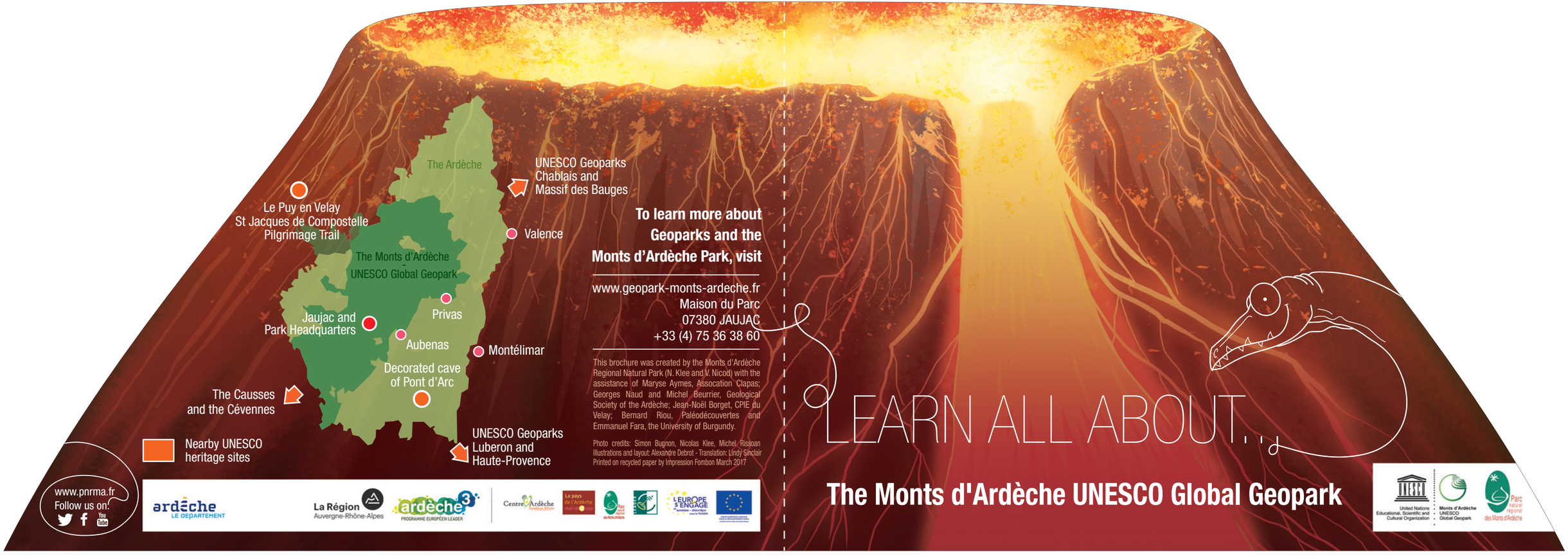
The Ardèche
Le Puy en Velay
St Jacques de Compostelle
Pilgrimage Trail
UNESCO Geoparks
Chablais and
Massif des Bauges
Valence
The Monts d'Ardèche
UNESCO Global Geopark
Privas
Jaujac and
Park Headquarters
Aubenas
Montélimar
Decorated cave
of Pont d'Arc
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Monts d'Ardèche UNESCO Global Geopark
Parc naturel régional des Monts d'Ardèche

WHAT IS A GEOPARK?

UNESCO Global Geoparks are single, unified geographical areas where sites and landscapes of international geological significance aim to focus on sustainable development with local communities. Geoparks are managed with the holistic concept of education, awareness, the development of tourism and economic opportunities, along with the development of research and the preservation of the geological heritage, in conjunction with neighbouring heritage sites. At present, there are more than 120 Geoparks on five continents!

To learn more visit: www.unesco.org - www.globalgeopark.org

United Nations Educational, Scientific and Cultural Organization

UNESCO Global Geopark

And the Park of Monts d'Ardèche?

UNESCO granted the Decorated Cave of Pont d'Arc - known as Grotte Chauvet Pont d'Arc - World Heritage Status. The neighbouring Park of Monts d'Ardèche, possessing a geological heritage of international value, decided to join in the UNESCO experience. In September 2014, it became only the fifth French region granted UNESCO Global Geopark status. To achieve this it was necessary to champion the values of the geology and the local communities within this exceptional territory.

OUR GEOLOGY: A WORLD-FAMOUS HERITAGE!

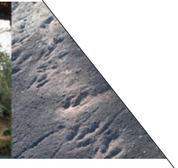
The majority of the iconic sites in the Monts d'Ardèche Park are geological. The naturally curious won't miss exploring:

The Ardèche Young Volcanoes which formed some of the most beautiful basalt flows in all of Europe

The phonolite (clinkstone) rocks of the Mézenc-Gerbier mountain range: the only zone in Europe

The granite chaos landscapes of Montselgues, vestiges of a lost mountain chain

The sandstone blocks that have eroded into spectacular and often surprising shapes



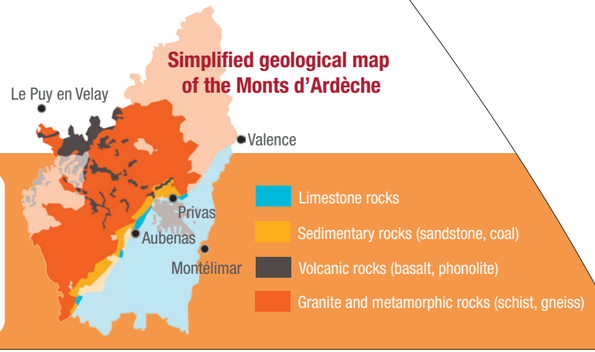
Sites with dinosaur footprints, a fleeting witness to this extinct fauna

This richness and diversity is explained by our long geological history. All the ages of earth for the past 550 million years (Ma) are represented here. There are few regions in the world which possess such a rich and diverse geological heritage.

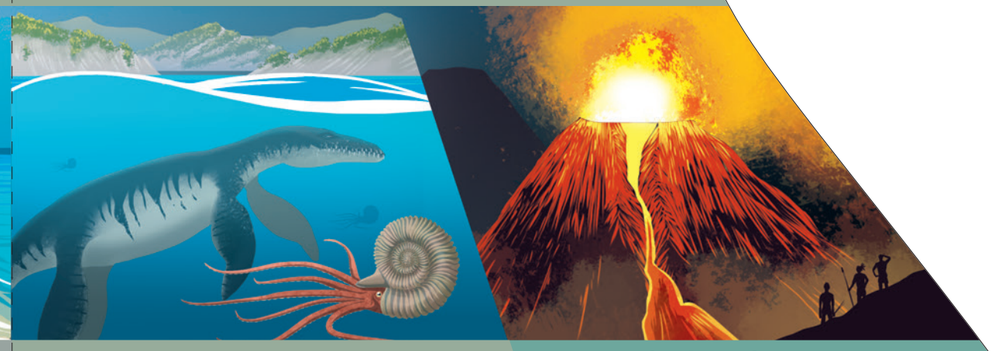
GEOSITE

53 'geosites' of major geological interest were presented to UNESCO. They were selected with the assistance of local and university scientists for their aesthetic, scientific and instructive merits. They are equipped with paths and interpretive panels… to assist in reading the geological landscape and to understand the earth and human history of the region.

Simplified geological map of the Monts d'Ardèche



THE MONTS D'ARDÈCHE: 550 MILLION YEARS OF WONDER



The Ardèche Himalaya: where continents collide

In the Carboniferous Period (-360 to -300 Ma) the ocean which had separated the two megacontinents (Gondwana in the south and Laurussia in the north) disappeared. It had existed since the end of the Precambrian (-550 Ma). The clash of the two continental masses created a giant mountain chain called the Variscan or Hercynian orogeny; it extends thousands of kilometres all across Europe. It was during this episode of continental collision that the schist, gneiss and granite which constitutes the majority of the Monts d'Ardèche was formed.

Erosion: from lakes to lagoons

From its creation in the Carboniferous period, the mountain chain was subjected to erosion. The first sediments were deposited into lakes where the sand and gravel alternated with seams of coal. The coal was a result of the decomposition of the luxurious vegetation related to the warm and wet climate of the time. But it was in the Triassic period, on the shoreline, where gigantic piedmont alluvial deposits of sand and gravel were built up. It's in these sediments that one can find the footprints of dinosaurs and crocodiles and other reptiles.

The Ardèche sea

In the Jurassic period, the Monts d'Ardèche evolved towards a marine phase. The shallows were the perfect conditions to favour coral reefs. In the Cretaceous period, the sea covered all the territory contributing to the deposits of marl and then limestone. Towards the end of the Cretaceous period, the sea had almost entirely retreated. Then in the Paleogene period, as a result of the emergence of the Alps in the east; the distension and compression led to the up-thrust of the eastern border of the Massif Central: the whole of the Monts d'Ardèche rose as a result. This is the origin of this giant step in height of more than 1000 metres between the Ardèche basin and the Ardèche mountains.

The festival of volcanoes and the first traces of humanity

In the Neogene period, the up-thrust of the Alps led to the distortion of the eastern edge of the Massif Central and the creation of the faults which allowed magma to rise and the creation of the first Ardèche volcanoes which appeared in the Mézenc-Gerbier sector (-12 to -6 Ma) then in the Coiron (-8 to -6 Ma) and the Devès (- 3 to 1 Ma). Finally, a new and last volcanic episode led to the formation of the Ardèche Young Volcanoes, the most recent of which are only a few tens of thousands of years old and are therefore of the same age as the arrival of man.

4600 million years | 550 | 360 | 300 | 250 | 200 | 145 | 65 | 23 | 2,5

Formation of planet Earth | … | … | Carboniferous | Permian | Triassic | Jurassic | Cretaceous | Paleogene | Neogene | Quaternary

Precambrian | **Paleozoic (first era)** | **Mesozoic (2nd era)** | **Cenozoic (3rd era)**

LEARN ALL ABOUT

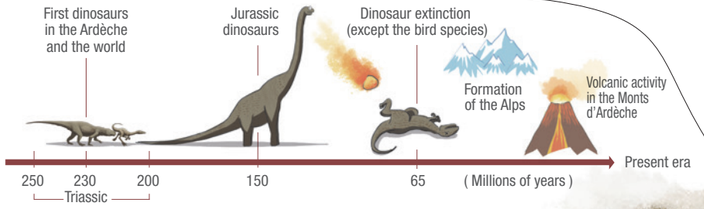
The dinosaurs and their Ardèche cousins!

Coelurosaurichnus: the small carnivorous dinosaur who left behind this footprint

Oh yes, not only did these fabulous animals stride all over the territory of the Monts d'Ardèche, but they left behind their traces! You should know that during the Triassic period (between around 250 and 200 million years ago) the Monts d'Ardèche had a rather warm climate and the hilly land was criss-crossed with large water courses flowing down to the sea in the south-east. It was during this period when the sandstone was formed that you can see all along the south-east edge of the Park (the piedmont Cévenol); along the line running from Privas to Les Vans.

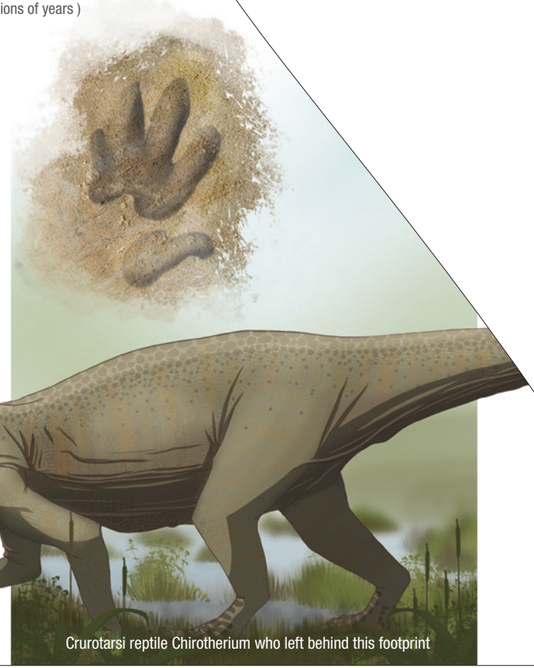
This period also coincides with the appearance of the first dinosaurs; whose fossilized footprints we can still see today.

There are a dozen sites which are currently being studied to determine which precise types of footprints have been preserved, and attempts are being made to identify the owners. The reptiles who were roaming the Monts d'Ardèche over 200 million years ago were very diversified. We have already identified around 15 different types in the region; such as Grallator and Coelurosaurichnus grancieri which were discovered at Payzac. And there is Chirotherium and Isochirotherium found at Largentière. There are even footprints which resemble those left by lizards. The size of the footprints found in the Park range in size from a few centimetres to almost half a metre!



Who left these footprints? The scientific research shows that the footprints of the Triassic Ardèchois belong to several groups of reptiles. Let's start with the dinosaurs. The Ardèche footprints correspond to several ancient dinosaurs known to have been between 1m and 5m tall. It's pointless to dream of the famous T-Rex or Diplodocus because these dinosaurs appeared tens of millions of years later than our Ardèche ones! Many Ardèche footprints have probably been left by animals which one could call 'pre-dinosaurs'. That means the close relatives of dinosaurs which looked terrifyingly familiar. We call them dinosauromorphs.

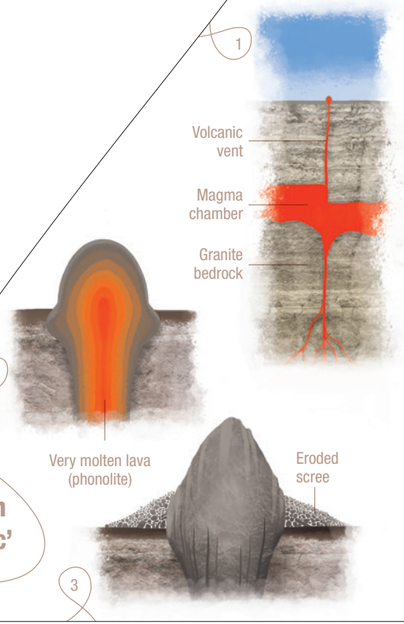
Finally there are the spectacular footprints left by animals that were the distant cousins of crocodiles. These animals carry the somewhat barbaric name 'crurotarsi reptiles'. Within this group we can attribute the footprints of the Chirotherium; you can find great numbers of them in the Triassic sandstone on the edge of the Ardèche.



Crurotarsi reptile Chirotherium who left behind this footprint

LEARN ALL ABOUT..

The volcanoes in the Monts d'Ardèche



Creation of a 'Suc'

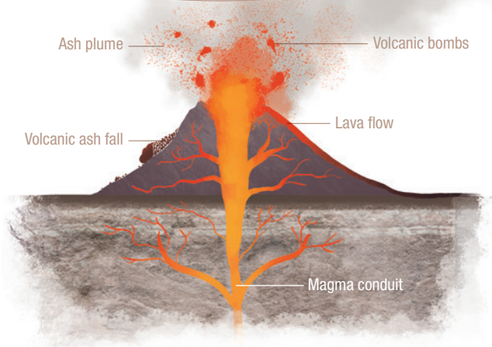
Strombolian craters, phonolite domes, maars, dykes, necks, basalt columns… they all have a profound impact on our landscape today. The Mont Gerbier, Mont Mézenc, the Ray-Pic, Jaujac, Aizac, Thueyts, Montpezat… how do you explain why there are so many volcanoes in the Monts d'Ardèche? Well, they are related in fact to the up-thrust of the Alps which triggered the distortion of the Massif Central.

Three great periods of volcanic activity can be seen in the Monts d'Ardèche.

1) The first began around 12 million years ago in the region of the Massif Mézenc-Gerbier and lasted around six million years. After a period of eruption of very molten lava, what was left behind were many columns of solidified lava (basalt) and some vestiges of strombolian cones. The lava then evolved after a few million years into phonolite. Rather more viscous than the basalt, the phonolite gave rise to the domes and peaks locally called 'sucs' (pointed peaks). These very special shapes, and the intense erosion, results in a unique and spectacular landscape. The largest mountain range of phonolite in all of Europe!

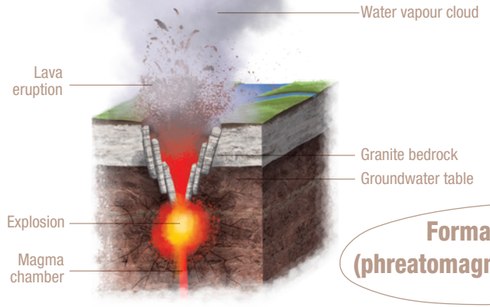
2) Next is the volcanic activity around Coiron (-8 to -6 Ma) characterized by molten basalt lava flows. But in an inversion of the mountainous landscape, this area is now a plateau, made up of stacks of the lava, criss-crossed by dykes and necks.

Formation of a strombolian volcano



3) The last great phase of the volcanic history of the Monts d'Ardèche; the eruption of the Ardèche Young Volcanoes; these appeared 168 000 years ago, to the south, and are characterized by almost perfect strombolian volcanoes. They are relatively young (between 12 000 and 40 000 years old, for the most recent ones according to dating methods). So they are contemporaneous with the humans who created the ornate frescoes in the Decorated Cave of Pont d'Arc, one of the world's oldest at 36 000 years old. The lava flows from these volcanoes, when they cooled, created great basalt columns, beautifully pleated. The longest among them, at Ray-Pic, is more than 20km in length between the waterfall of the same name and the end at the Pont-de-Labeaume.

The Ardèche Young Volcanoes are also characterized by the numerous maars that signify phreatomagmatic activity. These very violent explosions take place when hot magma comes into contact with ground water to produce a steam explosion. The maar at La Vestide du Pal is more than 5km wide and is one of the largest in Europe.



Formation of a maar (phreatomagmatic volcano)

AND WHAT ABOUT HUMANS?

The geological history of the Monts d'Ardèche, both rich and eventful, is the starting point of all our present-day landscape. On the slopes, humans have adapted to the hilly landscape which has been the result of the constant battle between the great tectonic movements and the erosion which has created this particular topography. In building dry stone terraces, humans have tamed the slopes, and cultivated the chestnut trees, adapted to these soils. In the piedmont, the cultivation of olives and vines has found the perfect home in the sedimentary layers of the Triassic sandstone.

In all the region, humans have scraped about in the soil, modifying the land, taking part in the grand creation of the landscape, which had been formed hundreds of millions of years before their arrival. Removing the granite or the schist to counter the slope, has meant humans have become a geological modifier. The houses of basalt or granite, the slate roofs, or those made from clinkstone or schist; all are witness to our geological history.

Quarry

Basalt column wall - Brion

The constraints of the soil, because it is too poor or too steep has in turn become a land of wealth once humans worked out how to understand it. Silver mines and the exploitation of flouride, iron, coal; quarries for the extraction of granite, pozzolan or flagstones. Water, inseparable from the history of the land, participates equally in our economic activity; mineral water plants, the thermal spa industry, hydroelectricity…

Humans have also been inspired by the creative power of the land to construct artistic works. Always a source of ceaseless inspiration, the Monts d'Ardèche now welcome new works of art along a route that is eminently geological: the watershed, which runs across our region, that divides the spring water flowing into the Atlantic and the Mediterranean. It is this combination of the 'geoheritge,' the cultural and also the geological activities that the label UNESCO Global Geopark aims to maintain and enhance.

WONDERS TO EXPLORE : A SMALL SELECTION OF GEOSITES!

Keen nature enthusiasts won't miss visiting all 53 geosites in the Park, but if you are short of time, here is a small selection of some fabulous places.

The Ray-Pic waterfall

The water rushing over the Ray-Pic waterfall pushes between 30-metre-high basalt columns which feel like they are plunging towards the visitor. A startling spectacle! An interpretation display gives you plenty of information about European volcanoes.

The Gerbier de Jonc

A climb up to the summit of Gerbier is essential. And more than just sheltering the sources of the Loire river, it is also a volcano! It is in fact a phonolite dome of a quite respectable age; it's eight million years old. To learn all about it, don't miss the visitor centre at the site.

The Borée rocks

Possibly one of the most beautiful panoramas of the Monts d'Ardèche. The walk around the Borée rocks lets you explore two phonolite sucs, (domes) and discover a rare view of the Boutières circuit and the Mézenc. The eccentric shapes of the domes are all on show. Allow an hour for this easy walk.

Mont Signon

A fabulous and musical site! This ancient flagstone quarry offers a landscape full of minerals where one can walk over clinkstone (it reverberates and clangs when you strike it). An interpretation path lets you learn more about the site and flagstone.

Rocher de Brion

Imagine a place where medieval houses and the castle walls were constructed from… basalt columns! This place exists – and is found at the Rocher de Brion at Jaunac. The ancient inhabitants of this fortified village just helped themselves to local stone: the basalt prisms from this ancient volcano.

The Giants' Causeway at Thueyts

The Thueyts basalt lava flow is one of the most accessible places to explore; it has viewing platforms and paths which let you discover all its aspects. And of course, the Roman bridge which straddles the Ardèche river adds an undeniably romantic character.

Find more detailed descriptions of the walks around all these geosites at www.geopark-monts-ardeche.fr

WONDERS TO EXPLORE

The Baumicou waterfall

The Baumicou waterfall is a protected treasure. Upstream from the walk, you find the mysterious sandstone teats, a feature which adds to the unique picture of this site. A small path allows you access to the site from the parking area in Vernon village across from the Mayor's office.

The Naves amphitheatre

Located on a massive fault line, Naves and its surroundings offer an important rich landscape. In just a few kilometres you travel from a typical Mediterranean landscape to countryside that is more characteristic of the Cévennes and the Massif Central. A magnificent interpretive trail lets you complete the circuit and visit this beautiful characterful village which gave its name to this amphitheatre.

The Montselgues granite chaos

With its Breton-like appearance, the granite chaos of Montselgues is a real change of scene for the Ardèche. These giant granite blocks are the result of the slow effects of water erosion, reminding us that even the hardest rock – granite – cannot resist the passage of time! An 8km walk lets you do the whole circuit leaving from Montselgues.

Find more detailed descriptions of the walks around all these geosites at www.geopark-monts-ardeche.fr

WHY A GEOPARK?

Unlike other UNESCO labels, the Geopark label must submit to a revalidation process every four years. To keep the status of Geopark, the region must be thoroughly examined to ensure it is continuing to develop its geological heritage.

As a result, the Monts d'Ardèche Park is committed to making accessible to everyone its geological history and remarkable heritage. To achieve this, all the geological sites are being progressively equipped; and activities, outings and lectures are being organized every year.

The Park is also committed to protecting the sites with management plans and specific amenities. It wants to ensure that the geological heritage which has been several million years in the making can be passed on to future generations.

Lastly, research programmes are being carried out by our partner universities to improve the scientific knowledge of our region and allow us to pass on this knowledge accurately to our visitors.