaña anticline, which we will see much closer on our technical field trip on Thursday.



These mountains are made of calcareous rocks and contain marine fossils. How can this be?

TUESDAY WALKING FIELD TRIP - Speaking Stones

URBAN GEOLOGY AÍNSA 2-3

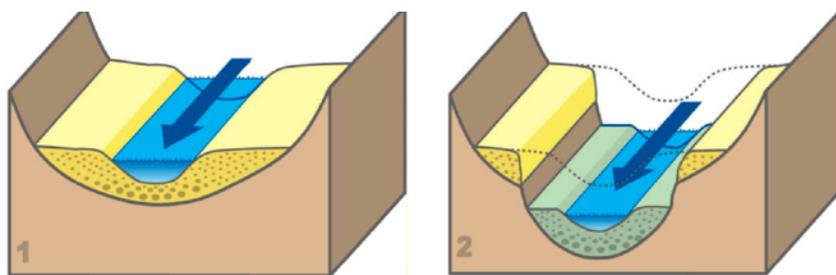
The Cinca river now and then

To go to the second stop of the itinerary you will leave the castle towards the Plaza Mayor (Main Square). After crossing the square, take the street on the left (Santa Cruz Street) and follow it down until reaching Santa María Church, easily recognizable by its bell tower. By the church, you will see a small street (locally known as callizo) that goes under an arch. Take it to arrive to stop 2, marked with information panels.



The goal of this stop is to take a closer look to the river Cinca. Observe how, during the summer, the current only occupies a thin section of the river flood plain. However, Pyrenean rivers are known to suffer dramatic seasonal changes in their flow. Floods happen regularly damaging infrastructures such as bridges and roads.

The river Cinca has changed a lot with time, not only its flow but its depth as well. Look at the river and its surroundings. Do you see several plains located at different levels? These are called River Terraces and correspond to the level of the riverbed at various times in the past.



This diagram shows the process of formation of staggered terraces by gradual erosion of previous levels. The oldest terraces are the highest and furthest from the current river course.

Now, move to stop 3. Go back to the street and continue down towards Plaza San Salvador. Keep walking down, cross under an arch (Portal de Abajo) and keep going until you see a second arch (Portal de Afuera). Just under this arch, between the walls of two houses, there is a small geological outcrop (2mx3m). Observe the outcrop carefully and try to answer the following questions (use your geologist!):



- What is this wall made of?
- Notice the shape of the pebbles and boulders. What does that tell you?
- Most of the stones are sandstones and limestones. How can you distinguish them?
- A few of the stones are granites. Try to find one.
- The closest granite mountains are 25 km north from Aínsa. How did the granites get here?
- Guess what this is (Tip: Remember Stop 2).

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URBAN GEOLOGY AÍNSA 4

An ancient fault

The fourth stop of the urban geology itinerary is very close to stop 3. Just go under the arch and down the stairs, until you reach the building of the old school, now the town library. The outcrop to observe in this stop is on the left, and looks like this:

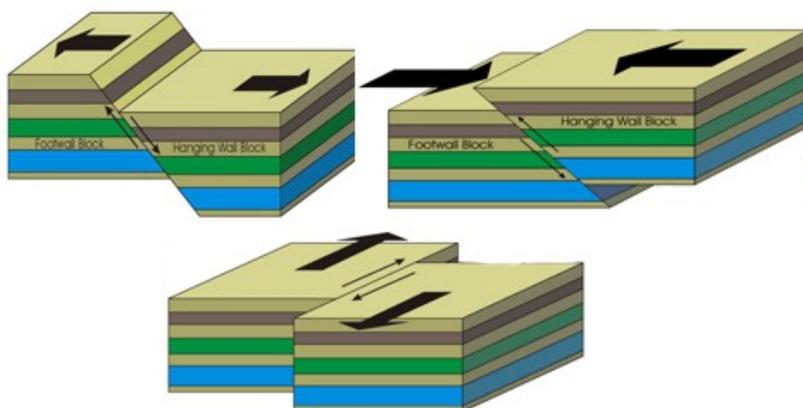


First, look at the upper surface of the top layer. What do you see? Does that shape look familiar? What is its name? Where do you see something similar? What does this mean?

Second, look at the lateral view of the layers. Try to find a spot with fine striations and whitish material, different from the rest of the rock. Do you know what that is?

You had a clue in the title of this stop: what you see here are significant clues suggesting that these rocks were affected by a FAULT.

Ask your geologist to explain the group what a fault is and which are the main types of faults. He/She can use the diagrams below.



In this case, one of the blocks involved in the fault is missing but looking carefully enough it is possible to know the direction of the movement. What is your guess?

What is the whitish material on the rock and how did it get there?

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URBAN GEOLOGY AÍNSA 5

Ichnofossils

To finish the urban geology itinerary you should keep going down from the old school building, taking another staircase that will take you to a balcony with an olive tree in the middle. This is our last stop, number 5.



Look carefully at the stone slabs that cover the floor and the walls of the balcony, specially in the spots indicated by the stars and arrows . What do you see?

Most of the marks found on these slabs are a special type of fossils called ICHNOFOSSILS or fossil trails. Ichnofossils are not the actual remains of living organisms but evidence of the activities (such as movement or eating patters) of these organisms.

What types of animals left these marks of activity? Where did they live? How can we know?

Ichnofossils are classified according to their shape and characteristics. How many different types can you find? Try to locate examples similar to the types shown in the pictures. Are there any other types?



Would it be possible that some of the marks were not fossils trails from organisms but something else?

What could they be?