PROJET GÉOPARC NORMANDIE MAINE

Parc naturel régional Normandie-Maine
Une autre vie s'invente ici

APPLICATION DOSSIER
Normandie-Maine Geopark

November 2019

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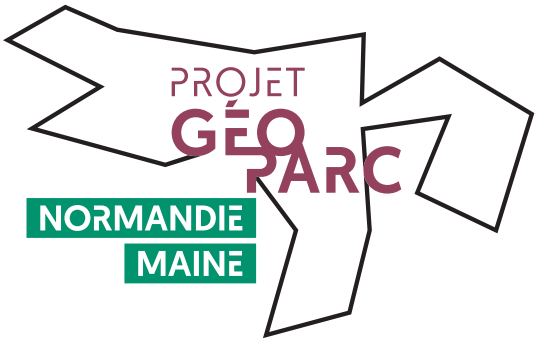

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Application
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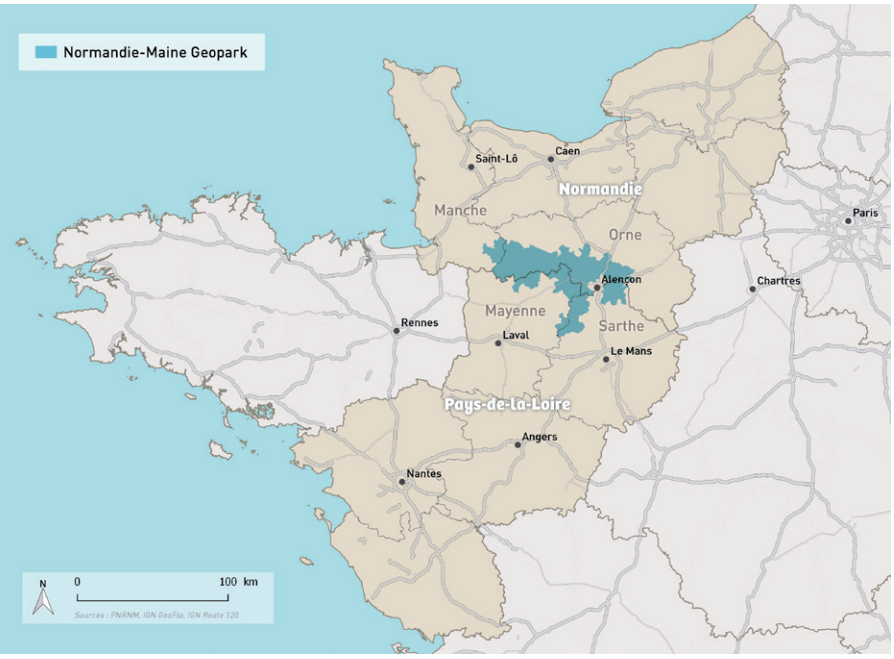
A GENERAL INFORMATION

A.1 | NAME AND IDENTITY

The candidate area is the **Normandie-Maine Geopark.** It takes its name from the two powerful administrative areas that left their mark in the Middle Ages, Normandy and Maine. The area thus bears witness to a long history born of the unique geological, landscape and natural features which form it.

In ancient times, this area was covered by a vast arc of forest which extended from Chartres to Rennes, effectively creating a natural boundary which influenced the settlement of Man. From the first prehistoric camps to Gallo-Roman occupations, up to the current administrative boundaries, the traces left by Man reveal a long history of overlapping administrative areas giving it a cross-border character. It is still the same today, the area of the Geopark, **established in 1975** through its classification as a **Regional Nature Park**, is located on the borders of two Regions, Normandie and Pays-de-la-Loire.



Geopark location in the north west of France

C | LOCATION

Geopark location in Europe

A.2 | LOCATION AND AREA

The Normandie-Maine Geopark is located in north western France. It spans approximately 100 km from east to west and 70 km from north to south, covering 2,650 km². It brings together 141 municipalities involving 16 inter-communalities.

It straddles two Regions: Normandie and Pays-de-la-Loire; and 4 departments: Orne, Manche, Mayenne and Sarthe.

The Geopark head office is in Carrouges (Orne).

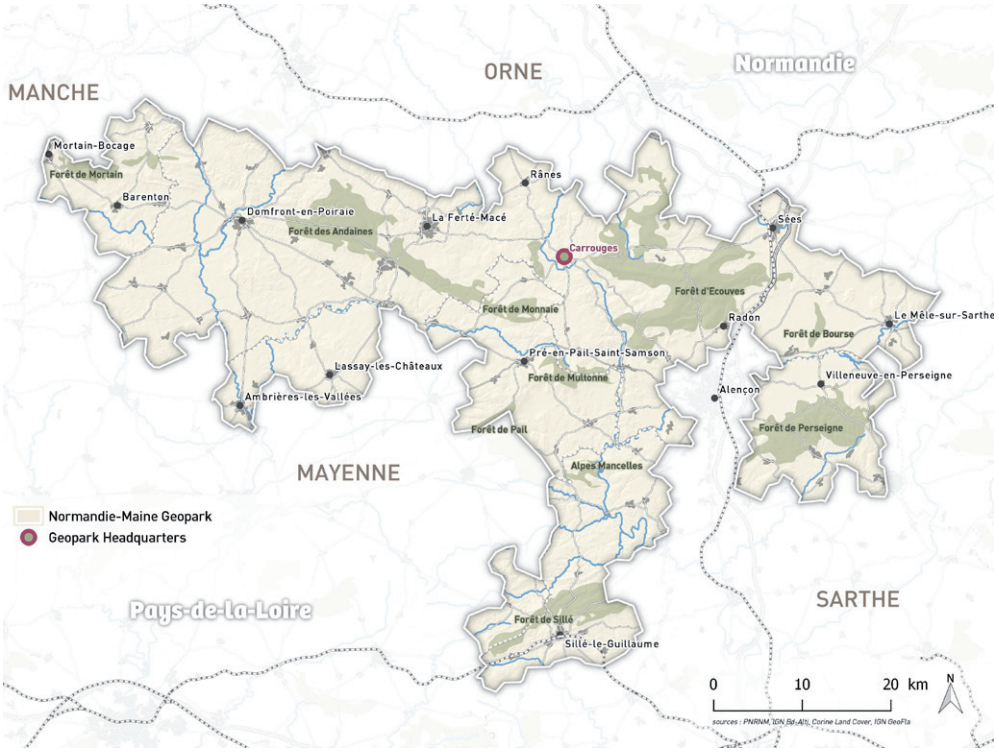
Its geographical coordinates are:

Latitude

48.563284 **/** 48°33'48" N

Longitude

-0.15038159 **/** 000°09'01" W



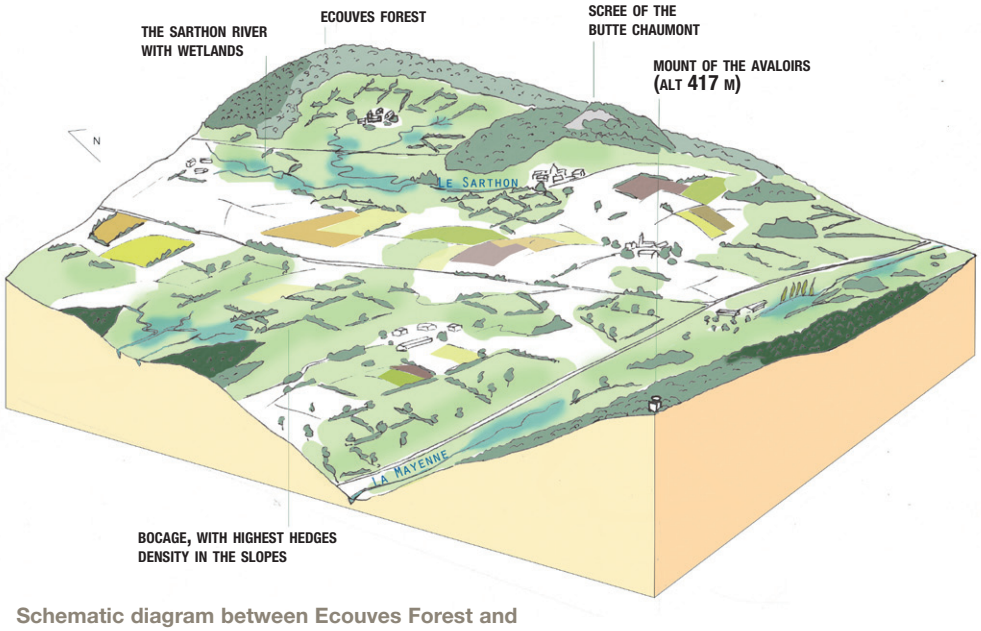
Map of the Normandie-Maine Geopark

A.3 | GEOGRAPHICAL AND HUMAN ASPECTS

The aspiring Geopark is **a predominantly rural region** with many different aspects. Its population is relatively small with 98,000 inhabitants and a population density of 38 /km². Its location away from the large cities partly explains this. Whilst the population benefits from a good quality of life, there is however a significant demographic contrast between the east, which benefits from a migratory flow due to the proximity of several urban areas, including Paris; and the west, which experiences a stronger demographic decline.

With over **60% of the land occupied by agricultural land**, agriculture is an important part of the local economy. In the west, cattle breeding, dairy and suckling, remains the dominant activity although it is undergoing profound changes. In the east, cereal farming is more prevalent, particularly due to better soil qualities. The forest also provides for significant activity with more than 46,000 hectares of woodland covering 20% of the Geopark area. In addition to agriculture and forestry, industry and crafts also have a significant presence.

The Geopark is a **historical area of passage.** Even today, significant flows are still seen moving from east to west with the N12 national route linking Paris to Brittany and north to south with the A28 motorway. In terms of tourism as well, the area is a transit zone, with hiking trails (GR22 and 36) and mountain paths and more recently, the boom of cycle routes extending to Mont-Saint-Michel and the Atlantic coast. The former relates to landscape and historical interests and promotes green and family tourism. Bagnoles-de-l'Orne-Normandie, a spa town since the 19th century, is a major tourist centre that has the largest concentration of tourist accommodation in the area.



Schematic diagram between Ecouves Forest and Multonne Forest © Gabriel Soulard

A.4 | MANAGEMENT STRUCTURE - CONTACT

The **management of the Geopark** is assured by the **Normandie-Maine Regional Nature Park**.

The Geopark is mobilised through a project logic which brings into play a wide range of transversal skills within a **multidisciplinary team**. Its implementation is carried out by the Regional Nature Park which rolls out activities in the area in conjunction with local people. In order to best lead these activities an elected representative and a Geopark project manager have been assigned has follows :

Study trip to UNESCO Global Geopark des Bauges (France)

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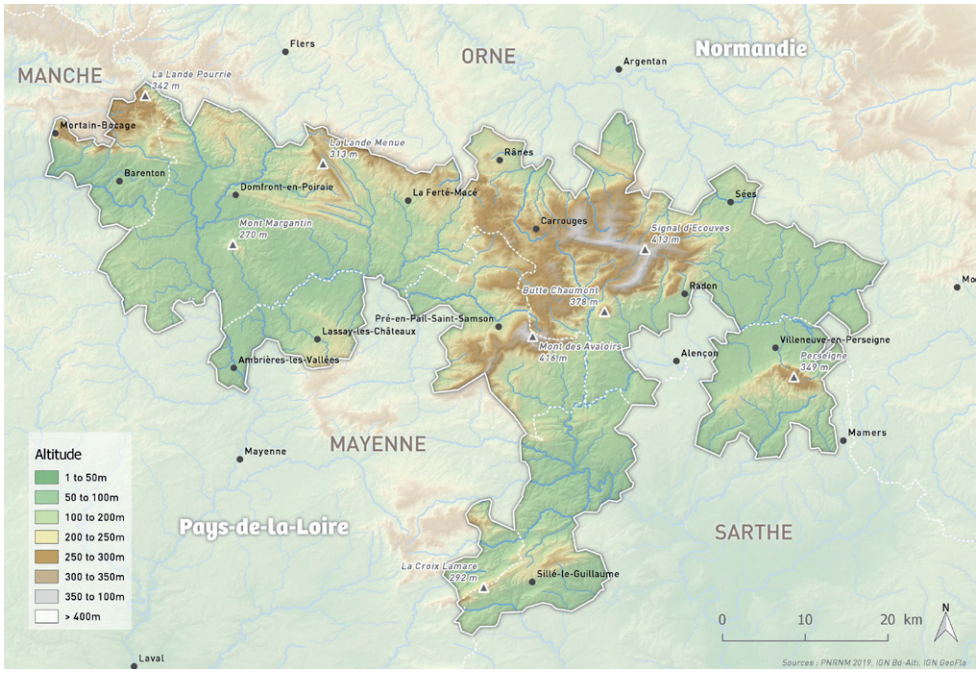
D MAIN GEOLOGICAL HIGHLIGHTS AND OTHER ELEMENTS

The aspiring Geopark has dense forests that form a crown on the Armorican sandstone crest line, a veritable spine crossing the area from west to east where it disappears under the Paris Basin. It is home to the highest point in the Armorican Massif and the west of France, at 416 metres.

These hilly areas are ancient; they present soft shapes, known locally as "**mountains**" (Mount Avaloirs, Mount Margantin ...) and "**Valleys**" (Misery Valley, Hell Valley ...) but also outcrops such as rocky cliffs and precipices known as "**Rocks**" (Dog Rock, Fairy Rock ...).

Born of the passage of water in the sandstone sections, the **transverse valleys form specific landscape features associated with the area**: they are narrow-like gorges, tortuous, some are natural sites as at the Fosse Arthour or the Gorges de Villiers, some occupied by Man as at Domfront-en-Poiraie or at Bagnoles-de-l'Orne-Normandie.

Nonetheless, the highest concentration of **natural lowland scree** in continental Europe is found here, coming from the last ice ages, often found bordering rivers. Despite the low altitude, the presence of this hard rock and related outcrops gives these landscapes a strong **mountainous character**. This general impression is reinforced by an oceanic climate which, when happening upon a rocky outcrop, gives surprising winter conditions for west continental Europe. It is not unusual to encounter snow, freezing rain and fog, an ideal environment for myths and legends.



Map of the Geopark reliefs

At the head of two watersheds, water is omnipresent in the form of **many streams and rivers** with fast currents, heading in one direction towards the Loire and the Atlantic Ocean and in the other direction towards the Orne and the Channel.

The landscapes are energised by the twists and turns of these rivers making their way through the mountains and brightening up the villages.

The strong presence of trees and the stone-built villages create an intimate and mysterious atmosphere, sometimes rugged and austere but always changing with the seasons.

Conversely, certain views from the rocks allow us to embrace the undulating horizons and taste a multitude of colours, especially the canopies of the vast forests, bright green in the spring, warm orange in autumn.

This ensemble is even more unique if we consider its location in north western Europe, from Bordeaux to Copenhagen where the landscape is dominated by plains, large coastal conurbations and major transport infrastructures.

On this scale, the Normandie-Maine Geopark, isolated by the confines of the two regions, rises up out of the hustle and bustle of human activity like little mountains on the plains.


Winter landscape in the Normandie-Maine Geopark © Gabriel Soulard

A historical and geological crossroad

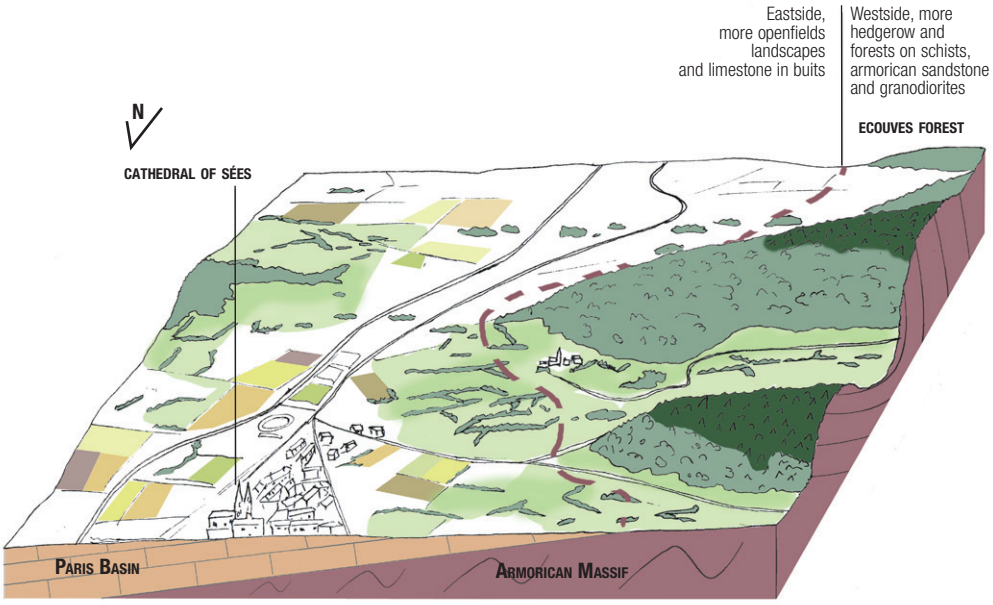
From east to west, the Normandie-Maine Geopark has diverse aspects, especially given its geology. In addition to the great geological diversity covering 600 million years of Earth's history, the contrast between the Armorican Massif and the Paris Basin is marked by a north-south erosin limit from Sées to Sillé-le-Guillaume.

These geological features have thus shaped the landscapes but also the history of the Normandie-Maine Geopark. Through the presence of a vast and ancient forest on the ridges, the natural boundaries were influenced by settlements from the Gallo-Roman period. These lands welcomed the last hermits in search of isolation. They have also been the scene of many conquests and power games during the Middle Ages.

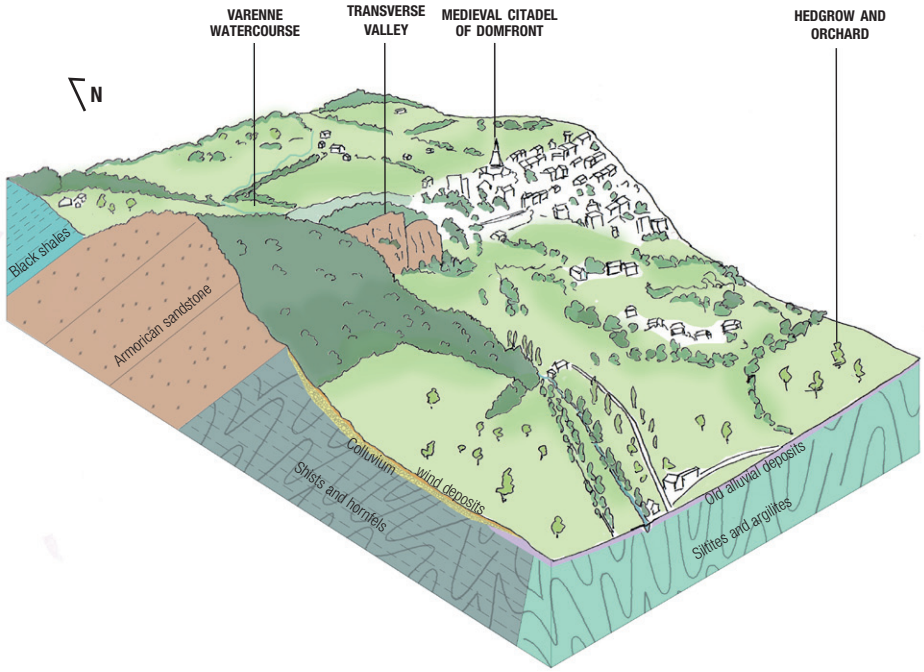
With the founding of the Duchy of Normandy in 911 up until the 16th century, this territory became an important historical frontier, between the Duchy of Maine, the Earldom of Anjou and the Kingdom of France. The bastions in Domfront-en-Poiraie, Lassay-les-Châteaux or Sillé-le-Guillaume, to name a few, bear witness to this medieval epic and proudly continue to defy time.

With its wild and hidden heritage, this region is best explored on foot or by bicycle because as one approaches it and one's knowledge of it deepens, it becomes more and more exciting.

To be captivated by its authenticity, one must get down into its mossy forests full of blueberries, to climb up a stony bank from a stream, to reflect on the tender green leaves of the beech trees after rain. Its historical riches merit visiting old manor houses, climbing a feudal mound, visiting a castle ... The romanticists of the 19th century and impressionist painters enamoured with the steep slopes and stony streams were not wrong: this territory has good reason to promise the curious its "**mountains and marvels**".



Schematic diagram between Paris Basin and Armorican Massif
© Gabriel Soulard



Schematic view of the transverse Valley of Domfront © Gabriel Soulard

A misty Normandie-Maine © Jérome Houyvet

VERIFICATION OF UGG CRITERIA

E.1 | TERRITORY

E.1.1 | Geological heritage and conservation

From the waterfalls of Mortain to the Perseigne forest, via the Alpes Mancelles, the Sées plains and the Sarthe Valley, the Normandie-Maine Geopark territory opens a window on 600 million years of our planet's history. From Precambrian times up to today, various marine and continental landscapes follow one another: abyssal plain, continental shelf, delta, carbonate platform ... Savannas, swamps, forests, steppes, all recording the evolution of life and the climatic variations from equatorial heat to periglacial cold.

The landscapes of the aspiring Geopark are a result of global geodynamics and tell a turbulent history, with **the formation of two mountain ranges** (Cadomian and Variscan) at the origin of the Armorican Massif **and the creation of the Paris Basin**, a subsident sedimentary basin. Following this, **a continental alteration** occurred, recording the upheavals that resulted in the formation of the Pyrenees and the Alps mountains.

The geological heritage of Normandie-Maine allows the discovery of nearly **600 million years of history** observed in rocks, outcrops, fossils and landscapes. This heritage has also influenced the settlement of Man, the use of the land and the diversity of the natural and cultural heritages.

To the west, the Armorican Massif consists of ancient sedimentary, magmatic and metamorphic terrains that have been deformed by two orogeneses. **The Armorican Massif** is one of the segments of **the great Variscan (or Hercynian) belt** formed in the late Paleozoic times and extending from the present Caucasus to the Atlantic coast of Northern America.

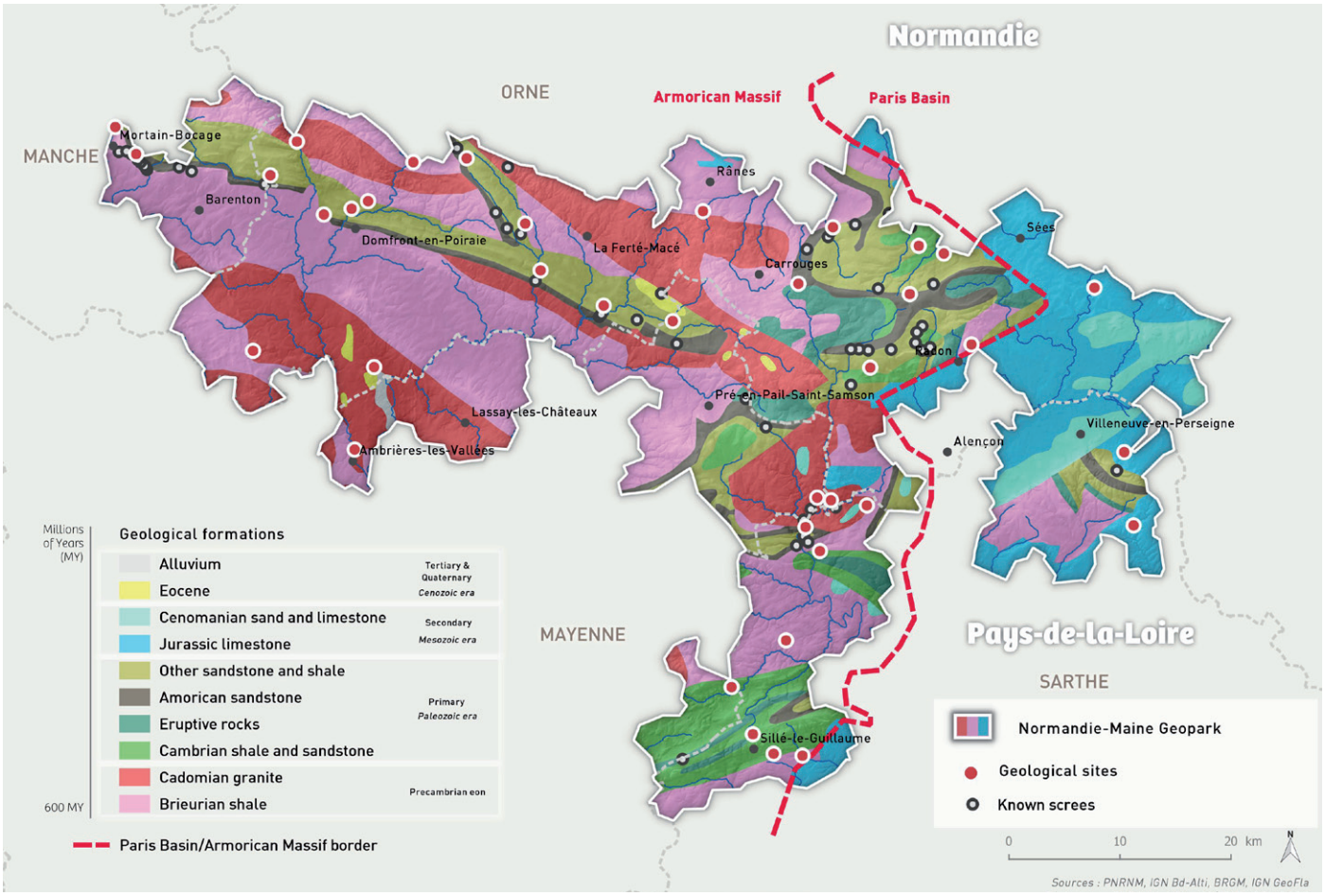
On the Geopark territory, the Variscan belt has incorporated a large block of the **Cadomian belt**, an older belt established at the end of Precambrian times on the northern edge of Gondwana continent. This mountain range is itself part of the **pan-African orogeny.**

To the east, the western end of the Paris Basin consists of a stack of unfolded and more recent sedimentary layers deposited during the last 190 million years. Essentially from Mesozoic ages, these geological formations (predominantly carbonated) represent a thin sedimentary cover compared to the Precambrian and Paleozoic base.

The boundary between the Armorican Massif and the Paris Basin actually correspond to an erosion limit, a consequence of the Cenozoic deformations and climatic changes which slowly stripped the sedimentary layers of the Paris Basin, progressively rendering the heights more and more visible.

The imprint of this long geological history is preserved in the hilly areas of the Normandie-Maine Geopark, its landscapes and lands.

Simplified geological map of the Normandie-Maine Geopark



E

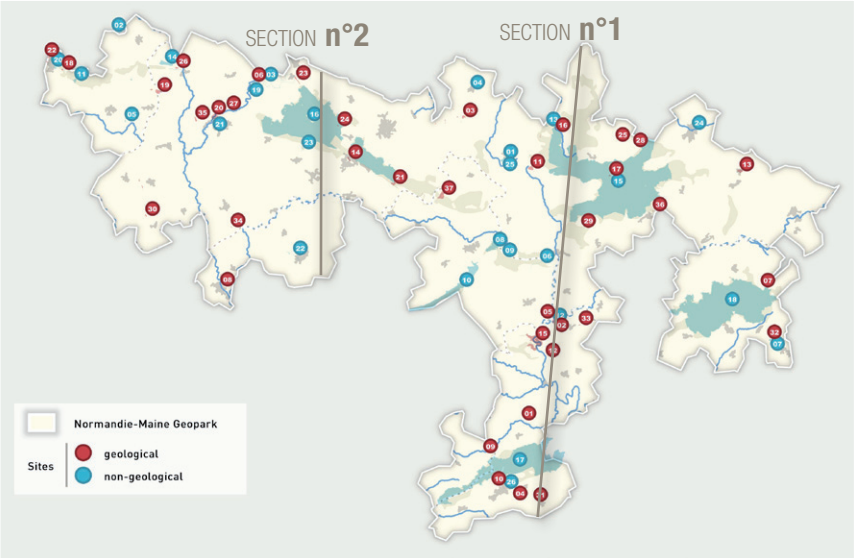
EVALUATION OF GEOPARK SITES OF INTEREST

The Normandie-Maine Geopark is a territory where geology, living nature and culture are intimately linked. Many of the biological conservation sites, both national and international, are home to a geological site while the cultural heritage also bears witness to our geological history.

This connection between different heritages explains our desire for a common development of the sites of interest within the Geopark. This is why we have chosen to analyse **the geological sites (p.10 & 11)** and **the additional sites (p.29 & 30)** by following the same method, explaining the links between this geological heritage and the other heritages.

The selection of sites (geological and non-geological) is the result of a comprehensive general study based on both a literature review, the databases established by the Regional Inventory of Geological Heritage and validated at the national level, the various databases on natural and cultural heritage and the knowledge of local geoscience stakeholders.

The various sites identified on the territory have been evaluated through the spectrum of a global methodology, corresponding to the specifications of the UNESCO Global Geopark Label and from the evaluation methods of geosites and geomorphosites developed by *Grandgirard (1999), Gray (2004), Bruschi and Cendrero (2005), Pralong (2007), Reynard (2006), De Wever et al (2006), Zouros and Valiakos (2010).*



Map of geological and non-geological sites in the Geopark

Information concerning the environmental, cultural and educational aspects was also evaluated, thus allowing a global multi-criteria approach corresponding to the definition given by the global network of Geoparks, namely: a geosite makes it possible to observe one or more geological objects or phenomena that reflect the geological history, events or processes at work in the territory.

The selected sites contribute to:

- Encouraging exploration, development and celebration of links between geology and other aspects of heritage (natural, cultural, intangible);

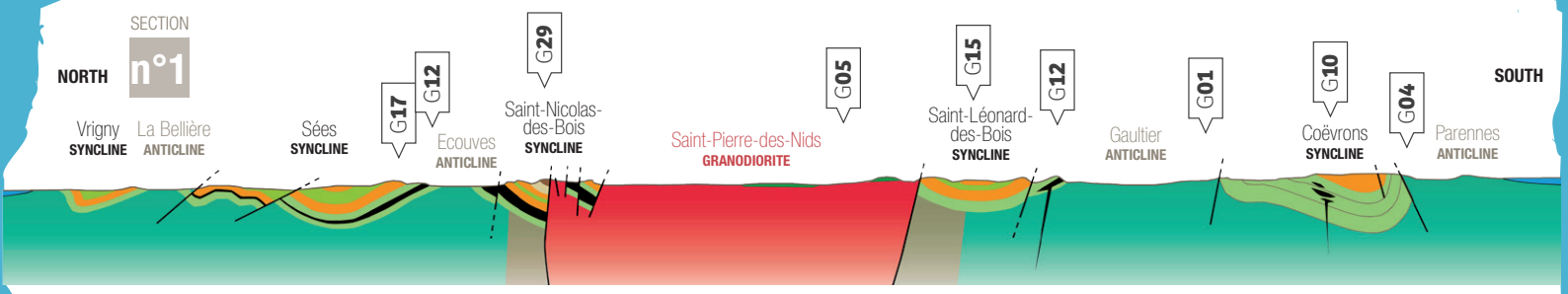
- Playing an educational and public information role;

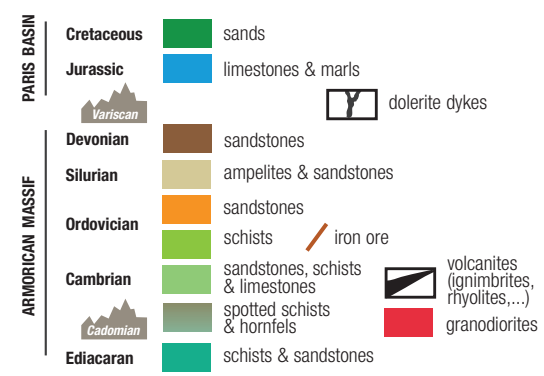
- Contributing to the local and sustainable development of the Geopark territory.

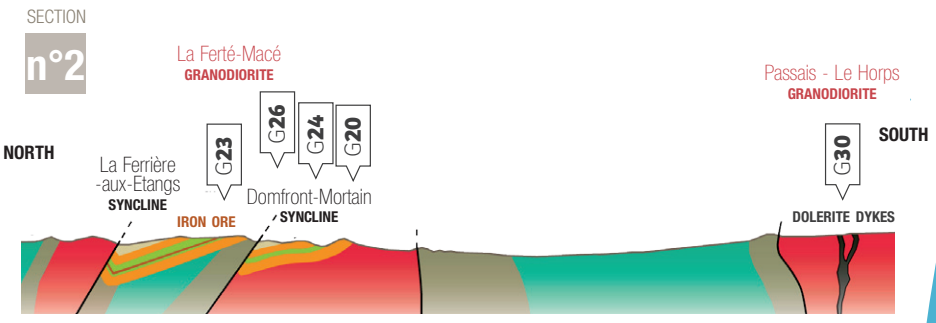
For each of the sites, the evaluation and a physical record of the site make it possible to take into account management measures integrating future prospects for future actions and highlighting certain threats to the sites.

The long geological history of the Normandie-Maine Geopark territory requires special attention in the selection of geosites. In order to help highlight the region's great geodiversity, some sites of a more confidential nature were also selected to help explain and show the geological history.

NORTH - SOUTH OVERVIEW OF GEOLOGICAL SECTIONS

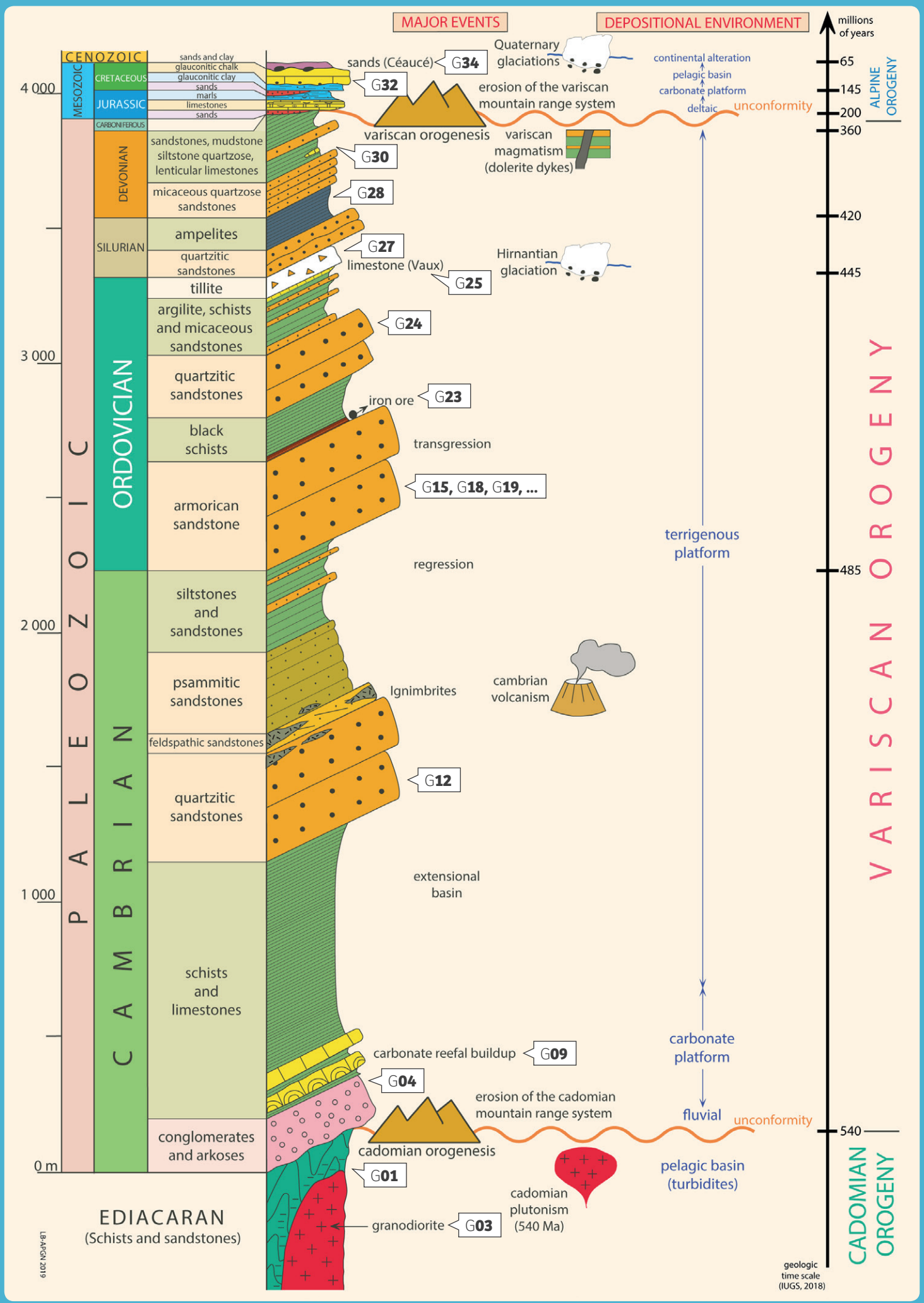






Produced by the Normandy Geological Heritage Asssociation - *Laura Baillet* **with the support of the Biological and Earth Sicences Department of the University of Caen.**

STRATIGRAPHIC SCALE OF THE NORMANDIE-MAINE GEOPARK



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with the support of the Biological and Earth Sicences Department of the University of Caen.

LIST OF GEOLOGICAL SITES

CENOZOIC

MEZOZOIC

PALEOZOIC

CODE	SITE NAME *Classed by the age of the oldest rocks visible on the site*	RARITY	MAIN GEOLOGICAL INTEREST	SECONDARY GEOLOGICAL INTEREST	PROTECTION	ACCESS	PUBLIC FOCUS	MEDIATION
G37	**The peat bog of Saint-Ursin** at Lignières-Orgères	3	**Sedimentology**	Strati /R.Nat Hgéol	+		S	
G36	**The karstic network of Vingt-Hanaps *** at Vingt-Hanaps, Radon, Semallé, Larré	3	**Hydrogeology**	Gmorph / Tect			S	
G35	**The Plio-Pleistocene clays of Saint-Gilles-des-Marais *** at Domfront-en-Poiraie	3	**Sedimentology**	R.Nat / Tect	+		S	
G34	**The Paleogene deposits of Céaucé *** at Céaucé	3	**Sedimentology**	Paléo / R.Nat Tect			S	
G33	**The glauconitic clays with iron ore of the Pouplinière's mound : Cenomanian parastratotype*** at Moulins-le-Carbonnel	2	**Stratigraphy**	Sédim			S	
G32	**The sands and conglomerates of Tessé** at Villaines-la-Carelle	3	**Stratigraphy**	Paléo / R.Nat			S	
G31	**The Butte-de-Crissé** at Crissé	4	**Sedimentology**	Paléo / R.Nat			S	
G30	**The dolerite dyke of the Devil's Table *** at Passais-Villages	3	**Plutonism**	Gmorph / R.Nat			TP S	
G29	**The Devonian coral reef *** at Saint-Nicolas-des-Bois	3	**Paleontology**	Strat	+		S	
G28	**The Silurian ampelites *** at La Ferrière-Béchet	3	**Natural Resources**	Paléo Sédim / Strat			S	
G27	**The Ordovician glacio-marine deposits from the Mortain-Domfront syncline *** à Domfront-en-Poiraie	2	**Stratigraphy**	Sédim / R.Nat	+		S	
G26	**The culminate sandstone and ampelites of Lonlay-l'Abbaye *** at Lonlay-l'Abbaye	3	**Stratigraphy**	Paléo / Sédim R.Nat			S	
G25	**The Ordovicien limestone of La-Carrière-des-Vaux *** at Saint-Hilaire-la-Gérard	1	**Stratigraphy**	Paléo / Sédim	++		E S	
G24	**The May sandstone of La-Brisette*** at Saint-Michel-des-Andaines	4	**Sedimentology**	Hgéol	+		S	
G23	**The Ordovician iron ore *** at La Ferrière-aux-Etangs	4	**Natural Resources**	Sédim			TP E S	
G22	**The waterfalls of Mortain *** at Mortain-Bocage	2	**Geomorphology**	Sédim / Strat Tect	++		TP E S	
G21	**The Gorges-de-Villiers *** at Antoigny, Saint-Ouen-le-Brisoult, Saint-Patrice-du-Désert	3	**Geomorphology**	Hther / Sédim	+		TP E S	
G20	**The transverse valley of Domfront *** at Domfront-en-Poiraie	2	**Stratigraphy**	Gmorph / Paléo Sédim / Tect	++		TP E S	
G19	**The Fosse-Arthour *** at Saint-Georges-de-Rouelley, Domfront-en-Poiraie	2	**Geomorphology**	Sédim / Tect	+++		TP E S	
G18	**The Armorican Sandstone of La-Grande-Noé *** at Mortain-Bocage	3	**Geomorphology**	Sédim	++		S	

LIST OF GEOLOGICAL SITES (CONTINUED)

PALEOZOIC

PRECAMBRIAN

CODE	SITE NAME *Classed by the age of the oldest rocks visible on the site*	RARITY	MAIN GEOLOGICAL INTEREST	SECONDARY GEOLOGICAL INTEREST	PROTECTION	ACCESS	PUBLIC FOCUS	MEDIATION
G17	**The rubified alterites of La-Croix-de-Médavy** ✱ at L'Orée-d'Écouves	3	**Geomorphology**	Sédim / R.Nat	+	●	S	
G16	**The periglacial scree of Goult** ✱ at La Lande-de-Goult	3	**Geomorphology**	Sédim	+++	●	S	
G15	**The Alpes-Mancelles : from the valley of Misère to the Haut-Fourché** ✱ at Saint-Léonard-des-Bois	1	**Geomorphology**	Paléo / Sedim Tect	+++	●	TP E S	
G14	**The thermal baths of Bagnoles** ✱ at Bagnoles-de-l'Orne-Normandie	2	**Sedimentology**	Gmorph / Hther Tect	++	●	TP E S	
G13	**The Paleozoïc islet of Boitron** ✱ at Boitron	3	**Sedimentology**	Gmorph / R.Nat Strat / Tect		◐	S	
G12	**The Cambrian volcanic complexes of the Massif-d'Assé-le-Boine** at Saint-Léonard-des-Bois, Sougé-le-Ganelon	3	**Volcanism**	Sédim		◐	S	
G11	**The Cambrian ignimbrites** ✱ at Rouperroux	3	**Volcanism**	R.Nat / Tect		●	E S	
G10	**Sillé-le-Guillaume, at the heart of the Coëvrons Variscan syncline** at Sillé-le-Guillaume	4	**Volcanism**	Tect		●	S	
G09	**The Cambrian limestones and lime kilns of La-Boissière** at Saint-Pierre-sur-Orthe	4	**Sedimentology**	R.Nat		●	S	
G08	**The contact between granite and Brioverian hornfels** at Ambrières-les-Vallées	3	**Métamorphism**	Plut	+	●	TP S	
G07	**The gabbro of Louzes** at Louzes	4	**Plutonism**	Métam		●	S	
G06	**The granitic arena of Dompierre** ✱ at Dompierre	3	**Geomorphology**	Métam / Plut R.Nat		●	S	
G05	**The Canyon-des-Toyères** at Saint-Pierre-des-Nids	4	**Geomorphology**	/	+++	●	TP S	
G04	**The Butte-d'Oigny** at Saint-Rémy-de-Sillé	3	**Stratigraphy**	Gmorph / Sedim Tect		◐	S	
G03	**The Cadomian granodiorites of La-Raitière**✱ at Joué-du-Bois, Le champ de la Pierre, Rânes, La Chaux	4	**Plutonism**	Gmorph / R.Nat		●	S	
G02	**The deep-valley meandering of the river Sarthe**✱ at Saint-Céneri-le-Gérei	3	**Geomorphology**	Plut	+	●	TP S	
G01	**The siliceous conglomerates of Pont-Landry** at Mont-Saint-Jean	4	**Sedimentology**	R.Nat / Tect		●	S	

LEGEND

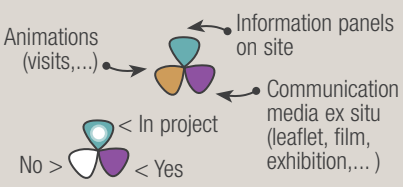
RARITY |
1 = International • **2** = National
3 = Regional • **4** = Local

SECONDARY GEOLOGICAL INTEREST |
Gmorph = Geomorphology
Hgéol = Hydrogeology • **Hther** = Hydrothermal
Métam = Metamorphism • **Paléo** = Paleontology
Plut = Plutonism • **R.Nat** = Natural resources
Sedim = Sedimentology • **Strat** = Stratigraphy
Tect = Tectonic • **Volc** = Volcanism

✱ = National Geological Inventory Site

PROTECTION |
+++ International *(Natura 2000)*
++ National *(Registered and classifies sites, Protection Act, Nature Reserve)*
+ Régional *(ENS, ZNIEFF)*

MEDIATION |

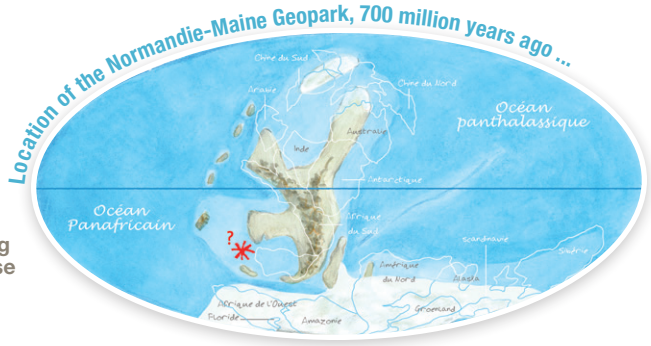


ACCESS |
● = Free
● = With permission
● = Prohibited / Not authorised

PUBLIC FOCUS |
TP = All public
E = Schools
S = Scientific / Geologist

1 THE CADOMIAN OROGENESIS
[600 - 540 Ma]

This period concerns **geological sites** :
G**01** À G**08**



According to Scotese © Arianne Delrieux

The oldest sites of the Geopark belong to the Cadomian belt *[cadomus: Latin name of the city of Caen where the epoch has been traced]* which is itself part of the history of panafrican orogeny. Its structure results from the evolution of a possible Celtic "ocean" (Channel Ocean) that existed in the Late Proterozoic between the North Atlantic and Gondwanian cratons.

The last stage of the construction of the Cadomian belt (585-540 Ma) is very well represented on the Geopark territory. It is associated with the Brioverian *[brioveria: Celtic name of the Norman city of Saint-Lô].* It begins with the erosion of volcanic arc structures (formed around 600 Ma).

The territory is located therefore in a vast marginal back-arc basin: the Mancellian basin *[From the name of the city of Le Mans in the Sarthe Departement]*. It is fed by the detrital material emanating from the erosion of the Coutances Arc in the north and by that of a continent (Cordillera) to the south whose traces have not been found.

Detrital and terrigenous products from the dismantling of the reliefs are deposited on a narrow continental platform. As a result of underwater earthquakes, they hurtled down the slopes of the channelled continental embankment before finishing in the abyssal basin.

The sediments are deposited there, forming graded bedding sequences deposited by turbidity currents at the origin of a very thick flysch (several thousand metres). **[G01 - The siliceous conglomerates of Pont-Landry]**

Depending on the sources of supply, the turbidities will be of varying thicknesses and composed of various coarse materials.

The end of the Cadomian orogeny is marked on the territory by the closure of the Mancellian basin (a shortening in a north/north west/ south, south east orientation). The deformation results in a folding of the sedimentary sequences, of north west/south east direction, with vertical axial planes which actively straightens the stratification. The schistosity is sub-vertical.

Brioverian schists with silliceous pebbles at The Pont-Landry

Former quarry of Cadomian granite

Following this deformation, intense magmatic activity allows the rise of granitic plutons (of crustal origin derived from subduction) often organised in an east-west direction. The intrusion of these granodioritic plutons, generates a contact metamorphism, transforming the Brioverian schists which are in contact with the granite massifs into hornfelses, a highly erosion-resistant rock. **[G08 – The contact between granite and Brioverian hornfels].** The granodiorites (rich in quartz, orthoclase, plagioclase) have been dated to 540 + or - 10 Ma **[G03 - The Cadomian granodiorites of La-Raitière]**. The main geological formations of the Brioverian are schists **[G04 - the Butte-d'Oigny]** and sandstones (greywackes), locally intersected by granodiorites and their rings of metamorphism: hornfelses and spotted schists.

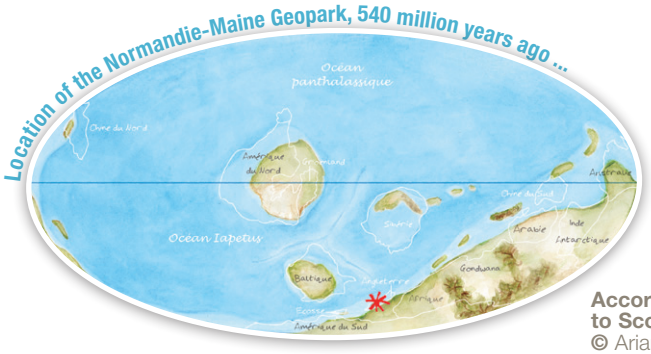
Trilobite drawn by children in 2012 as part of the Evolution of Life trail [NG06]

2 TECTONIC SEDIMENTATION AND CAMBRIAN VOLCANISM

[540 - 490 Ma]

This period concerns **geological sites** :

G**09** À G**13**



According to Scotese © Arianne Delrieux

At the end of the folding and granitisation phase, the Cadomian belt is given over to erosion. On the Geopark, the presence of a more erosion-resistant granite constitutes a part of the major reliefs of the region. The territory is therefore placed in an expanding geodynamic context (which succeeds the compressive regime at the origin of the Cadomian belt) associated with a period of rifting and the opening of the Rheic Ocean.

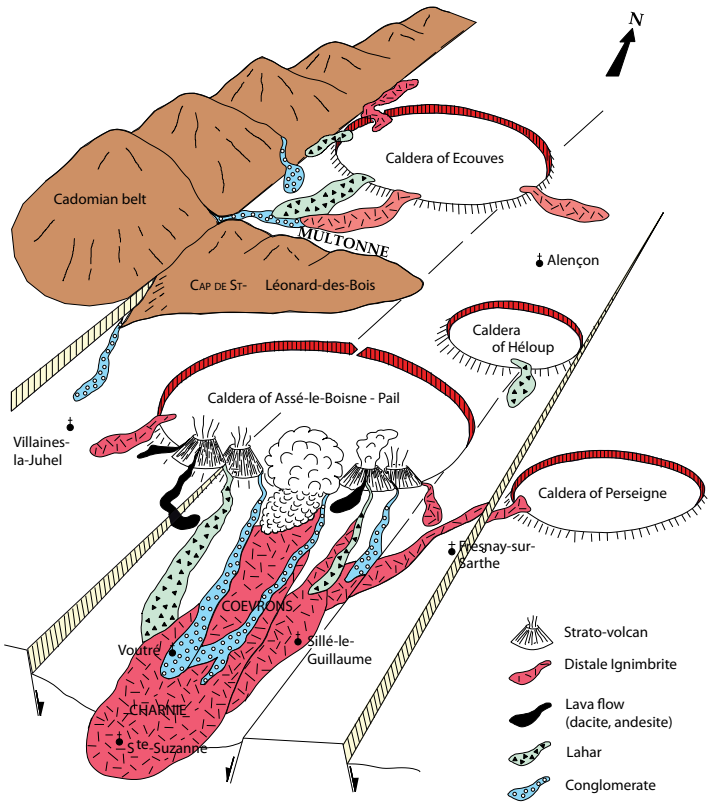
This phenomenon is at the origin of the formation of a rift, oriented north-west / south-east on the territory: the Normandie-Maine graben which extends from the uplands of Ecouves to the Laval basin. It is 75 km long and over 50 km wide. It traverses, therefore, a very large part of the Geopark.

The dismantling of the Cadomian belt feeds detrital sedimentary formations which are attributed to the Cambrian, despite the scarcity of fossils. The first coarse deposits, stones rich in Brioverian Greywacke pebbles are transported by the rivers and then accumulate in alluvial fans, the red colour denoting their continental character. They are deposited unconformably above the Brioverian schists. After this continental episode, in an environment of coastal lagoons covered with a thin layer of water, the arrival of the sea in the Normandie-Maine graben results in deposits of carbonates (limestones more or less dolomitic). **[G09 – The Cambrian limestones and lime kilns of La-Boissière]**

Detrital sedimentation, essentially sands, is then observed in the south of the territory. Intense volcanic activity parallels the **Normandie-Maine graben** at the eastern end of the current Armorican Massif. This area was the site of intense volcanic events.

The eruptive centres were concentrated in several calderas. They are at the origin of voluminous deposits of ignimbrites (pyroclastic surges), rhyolites, lahars, conglomerates, cinerites, pumices ... **[G11 – The Cambrian ignimbrites, G12 – The Cambrian volcanic complexes of the Massif-d'Assé-le-Boine].** This volcanic occurrence can be compared with outcrops also seen in the Bohemian mountains (another witness to the opening of the Rheic Ocean).

The combined effect of erosion and tectonics (Variscan folding around 340-300 Ma) erased the primitive volcanic morphology of the landscape. Evidence of this period is nevertheless visible in natural outcrops and active quarries.



Schematic view of the Normandie-Maine graben during the Cambrian (500 Ma), when the Assé-le-Boisne - Pail caldera was active. Thick ignimbritic layers accumulated in this structure, whilst pyroclastic flows (distal Ignimbrite) escaped to the exterior along with lava and huge mudslides (lahar), covering an area of approximately 20 km in diameter. © Jean Le Gall

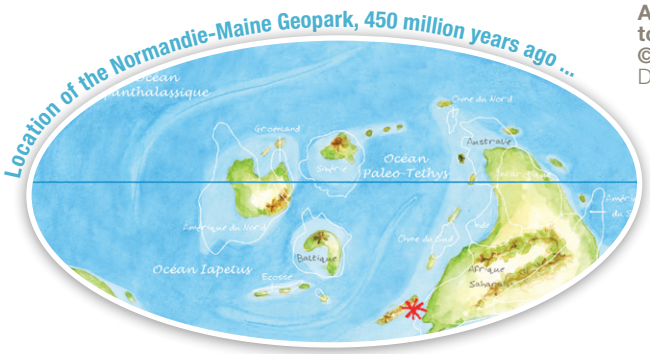
Cambrian Ignimbrite at the Rouperroux Quarry (Ecouves Caldera)

Rhyolite from the cambrian volcanic complexes (Asse-le-Boisne Caldera)

3 SEDIMENTATION AND EO-VARISQUE FOLDS

[490 - 252 Ma]

This period concerns **geological sites** : G**14** à G**30**



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The Paleozoic is predominantly represented on the Normandie-Maine Geopark territory, notably by a formation called the Armorican Sandstones, resulting from Ordovician sedimentation, which contributes in a major way to the geological and patrimonial richness of the territory. These rocks structure the Geopark in the form of wide ridge lines. Today, these ridge lines are home to large forest areas.

The Geopark territory is part of the Variscan belt history in the North Armorican area. This Orogenic cycle culminated when Gondwana and Laurussia collided together to form the Pangea. In Normandy, there is a beautiful illustration of the foothills of this belt in the Armorican Massif.

At the beginning of the Ordovician (-480 Ma), the Armorican Massif was located in the high latitudes of the southern hemisphere. The conditions of tropical sedimentation are fading and the sea returns to the east on the territory which it ends up completely covering. The erosion of the reliefs, the old Coutances magmatic arc in the north but especially Gondwana in the south, feed on sandy or clay detrital sedimentation, depending on hydrodynamic conditions.

This shallow sea-bed sedimentation, whose characteristics are those of cold to temperate seas, forms the emblematic Armorican sandstone of the Geopark. **[G19 – The Fosse-Arthour]**

Ordovician Limestone in the *Carrière des Vaux*

Iron Ore nodule

Feugerolles tilite

Dolerite ball (with onion-like alteration)

Extremely variable in thickness (150m in Mortain, 500m in Perseigne forest), it contains numerous ichnofossils (Skolithos, Cruziana, Rusophycus) and fossils (brachiopods, trilobites) but also sedimentary structures (ripples marks, tempestites ...). **[G14 - The thermal baths of Bagnoles]**

Sedimentation continues during the Ordovician with a succession of sandstones and schists, including the shale of the *Pont-de-Caen* with intercalation of iron ore. **[G23 - The Ordovician iron ore]** The rocks that will be formed later will be successive sandstones. **[G24 – The May sandstone of La-Brisette]**

Towards **the end of the Ordovician (end of Katian)**, an extremely circumscribed carbonate sedimentation forms the limestone of Vaux with microfauna of conodonts. **[G25 – The Ordovicien limestone of La-Carrière-des-Vaux].** It shows a global warming before the Hirnantian glaciation. It is similar to a known carbonatic episode in western Europe and northern Africa corresponding to a brief episode of global warming *(BODA or Late Ordovician Global Warming).*

The glaciation which occurs at the end of the Ordovician (Hirnantian), is represented on the territory by a particular formation: the tillites. **[G27 – The Ordovician glacio-marin deposits from Mortain-Domfront syncline].** From glacio-marine origin, it results from a release of rock fragments imprisoned in the ice of the flowing glaciers, and released during the melting of the iceberg.

In **the Siluro-Devonian**, sedimentation conditions gradually become tropical again.

The Silurian (-444 Ma) is characterised by deposits of black shale. Anoxic environments preserve the organic matter where the remains of a pelagic fauna abound (graptolites). They testify to a major marine transgression on the entire northern edge of Gondwana.

The black shale is known locally as ampelites and their graphitised organic matter was the raw material used by Nicolas-Jacques Conté when he invented the pencil in 1795. **[G28 – The Silurian ampelites]**

The Devonian (-419 Ma) is not well represented on the Geopark. It can only be observed through fossiliferous sandstones in Saint-Nicolas-des-Bois (Lochkovien). **[G29 – The Devonian coral reef].** Even though not very extensive, they present coral reef characteristics, testifiying to the migration of the territory towards the lower latitudes.

Fossil traces of inarticulate brachiopods (lunguids)

Armorican sandstone at La Fosse Arthour ©Jérome Houyvet

The formation of the Variscan belt

The first movements related to the formation of the Variscan belt are recorded from the end of the Devonian in the north Armorican area. The Paleozoic cover, discordantly resting on the Proterozoic (Brioverian), is folded into large synclinal and anticlinal structures, of pluri-kilometric scale during the Carboniferous. The anticlines are not well represented today. They were stripped out by the post-Variscan erosion which began at the end of the Carboniferous.

These folds are oriented in two directions: Variscan direction Southwest / Northeast and Armorican direction West-North-West / East-South-East.

The Variscan compression is of low intensity, inducing very open folds. Schistosity and metamorphism are almost non-existent, explaining the lack of development of new minerals.

A doleritic vein, associated with these deformations, oriented north-south, intersects the Proterozoic and Paleozoic formations. Dated from 350 +/- 10 Ma, these veins are evidence of a north-south shortening at the beginning of the Carboniferous. They demonstrate the brittle character of the continental crust in the north of the Armorican region and are located in imperceptibly deformed areas from Variscan orogeny. Paleomagnetic studies reveal that at the time of their intrusion, the territory was at a latitude of 5-10 ° S. **[G30 – The dolerite dyke of the Devil's Table]**

The north of the Armorican domain, characterised by Proterozoic and Paleozoic formations with little deformation during the Variscan orogeny, is very similar to the central Iberian zone from which it was separated at the time of the formation of the Ibero-Armorican arc (305-300 Ma).

The Variscan belt, barely established, is subject to erosion under a warm and humid equatorial climate. This erosion continues until the formation of a flat surface with residual reliefs which are then covered by the various Mesozoic transgressions during the Cenomanian period.

4 SEDIMENTATION OF THE PARIS BASIN [252 - 66 Ma]

This period concerns **geological sites** :
G**31** à G**33**

The **history of the Paris Basin** is associated with the dislocation of Pangea and the formation of rifts (Alpine, Atlantic, North Sea). The sea will make its return from the east on the levelled landforms of the territory at the end of the Lias period. During the Aalenian, sands from the Armorican reliefs are deposited in a tropical sea with a high carbonate content.

A rich coastal fauna of vertebrates (plesiosaurs, sharks) and invertebrates (brachiopods ...) is present. **[G32 – The sands and conglomerates of Tessé]**

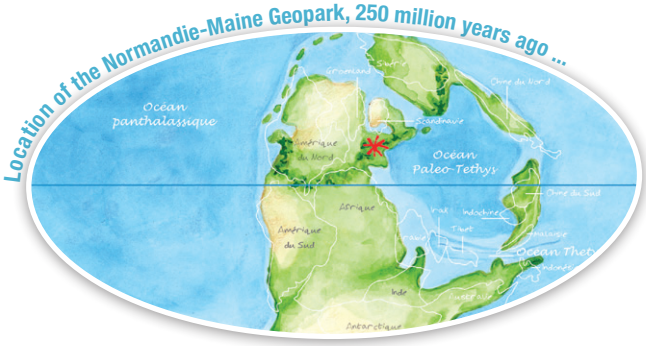
From Bajocian to Callovian (-170 Ma), more substantial transgressions cover all or part of the territory.

Ammonite carved by Christian Malézieux, local artist.

Sedimentation on the Armorican platform oscillates between a carbonated regime, sometimes with interbedding of flint and a marly or sandy terrigenous regime.

Sedimentation is strongly subjected to marine influences (warm and southern or cold and northern) associated with marine currents and varying effects of the Tethys and the North Sea.

Another particularity, residual reliefs of the Variscan belt, more islets than reefs in the Jurassic sea **[G13 – The Paleozoïc islet of Boitron]** influence the sedimentation and sometimes the marine currents.



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The sea will withdraw once again to the Upper Jurassic (-163 Ma), leaving space for continental alteration. It will only return during the Cenomanian on the east and south-east of the territory with the opening of the Bay of Biscay which causes an uprising of the Armorican Massif and its shift towards the north and the east.

On the submerged part of the territory, deltaic deposits border the shorelines (sands of Maine). **[G15 - The Alpes-Mancelles : from the valley of Misere to the Haut-Fourché]** Further away from the coasts, glauconitic clays with iron ore, marls, followed by a glauconitic chalk are deposited. The Cretaceous sea will then leave the territory at the end of the Cenomanian.

Unconformity below the Paleozoic (below) and Mesozoic (flat-ying layers on top) at Boitron

Speckled sandstone

5 THE CENOZOIC

THE GEOPARK EMERGED FROM A TROPICAL CLIMATE TO PERIGLACIAL

[66 Ma to today]

This period concerns **geological sites** :

G**34** À G**37**

and all the **geomorphological sites**

For the most part, the Geopark territory has been emerged during the Cenozoic era. Continental alteration under a warm climate is having an effect on Mesozoic and Cenozoic sedimentary areas which have been partially eroded.

At the beginning of the Cenozoic (-66 Ma), rocks were subjected to the action of alteration agents in a hot and humid climate. The limestone, subject to decalcification, gave way to the residues of the alteration: clays and flint. Limestones (Callovian clayey limestone) are also subjected to the beginning of karstification, responsible for a network of losses **[G36 – The karstic network of Vingt-Hanaps]** and resurgences, on the edge of the Armorican Massif.

The **regional tectonic movements** (Bay of Biscay, Pyrenees, Alps ...) generated slight tectonic uplifts throughout the Cenozoic, notably in the Armorican section, or quite the opposite, some periods of subsidence accompanied by marine transgressions. The sands of Saint-Patrice-du-Désert represent the course of an ancient Eocene fluvial network, testimony to the detrital crisis of the Armorican Massif at the end of the Paleogene. **[G34 – The Paleogene deposits of Céaucé].**

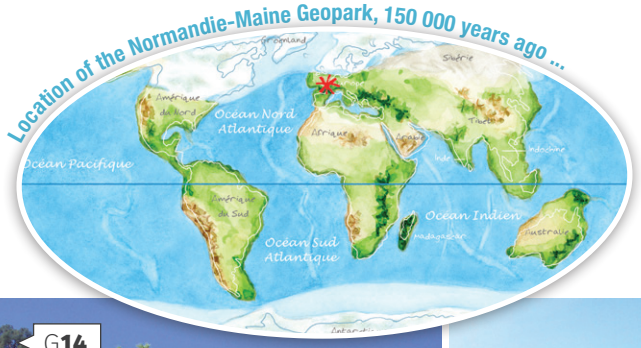
Trench in Paleogene deposits at Céaucé

The Ceaucé graben is influenced by the proximity of the sea, with its lagoon-lacustrine sediments and the alluvial deposits of an ancient stream. These tectonic movements also control erosion and the establishment of the modern hydrographic network. The erosion limit between the Armorican Massif and the Paris Basin is gradually changing.

In the Pliocene (-5.3 Ma), a slow deterioration of the global climate leads to a gradual cooling of temperatures then a succession of glacial and interglacial periods where the climate is warmer. It is during these 2.5 million years that the landscapes acquired their current shapes.

The Pleistocene climatic fluctuations, together with the slow rise of the Armorican block, now control the formation of current reliefs.

The reactivation of the Variscan faults perpendicular to the folds, associated with the lowering of the sea level, leads to the formation of transverse valleys **[G22 - The waterfalls of Mortain, G19 - The Fosse-Arthour, G20 – The transverse valley of Domfront]**, characteristics of the landscapes of Normandie-Maine. The Alpes Mancelles are a very good example of over-arching epigenesis where the Sarthe has bored into the flattening surface of the Cenomanian before carving a gorge into the Paleozoic **[G15 – The Alpes Mancelles: from the valley of Misère and the Haut-Fourché]** and Precambrian rocks **[G12 – The Cambrian volcanic complexes of the Massif-d'Assé-le-Boine, G05 – The Canyon-des-Toyères].**



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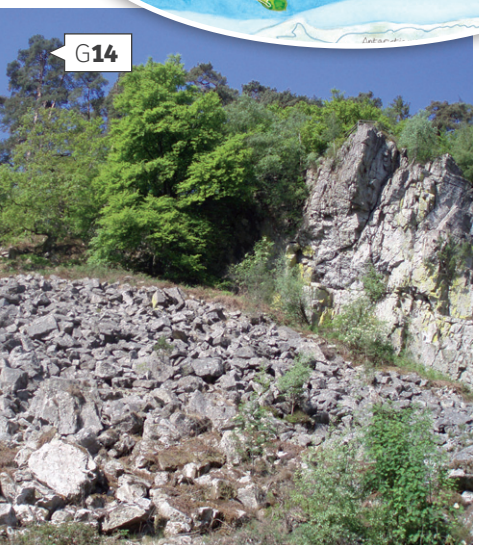


Screes at Roc-au-Chien, Valley of Misère and Fosse-Arthour

The quaternary cold climates are at the origin of the first formations peculiar to the territory: Sloped screes whose number is remarkable at these low altitudes. **[G14 – The thermal Baths of Bagnoles]** Associated with the ridge lines and made almost exclusively of Armorican sandstone, they are derived from the effect of the freeze-thaw cycles on rocks in a periglacial climate.

They present very different physiognomies and morphologies: screes with or without wall, strong disparity in the size of the blocks ...

They constitute a significant geological and natural heritage of the territory. During cold periods, the land emerging from the Channel, Orne and Sélune estuaries are swept by violent west/north-westerly winds. They lift up silty-clay particles that are then deposit on the continent. Well represented in the region of Passais and to a lesser extent in the east part of the Paris Basin, they form loess of varying thickness, which coats the reliefs. It provides rich silty farmland and is used in the construction of timber framed buildings in the west of the Geopark.

The thaw periods are favourable for solifluction flows and accumulation of head which coats the slopes and softens the reliefs.

The fluctuations in sea level associated with climatic variations are also responsible for deposits linked to the hydrographic network: terracing of the river Sarthe downstream of Saint-Léonard-des-Bois, ancient alluvia of the Mayenne, Varenne, Egrenne, Sarthe ... **[G35 – The Plio-pleistocene clays of Saint-Gilles-des Marais]**

The influence of the climatic variations on the vegetation and also the impact of Man has been conserved in the pollens that have been preserved in peat. It allows the reconstruction of ancient environments like the peat bog of Saint-Ursin: 12 000 years. **[G37 – The peat bog of Saint Ursin]**

Values of sites (international, national, regional and local)

The great diversity of the rocks, phenomena and ages observable on the aspiring Geopark makes Normandie-Maine a territory presenting an exceptional geology. This geological richness testifies to 600 million years of our planet's history and thus offers an interpretation of the evolution of paleoclimates in the different periods represented. This testimony is all the more important in the current global context of climate change and the collapse of biodiversity. This geological heritage constitutes a major lever of awareness among the inhabitants.

The knowledge of this heritage is mainly due to the numerous studies carried out since the 19th century (see bibliography attached in Annex 6). In France, studies on geological heritage were significant up until the middle of the 20th century. More recent studies are now more often as a result of the initiative of foreign universities or international cooperation.

The evaluation of the Geopark sites was carried out with regard to their scientific interest (scientific publications), the National Inventory of Geological Heritage (75 identified sites), the existing classification and protection measures, their rarity and what the experts have reported. Of the 37 geological sites selected for this nomination process, **2 have an international value, 5 a national value, 21 regional and 9 local.**

The Ordovician limestone of the carrière-des-Vaux [G25] is a conodont-dated, late-Ordovician microfauna limestone. This site is of international interest through its rarity, its heritage, its current scientific interest and its contribution to the reconstruction of the paleo-environment preceding the Hirnantian glaciation. The Geopark has been working on the conservation and enhancement of this site since 2009, notably through its classification as a Regional Nature Reserve.

The Alpes Mancelles: from the valley of Misère and the Haut-Fourché [G15] present a complex geology where the 600 million years of history of the territory can be used to illustrate many phenomena. It is the second most valuable site of the Geopark. Many actions are conducted on the site to make it visible to the wider public and preserve the heritage.

The thermal baths of Bagnoles [G14], the Fosse-Arthour [G19], The waterfalls of Mortain [G22] and **the Ordovician glacio-marine deposits from Mortain-Domfront syncline [G27]** are sites of national value because they testify to the major events of the Geopark's geological history.

Status of protection Geosites

In France, there are different protective measures specific to geological heritage. The most significant are:

• The classification as **a Regional Nature Reserve.** It is a tool for the long-term protection of rare and remarkable territories, species and geological features, as well as functional natural environments representative of biological diversity. A reserve has three main missions: to protect, manage and raise public awareness. The Geopark is thus at the origin of the creation of two Reserves of which it is the Curator:

- 2009 - Creation of the Normandie-Maine Geological Regional Nature Reserve.

- 2018 - Creation of the Regional Nature Reserve "Pierriers de Normandie".

• **Geotope Protection Orders.** This national nature protection tool is entirely dedicated to geology. The Geotope Protection Orders are not yet in force in the Geopark territory but steps are being taken at the regional level to develop this tool. It is anticipated that two sites within the Geopark will benefit from such a decree.

Other tools for protecting environments and species exist and can be mobilised to participate in the conservation of the geological heritage:

• **Listed and classified sites** are part of state legislation created in 1930 to preserve natural monuments, landscapes and sites of outstanding historical, legendary, artistic or scientific interest; seven geological sites within the Geopark are listed or classified.

• **The Natura 2000** network. This European tool aims to maintain and restore natural environments to achieve a conservation status favourable for habitats and/or species. Rocky environments are habitats of community interest. Four geological sites in the Geopark benefit from the Natura 2000 classification. The resources allocated by this system make it possible to integrate measures for the management and conservation of geological sites.

• **Sensitive Natural Areas** are the result of a proactive voluntary county-wide policy that aims to manage, preserve and open to the public, spaces whose natural character is fragile or threatened. This tool, although smaller, allows a strong mediation with the general public especially for two sites managed by the Geopark.

Current pressures

The pressures exerted on the geosites are mainly of two types: anthropic and natural.

The **anthropogenic pressures** concern the filling-in of geological sites located in old quarries **[G34 – The Paleogene deposits of Ceaucé]** or in active quarries (plans of redevelopment that envisage the filling-in). They also concern the fly-tipping and backfilling as well as the over-use of certain sites. Sampling of fossils or rock **[G29 – The Devonian coral reef], [G25 – The Ordovician limestone of the carrière-des-Vaux]** and more rarely, construction projects near geological sites which can also have an impact on them.

Natural pressures are mainly related to the natural dynamics of the vegetation (mosses, scrub, spontaneous afforestation according to the type of sites). The majority of the sites is concerned, especially the screes. The importance of natural alteration is different depending on the nature of the outcrop or the landslide scree in old quarries.

Maintenance actions (cleaning, restoration, etc.) are carried out on certain sites, particularly those benefiting from protection (Reserve, Sensitive Natural Area, Natura 2000).

E.1.2 | Geopark Boundaries

Natural boundaries

From Mortain-Bocage in the west to Le-Mêle-sur-Sarthe in the east, from Sées in the north to Sillé-le-Guillaume in the south, the Normandie-Maine Geopark territory is framed by **a belt of imposing solid sandstone escarpments** crowned with large dense forest. It is around this natural boundary, which supports the highest points in the west of France, that the identity of the Geopark is shaped.

It is this that makes its landscapes unique: its distant blue horizons give **the impression of a vast wilderness**, for as far as the eye can see. In contrast, hamlets and villages nestle between the woods in the hilly Bocage farmland.

Institutional boundaries

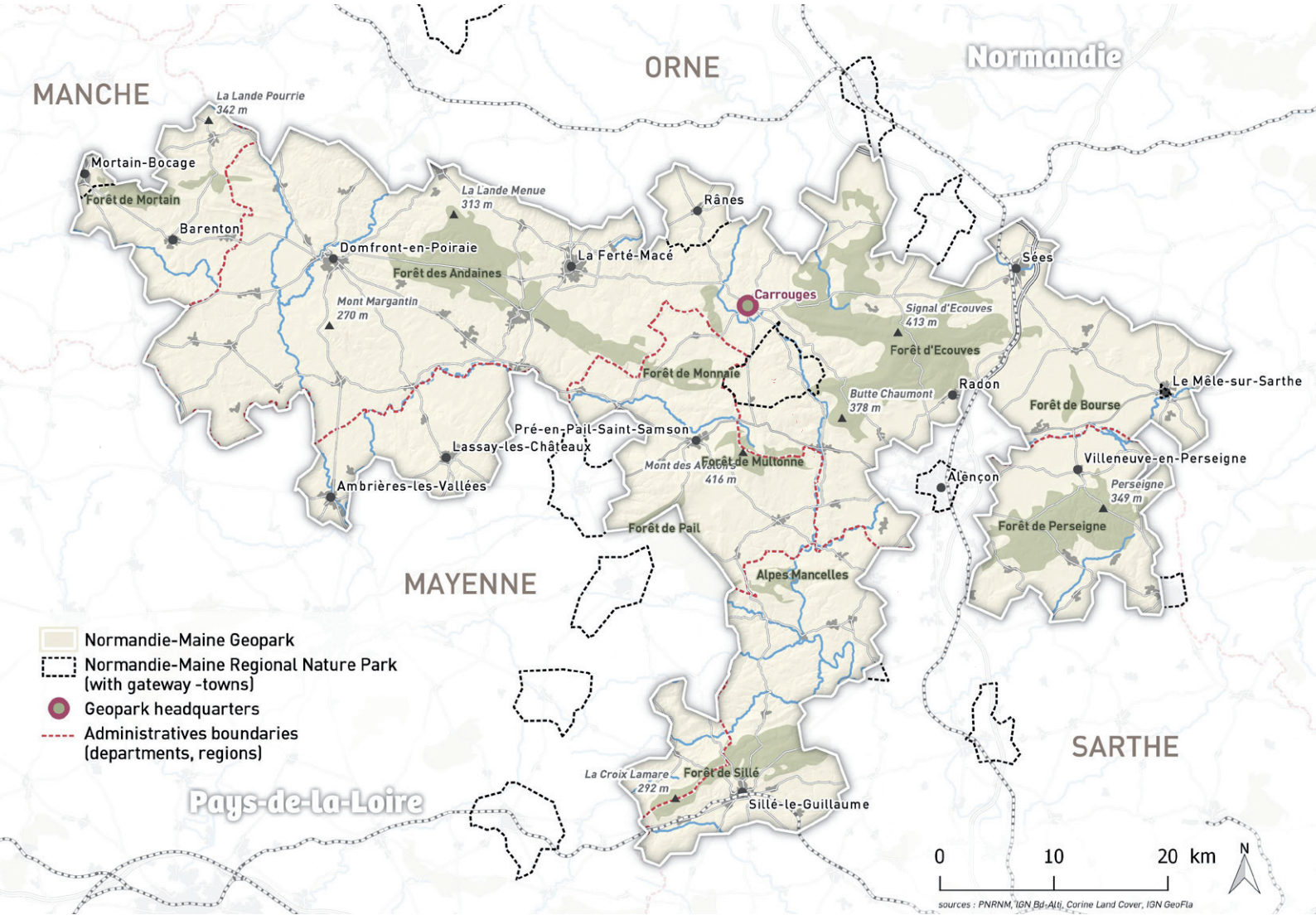
The Normandie-Maine Geopark boundaries follow those of the territory classified as a Regional Nature Park, with a few exceptions.

The French Regional Nature Parks have the particularity of having gateway-towns (conurbations close to the territory, with a significant population) that play an important role for the residential and tourist attractiveness of the territory.

Most are not within the classified territory (not even bordering). Only 3 of the 14 gateway-towns in the Normandie-Maine Park are included in the Geopark because they are all or partially within the perimeter.

Two of them are integrated because they feature a remarkable site within the Geopark - Rânes and Mortain-Bocage and also Le-Mêle-sur-Sarthe which is geographically included within the perimetre.

Three other municipalities not yet part of the Regional Nature Park (in the centre of the territory) are integrated because they are located inside the Geopark perimeter (Ciral, Saint-Ellier-des-Bois, Longuenoë / L'Orée d 'Écouves). **As of 1 November 2019, the Normandie-Maine Geopark has 141 municipalities.**



Map presenting the Normandie-Maine Regional Nature Park and Geopark

E.1.3 | Visibility of the Geopark

The **Normandie-Maine Geopark** is located 2 hours 30 minutes west of Paris, 1 hour north of Le Mans and 1 hour south of Caen. The two principal roads into the Geopark are the N12 national route which connects Paris to Brittany and Mont-Saint-Michel and the A28 motorway which runs from Le Mans towards Rouen and Caen. On these major roads, several signs signal the entrance to the Normandie-Maine Park. 2023 will mark the re-designation of the Regional Nature Park and a vast road signage plan integrating the Park and the Geopark will be implemented.

Beyond this signage, the Geopark ensures its visibility, primarily through its base, **the Park and Geopark Visitor's Centre**, which it manages. It is equipped with a museographic space and a tourist information point and is located in the heart of the territory, open every day from 1 April to 31 October. Three Geopark employees welcome and inform more than 12,000 visitors a year. The Park is also the curator of **the Poiré Museum (Perry)**, a recognised *"Museum of France"*, located in the extreme west of the territory. Benefiting from the same opening periods and a tourist information point, this site welcomes 6,000 visitors a year. It is also a first point of contact for all information on the Geopark.

The information and visitor points of our tourism partners (Tourist Offices, Museums) and some public places (Town Halls, Media libraries) also offer information spaces on the Geopark (documentation, posters, ...). Their employees are progressively familiarised and trained in order to be able to present the Geopark to residents and visitors. The multitude of stakeholders and therefore information points (16 Tourist Offices, 12 Museums, 141 Town Halls) requires both collective and personalised support to enable everyone to integrate the information about the Geopark.

Various digital or paper communication media are also used to increase the visibility of the Geopark. In order to benefit from the reputation gained by the Park, its main communication tools (website, Facebook page, discovery maps, ...) have been shared. Specific communication materials have also been created and the new tourist positioning of the Park, which has exclusively focused on geotourism and has led to the creation of new media including an all-English version. In order to clearly distinguish the actions of the Geopark from those carried out by the Park, a specific Geopark logo has been designed. It is used on all media related to the Geopark.

Many sites already benefit from on-site promotion to raise awareness of the geological, natural and cultural riches within the territory. The information panels are the results of the efforts of the numerous partnerships brought together by the Park with the National Forestry Office, the local and regional authorities. They are therefore often heterogeneous in their choice of fixing and graphics but the information on the territory and its uniqueness is presented in a similar way.

Boosted by the strong link between the Geopark and the territory, **a new signage plan** was initiated in 2018 to make the network of geological and non-geological interest sites more visible. Designed to equip the sites in a more uniform way, this new plan specifies display equipment which uses 3 materials that are associated with the territory (rock, wood, iron). Available in French and English, they gradually supplement or replace the current display equipment.

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The Park and Geopark Visitor's Centre

Diagram of totem-style signage on Geopark sites © ATEMIA

E.1.4 | Infrastructure and facilities

The Park and Geopark Visitor's Centre [NG01],

Located in Carrouges, the Park and Geopark Visitor's Centre is the favoured entrance through which to discover the Geopark. Located 30 minutes west of Alençon, and 250 metres from the Chateau of Carrouges, managed by the Centre for National Monuments, it has a significant flow of visitors (10th tourist attraction in Orne). This site is steeped in history and has been the headquarters of the Regional Nature Park since its creation.

An old canonry founded in 1498, its former conventual buildings now host the Park and Geopark administrative and technical teams.

The collegiate church, whose chapel is classified as a historical monument, is also open to the public. Old outbuildings adjoin new buildings and are now the Park and Geopark Visitor's Centre. The site offers a total immersion in Normandie-Maine with its museum-infographic space, tourist information point, exhibitions and activities. Not forgetting its shop which sells local products.

Created in 2007, the scenographic space invites you to discover the natural and cultural heritage and crafts of the territory. The forest, the water, the building styles, the cider industry, the agriculture and the craftsmanship all play an important part. The same goes for the geology, which has a dedicated section with an exhibition of rocks and their formation through a scenographic experience evoking the screes.

Temporary exhibition spaces complemented by annual activities promote local stakeholders. These tools also make it possible to reinforce the information about certain heritages (an exhibition on lichens in 2018, an exhibition on the traces of Neanderthal man is planned in 2020).

In addition to tourist information, the site is also a reference point for more technical information about the territory and actions carried out by the Park and the Geopark. Reference books are on sale in the shop and a technical documentation reference section is open to the public.

Museographic space

Tourist information point

The Poiré Museum [NG05],

Created by the Park in 1983 and completely renovated in 2016, the Poiré Museum showcases the orchards of tall standard pear trees and the resulting cider productions, notably *Poiré Domfront* and *Calvados Domfrontais*.

These symbolic productions on the territory are the result of a unique European landscape coupled with the number and variety of orchards. Since 2002, the Park has supported the producers in working towards the creation of a designation of origin. Its administrative headquarters are located at the Museum.

In 2001, it was classifed as a "Museum of France" and became part of the network of state museums. It houses a scenographic path on the history and know-how related to cider production and has a conservatory orchard which reflects the commitment of the Park in the conservation of old varieties of apples and pears.

Housed in an old farmhouse typical of the Mortainais-Domfrontais style with its half-timbered structure and cob, the Museum holds various collections of ethnographic objects and actively seeks out new objects to add its collection. The link to the land, and therefore to its geology, is an important element that the Geopark will expand on in more detail through the museum in the years to come.

Poiré Museum

The tourist sites and trails network “Monts and Marches”

In its 2008-2023 Charter, the Normandie-Maine Park laid the foundations for an ambitious site development programme around one major aspect: **the “*Monts et Marches*”**. (Mountains and historic borders and strongholds) The aim was to identify remarkable places by their position on a high point (mountain, escarpment, rocky outcrop) or by their defensive nature on the border between two historic territories.

Of the 27 sites identified in 2009, 12 were highlighted with explanatory information panels. Each development has been designed with a view to sustainable tourism, with the lowest possible environmental and landscape impact. Following the desire to create a network and spread over the entire territory, the challenge was to develop the tourism offer and extend the length of stay of visitors to the Geopark.

This network has been developed in partnership with all tourism stakeholders at the regional and local levels. For each site developed, communication media (panels, boards and/or digital applications) have been developed.

The **12 developed sites** are related to the geological heritage of the Geopark either directly linked to a geological site or linked to its heritage. These sites, which are at the intersection of geological, natural and cultural heritage, form the basis of Geopark sites of interest.

In addition to the amenities, regular activities have been in place since 2015, highlighting the uniqueness of each site: Neolithic history in Rânes, medieval heritage in Domfront-en-Poiraie, Arthurian legend in Lassay-les-Châteaux, ...

The 12 developed sites and trails

- **Geological History** *trail*
- *Trail* **"Saint-Céneri-sur-le-motif"**
- **Museum of Prehistory at Rânes**
- *Trail* **" Entre landes et abbaye"**
- *Trail* **"La tête et les jambes"**
- *Trail* **"Tour et détour à Bonvouloir"**
- *Trail* **"Lancelot au Pays de Lassay"**
- *Trail* **arround the historic town of Domfront**
- *Trail* **arround the historic town of Sées**
- *Trail* **"Du fer sous la colline"**
- *Trail* **"L’histoire des gobelins"**
- *Trail* **"La légende arthurienne"**

Geological trail at Saint-Léonard-des-Bois

Mortain-Bocage trail

Trail around the historic town of Domfront

Several museums are linked to this network of developed sites which explain the close link between the history of Man and the resources in the territory. They are essential stakeholders in the Geopark, both through their tourist activities and as partners in the proposed education programme.

The **Prehistory Museum [NG04]** in Rânes, established by the Park alongside local stakeholders and now led by the Association of the Friends of the Museum. It is the only one entirely dedicated to this theme in Normandy. Based on archaeological discoveries made nearby, the Museum presents the life of Neanderthal man in Normandy. Thanks to the available geological resources, it showcases locally-made flint tools.

The **Iron Discovery Centre [NG03]** in Dompierre, managed by the association “*Le Savoir et le Fer*” (the Knowledge and the Iron), presents the history of the forges and iron mines in the Orne bocage area centred around 3 themes: the geological formation of the iron ore, the iron and steel industry in the bocage from the Middle Ages to 19th Century and the iron mines in Orne between 1901 and 1978. Developed in partnership with the Park, the thematic tour "Iron under the hill" completes the visit.

The **Ceramic Museum, creation centre [NG02]** in Ger is managed by the Departement of Manche with the support of 3 associations, (Genealogy and History - GER, Association of Friends of the Pottery and the Land Exchange Association). Founded on the site of a former potter's workshop, with kilns and tunnels, the Museum presents the production and use of pottery up to the beginning of the 20th Century. It explains the origins of this activity, linked to the presence of nearby sandstone clay and large quantities of wood for the kilns.

E.1.5 | Information, education and research

Since 2012, the Park has structured its actions in a holistic way. This logic involves clearly defined goals for each element and establishes a forecast of the human and financial resources allocated to it. This approach also includes the preliminary definition of performance indicators and results in order to evaluate the actions taken.

Whatever the project, mediation with the various publics concerned is a cornerstone of its success. This is why a hub dedicated to mediation was created within the Park team in 2015, with the ambition to ensure the visibility of all activities on the territory, especially with elected officials and residents.

The concept of mediation includes any act of information, familiarisation, education or training for a previously defined audience using the most relevant and innovative tools.

Around 10 people with varied and complementary skills (web and print communication, events, public and school activities, training, exhibitions ...) support technical missions to develop mediation for each project. The Geopark benefits from this kind of organisation and this way of working.

GEOactus. A Geopark-specific newsletter was inaugurated in 2019. Distributed primarily in digital format to more than 3,500 subscribers, it has also been designed for print distribution. Its frequency depends on the volume of information on the project.

Normandie-Maine Geopark. A brochure presenting the Normandie-Maine Geopark was produced in 2019 and widely distributed in the area. Mainly addressed to partners, it also enables residents and visitors to discover the UNESCO Global Geoparks and the Normandie-Maine Geopark. It was produced in French and English to allow wider communication, particularly within the network of UNESCO Global Geoparks and to English-speaking visitors.

INFORMATION

The transmission of information is the first level of mediation. This action can use a wide range of tools.

Two communication officers are working to report on the actions taken and to promote a better understanding of the Geopark among elected officials and residents.

• **Digital tools** are obviously used as communication levers because their scope is potentially very strong for a low cost.

The Regional Nature Park has had a website for many years enabling residents and partners to be informed about the territory and the actions undertaken.

This site is already enjoying a good reputation (about 30,000 visits per year). We chose to use it as a digital showcase for the Geopark by dedicating a specific space.

A URL address has been created to increase the visibility of the Geopark:

www.geoparc-normandie-maine.fr

For the same reasons, the Park's social networks have evolved towards a shared Park/Geopark approach.

As a result, the Park Facebook page has become ***Parc naturel régional & Géoparc Normandie-Maine***. It brings together a growing community of more than 2,500 people in 2019, with an average of 1-2 publications per day. A YouTube channel is also being developed as a means of sharing the different videos produced.

• The **press** and the **media** are major tools in this rural area. The Geopark is covered by a dozen or so weekly or daily newspaper titles, by several local or regional radio stations and French TV stations. Newsletters are regularly sent to residents to keep them informed about the Geopark.

• The use of the **design and printing of communication brochures** is widely used; its content is adapted to a target audience. The modes of diffusion differ according to the message and the target public in order to use the best possible medium (distribution via letter boxes, in public places within the territory ...).

In order to easily identify the Geopark, **a dedicated logo** has been created, complementary to the Park logo. It is gradually being added on all communication media related to the Geopark.

PROJET GÉOPARC
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AWARENESS

On this second stage of mediation, it is no longer appropriate to target specific audiences. It's about raising awareness in order to generate more stakeholders.

If some of the previously mentioned communication tools could be used, they would not be adequate. There must be a reflection on the choice of visuals and approaches used. It is necessary to focus more on the wonder, discovery and surprise and in a less formal way.

The offer of a **guided tour** of a geological, natural or cultural site is an ideal approach to raise awareness. The Geopark aims to put in a place an annual programme of visits including around 100 visits for groups of about 30 people maximum.

Other activities and actions carried out are:

- Aesthetic approach by showcasing beautiful visuals (poster creation, video production, photo album ...);
- Fun approach using the game “Les Incollables” quiz game as a discovery tool (The Unbeatables), Facebook quiz, competitions ...);
- A metaphorical and artistic approach that shows artists' visions, as a way of informing visitors (2019 exhibition "in resonance" at the Park and Geopark Visitor's Centre).

Examples

« Vol au-dessus du Parc naturel régional Normandie-Maine ». ". This photographic work, carried out in 2015, showcases the diversity and richness of landscapes through almost 150 photos taken in powered paragliders (paramotors). It is regularly offered to Park and Geopark partners and sold in the shop.

A Park newspaper. From 2009 to 2012, the Park distributed a newspaper to all residents entitled "Normandy and Maine Mountains". 90,000 copies were published twice a year, it highlighted the heritage and initiatives of the territory. The principal article in the second issue, published in February 2010, focused on the geology of the territory. This edition is available on line, along with previous editions.

School activity at the Prehistory Museum at Rânes

School activity at the Fosse Arthour

An educational service in support of the Geopark

Since September 2018, a secondary school science teacher has been made available for 2 hours per week along with a “resource” teacher for several hours during the year for all primary school students. This has been organised in partnership with the National Education department.

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EDUCATION

In France, the term education very much refers to the school setting. This is an important component, as long as our activity is not limited to it.

The Park's educational programme was developed in 2011 and is now backed by **close partnerships with the National Education department**. The resulting proposition, therefore, is fully in line with national objectives. It encourages teachers to use the territory as a local learning ground to develop projects with their classes and to promote understanding of the current issues in our society.

This programme is made possible through the involvement of accredited educational associations and cultural stakeholders. There are 11 structures participating in the implementation of the educational package, constituting a network of stakeholders on the Geopark. Training proposals are progressively being proposed to them. A first Geopark Geology Awareness Day was held in March 2019. Training proposals are also offered to teachers to allow them to better engage their students with the Park and the Geopark

Since June 2011, the Park has organised an annual **“call for applications” entitled “Discover your region”** formalised in an educational guide addressed to the 220 schools in the area, from nursery to secondary school. This guide lists the themes of proposed activities dealing with the environment, heritage and sustainable development. Teachers are then invited to send their application explaining their support needs in relation to the

proposed activity. Every October, **30 to 40 projects are selected** by a steering committee.

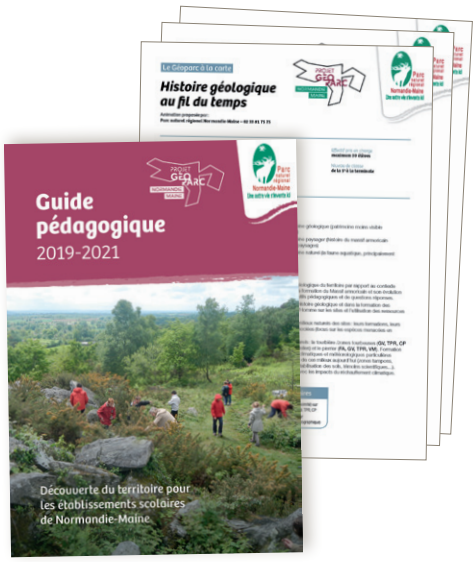
A re-structuring of the activities was designed to make the Geopark more accessible to schools. The call for applications now has two themes:

- **My class in its environment** (discovery of the territory close to the school);
- **The Geopark "à la carte"** (cultural, historical and geological proposal based on the Geopark territory as an educational support).

In parallel with this educational proposal which is available to all schools in the region, the Park designs innovative and tailor-made educational projects.

These educational projects are designed specifically to support a programme managed by the Park (e.g. activities on Natura 2000 sites). They usually target a specific geographical area. Following in this logic, a teaching project was specifically designed for the start of the 2019/2020 school year to mark the 10th anniversary of the Normandie-Maine Geological Regional Nature Reserve **[G25 – The Ordovicien limestone of la-carrière-des-Vaux]**.

Also included in the educational proposal are one-off activities. These consist of a class welcome to the Geopark facilities (The Park and Geopark Visitor's Centre, Poiré Museum) and also to the vulnerable nature areas (for which the Visitor's Centre is the designated host).



RESEARCH

The Geopark is linked with various higher education institutions to which it regularly proposes subjects in the form of tutored projects (BTSA Nature Management at Sées, Master of Geography at Caen). It also welcomes groups of students from different schools every year in search of tangible study topics to illustrate their programme.

Several internship topics are also offered every year. In 2019, the Geopark hosted a trainee from the University of Rennes who accompanied us in the evaluation of the Geopark's geological and non-geological sites.

In 2017, an engineer carried out a study on the awareness, conservation and the development of the territory's screes. This work was the subject of a presentation at the 10th National Inventory of Geological Heritage Symposium at Chambéry 2018 and also at the European Geopark meeting held at Seville in 2019.

Conferences or seminars are occasionally organised to invite residents to discuss certain issues such as the history of our forests or lichens.

In 2019, a lecture was also proposed on biodiversity during geological time, by Patrick De Wever, Professor at the National Museum of Natural History.

In terms of geology, from the late 19th century to the end of the 20th century, the Geopark territory was featured in the studies by researchers at the universities of Caen, Le Mans and Rennes. Geoscience research is still in progress, but it is carried out by international teams. The Geopark team is charged with welcoming them during their field missions. Articles and theses have recently been published, some of which have been produced in partnership with the Geopark. In other areas, a substantial amount of research has been conducted in connection with the Park.

For example, the hydrological study on the Sarthe conducted with the University of Le Mans; a succession of vegetation studies with the University of Brest; and currently, the mapping of large plant formations by remote sensing carried out by the National Botanical Conservatory at Brest.

In order to strengthen its link with research, the Geopark has set up **a multidisciplinary scientific council,** where earth sciences have an important role. Its objective is to offer support in knowledge enhancement and on future considerations, in particular on climate change, the management of water resources and natural environments, natural risks and the development of sustainable tourism.

Two researchers leading a paleontology study on the flat stones of Bagnoles-de-l'Orne-Normandie

Geotechnical study on the screes

E.2 | OTHER HERITAGES

E.2.1 | Natural heritage

The Normandie-Maine Geopark is located in **an Atlantic biogeographic context.** However, distinctions can be felt, particularly because of its geological uniqueness. The altitude of the Armorican Massif on its western part, with the highest points in the west of France **(Signal d'Ecouves - 413m and Mont des Avaloirs - 416m)** has an influence on the climate. The relatively high rainfall, 900 to 1300mm/year and cool temperatures give it a **"submontane" character**.

This submontane character can be observed through the presence of some alpine or boreal-loving species. With regard to the flora, for example, the mountain fern, the Beech Polypode and the Horsetail; with regard to the wildlife - the Purple Meadow Bush-Cricket and the Snow Flea.

In contrast, the east part of Geopark, covered by the Paris basin, has a less humid climate (800 mm/year) and is slightly warmer.

Certain environments stand out because of their prevalence or their scarcity and are representative of the diversity found on the territory.

Autumnal forest

The stag, emblem of the Normandie-Maine Park © Eric Médard

Forests and hedgerow

The cool and humid climate combined with the acidic rocks in the Armorican bedrock is favourable to the development of large forest areas, which cover more than 20% of the territory. Among the most significant are the **forest of Ecouves [NG15], the forest of Andaines [NG16], the forest of Sillé [NG17] and the forest of Perseigne [NG18]**.

The beech-oak woods grow spontaneously and represent half of the colony while the other half is occupied by coniferous colonies planted by Man. Approximately half of the forest area in the Geopark territory is located in the public domain and is managed by the National Forest Office, the other half is managed by private owners.

These forests host a large variety of fauna, such as deer, wild boar and also the **stag which is the emblem of the Park.** For twenty years, we have observed the nesting of several pairs of black storks which find these forests to be a suitable habitat.

The hedgerow landscapes are characteristic of the Geopark where woods, meadows and crops are surrounded by hedges and form a kind of mosaic. The sparsely scattered hamlets are also a special feature of hedgerow landscapes. The natural tree alignments are refuges and ecological corridors for many species and thus play a fundamental role in biodiversity conservation. The traditional pollarding of the trees creates essential habitats for saproxylic invertebrates such as the Stag beetle, the Hermit beetle and the Greater Long Horn beetle.

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Pollarded trees

Hermit beetle
© Gabriel Soulard

Marsh Fritillary
© Gabriel Soulard

Wetlands and streams

The Armorican ridge line also establishes the dividing line between the Channel and the Atlantic. On either side of this ridge, more than **3,000 km of rivers and streams** have carved their pathway and flow into four sloping basins: Orne, Sarthe, Mayenne and Sélune. The Geopark appears like **a water tower for one section of west France**.

This strong, well-oxygenated, freshwater system is favourable for Brown Trout, Freshwater Sculpin, Brooke Lamprey and White-Clawed Crayfish. Rare and discreet, the "demanding" Freshwater Pearl Mussel is also a typical species of the Geopark. This freshwater mussel, which lives for nearly a century buried in sandy and gravelly substrates, is a formidable indicator of river quality.

For the past ten years, we have also seen the return of the European Otter, a species threatened with extinction at the end of the 20th century in France. It can now be seen in upstream areas of the main rivers.

The Geopark territory is also covered by nearly **15,000 hectares of wetlands** that are home to a remarkable biodiversity. To the east of the Geopark, the Sarthe forms a vast flood plain covered with recent deposits of alluvium. This results in a meadow wetland suitable for rare species such as the Lax-Flowered Orchid and Adder's-Tongue Spearwort. Many species of birds can also be seen there: Grey Heron, Cattle Egret, Eurasian Curlew, Little Egret and Great Egret.

Growth in insect populations such as the Marsh Fritillary, a butterfly that has become rare in Europe, is also in evidence on the Geopark's acidophilic wetland meadows.

Waterways © Francis Massias

Freshwater Pearl Mussel

Peat bogs

Much more widespread in northern Europe, peat bogs are mainly confined to France, in the mountain ranges and climatic conditions similar to boreal regions. On the Geopark, the high rainfall, cool temperatures and the presence of Armorican sandstone are suitable conditions for the development of peat bogs. These habitats are home to many heritage species: Round-Leaved Sundew, Hare's-Tail Cotton Grass, Bog Asphodel, Royal Fern ... the list is long.

[NG13 - Goult : Priory, chapel and peat bog]

The Moors

Established high up on acidic and poor soils, as a result of forest decline, these ericaceous vegetation formations (heathers) are part of the natural heritage areas of the Geopark, from a historical, landscape and ecological point of view. Many rare species thrive here. Previously stimulated by the deforestation and agricultural use, these moors have now been abandoned by agriculture because they are unproductive. Among the most typical moors of the Geopark is **the moor of the Mont Souprat [NG08]**, which has benefited from the European Commission conservation programme (LIFE) since September 2018.

Mont Souprat moor © Julien Crocis

Round-Leaved Sundew
© Céline Lecoq

Pasqueflower © Francis Massias

The limestone hills

Several thousand years ago, the erosion caused by the Rutin (a small winding stream in the Geopark) cut through the stone in the Paris Basin to the east of the Geopark. The resulting effect today is a small valley bordered by steep slopes that together, forms an exceptional natural setting.

Here, the short grasses grow side by side with herbaceous plants composed largely of perennials which are able to grow on the poor soil. Notably, one can see the Pasqueflower and several different orchids. **[NG07 - The valley of Rutin and the hill of Chaumiton]**

Awareness engenders conservation

The conservation of biological diversity and natural environments are major missions of the Regional Nature Parks. This commitment implies a good knowledge of the territory. This is why many inventories of fauna and flora have been conducted by the Park since its creation. This initial knowledge is essential in order to experiment with innovative management methods, as is the case with the LIFE Avaloirs programme.

This knowledge also makes it possible to be able to follow the evolution of the biodiversity on the territory, in particular by studying some indicator species and the quality of their environment. All the information collected by the Park is used to feed an observatory which is accessible online. This atlas contains over 160,000 observations providing information on the distribution of nearly 6,330 species, including 3,080 fauna, 1,950 flora and 1,300 mushrooms.

Little Owl © Cyrille Biegala

The screes

These can be seen on the steep slopes of the crest lines on the territory. Screes or periglacial scree slopes formed during consecutive cold episodes over several thousand years. They result from the fracturing of the rock under the repeated action of freezing and thawing. More common in the mountains, lowland screes are much rarer. They exist here and there in Europe on the last reliefs of the Variscan belt.

In the north and west of France, screes are mainly concentrated in the Geopark territory. Well-known areas of community interest, they are home to many heritage species such as Grey-Green Reindeer Lichen. The Geopark is conducting studies on mosses, lichens and rocky vegetation and soon one on interstitial fauna. Those of the Alpes Mancelles in Saint-Léonard-des-Bois are particularly characteristic of the area.

Souprat scree with Grey-Green Reindeer Lichen

Cavities and quarries

Former or active mining activity areas sometimes suitable places for species requiring special conditions. In the west, underground iron ore mining in the Bion and Barenton municipalities continued until the mid-20th century and in the east, limestone in Villaines-la-Carelle created caves that became hibernation sites of national and even international importance for many different species of bat. More recently, rock extraction sites with sheer vertical faces are home to the Peregrine Falcon. This species which is rather rare in the region and was in fact endangered up to the end of the 20th century, is able to find suitable nesting sites on the territory.

[NG11 - The old mines of Barenton and Bion]

[NG07 - The valley of Rutin and the hill of Chaumiton]

Greater Horsehoe Bat
© Céline Lecoq

Protection and development measures

These remarkable species and habitats benefit from various protection measures. Most of them have been identified in the inventory of the **165 Natural Areas of Ecological Interest of Fauna and Flora (ZNIEFF)** that exist on the Geopark territory.

Some sites on the territory benefit from national protection tools with **1 Organic Reserve in the process** of being created, **12 Biotope Protection Orders** and **22 classified sites and 24 registered sites** as per the law of 2 May 1930. Protections at the regional level have enabled the classification of **4 Regional Nature Reserves** on the Geopark territory. Other protection tools exist such as **Sensitive Natural Areas (23 in the territory),** a county-wide system that enables acquisition by the Department (Land Registry) or a management agreement with the owners. Means of restoration and conservation are dedicated to these sites and take into account the potential visiting public.

This is the case for many additional sites such as **the Corniche de Pail [NG10] or Goult: Prieuré, Chapelle and tourbière [NG13]**.

The Geopark also lists **17 internationally recognised sites under the Natura 2000** European network. Twelve of them are run by the Park as is the case for the moor of Mont Souprat **[NG08]**.

Some sites are set up to welcome the general public and act as information points, whether in autonomy or as part of guided tours.

The Corniche de Pail

Limestone hills in la Vallee du Rutin

LIST OF ADDITIONAL SITES - NON GEOLOGICAL

CODE	SITE NAME	INTERESTS	DESCRIPTION LINK TO GEOLOGY	INFORMATION	PUBLIC FOCUS	MEDIATION
NG**01**	**Park and Geopark Visitor's Centre** at Carrouges	**A - B C - D**	Recognised information point in the Geopark (museographic space, information point, shop, …)		TP E	
NG**02**	**Ceramic Museum, Creation Centre*** at Ger	**A - B - C**	This museum presents the potter and the history of pottery in the area, the sandstone clay and the wood for the kilns	€	TP E	
NG**03**	**Iron Discovery Centre *** at Dompierre, La Ferrière-aux-Étangs	**A - B - C**	Presentation of the history of mining in the region, from the Middle Ages through to the 20th Century.	€	TP E	
NG**04**	**Prehistory Museum** at Rânes	**A - B**	This unique museum in Normandy, presents the traces left by Neanderthal Man in the Geopark.	€	TP E	
NG**05**	**Poiré Museum** at Barenton	**A - B C - D**	This acclaimed "Musée de France" is a window on typical production: Domfront Poiré and a recognised tourist information point on the Geopark.		TP E S	
NG**06**	**Evolution of Life Trail** at Ravigny	**D**	This trail was created in 2012 by students from Ravigny school and unveils the evolution of life along its 3.5km trail.	**L**	TP E	
NG**07**	**The valley of Rutin and the hill of Chaumiton *** at Villaines-la-Carelle	**D**	These limestone hillsides are typical of the east of the Geopark and are home to specific flora and fauna.	**L**	TP E S	
NG**08**	**The moor of the Mont-Souprat** at Pré-en-Pail-Saint-Samson	**D**	These remarkable moorlands situated on the heights of the Geopark benefit from a European conservation programme.	×	E S	
NG**09**	**The Belvédère-des-Avaloirs** at Pré-en-Pail-Saint-Samson	**D**	The highest point in the Amorican massif and west France offers a panoramic view across the Geopark landscape.	**L**	TP	
NG**10**	**The Corniche-de-Pail** at Pré-en-Pail-Saint-Samson, Saint-Cyr-en-Pail	**D**	This sandstone belt is home to the major habitats in the Geopark, such as the dry moorlands and the forests.	**L**	TP E S	

CODE	SITE NAME	INTERESTS	DESCRIPTION LINK TO GEOLOGY	INFORMATION	PUBLIC FOCUS	MEDIATION
NG**11**	**The old mines of Barenton and Bion** at Barenton, Bion	**D**	These old quarries provide accommodation for large populations of bat and are of international interest.	×	S	
NG**12**	**The themed trail *Saint Céneri-sur-le-motif* ✱** at Saint-Céneri-le-Gérei	**B - D**	A discovery trail of the landscape around the river Sarthe and its deep-valley meanderings, through the medium of paintings, notably impressionist art.	**L**	TP E	
NG**13**	**Goult : priory, chapel, peat bog ✱** at La Lande-de-Goult	**B - D**	The hamlet bears witness to a rich, natural heritage, both historic and religious linked to the rocky outcrop which borders it.	**L**	TP E S	
NG**14**	**The themed trail "*Entre Abbaye et lande*" ✱** at Lonlay-l'Abbaye	**B - D**	Lonlay-l'Abbaye reveals natural and historic heritage links to the abbey and remarkable moorlands.	**L**	TP E S	
NG**15**	**The Ecouves Forest ✱**	**B - D**	This forest, 8,000 hectares of which are state-owned, is home to numerous National Inventory geological sites and the highest point in Normandy – Le Signal d'Ecouves.	**L**	TP S	
NG**16**	**The Andaines Forest ✱**	**B - D**	5,400 hectares of this forest are state-owned, it extends from east to west along the sandstone belt and bears many scars from the second world war.	**L**	TP S	
NG**17**	**The Sillé Forest**	**B - D**	This forest, to the south, 3,500 hectares of which are state-owned, is a tourist attraction for the Geopark and bears witness to the resurgence of the Amorican massif.	**L**	TP S	
NG**18**	**The Perseigne forest and it's belvedere ✱**	**B - D**	To the east, this forest, of which 5,000 hectares are state-owned, appears like a little Amorican island in the heart of the Paris Basin and is home to the highest point in Sarthe.	**L**	TP E S	
NG**19**	**The Forges of Varenne** at Champsecret	**C**	This site marks an important point in forge history dating back to the Middle Ages.	**L**	TP S	
NG**20**	**Little chapel, Collegiate and the Abbey of Mortain ✱** at Mortain-Bocage	**B**	Mortain is an ancient fortified Norman town with a panorama opening out on to the bay of Mont-Saint-Michel.	**L**	TP	
NG**21**	**The historic town and the donjon of Domfront ✱** at Domfront-en-Poiraie	**B**	The history and heritage of this medieval city are intimately linked to its transverse valley.	**L**	TP E	
NG**22**	**Lassay Castle and the themed trail "*Lancelot au Pays de Lassay*"** at Lassay-les-châteaux	**B**	This trail presents an exceptional construction heritage including the castle of Lassay. The surrounding area was a land of inspiration for the Lancelot legend.	**L**	TP E	
NG**23**	**The themed trail "*Tour et Détour à Bonvouloir*"** at Juvigny-Val-d'Andaine	**B**	This site presents a construction heritage which feeds the numerous legends and a strong natural and cultural heritage.	**L**	TP	
NG**24**	**The historic town of Sées ✱** at Sées	**B**	This episcopal city bears witness to an exceptional religious heritage, constructed principally in limestone.	**L**	TP E	
NG**25**	**The Chateau of Carrouges** at Carrouges	**B**	This 14th Century château, managed by the National Monuments Centre, is a major historical heritage, notably for its construction in brick, unusual for the region.	€	TP E	
NG**26**	**The Castle of Sillé** at Sillé-le-Guillaume	**B**	This medieval castle was a strategic stronghold in Haut-Maine, testament to William the Conqueror's rivalry with people of Le Mans.	€	TP	

LEGEND

INTERESTS |

A = Interpretation Centre
B = Historical and Cultural
C = Artisanal and Industrial
D = Natural and Landscape

✱ = Directly linked to a Geopark geological site.

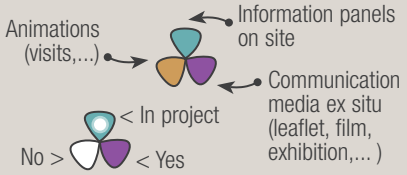
PUBLIC FOCUS |

TP = All public
E = Educational
S = Scientific

USEFUL INFORMATION |

L = Free
= According to opening hours
€ = Paying
× = Prohibited / Authorised access only

MEDIATION |



= Trail from the "Monts et Marches" network (mountains and historic borders)

E.2.2 | Cultural heritage

Early human settlement

Although little is known, the first traces of human settlement date back to the Paleolithic on sites at Rânes and Saint-Brice-sous-Rânes.

Archaeological excavations have revealed a rich deposit of lithic tools revealing **a human Neanderthal (Homo neanderthalensis) settlement** between 100,000 and 50,000 years ago. The scale of the site (several tens of hectares) has been of significant interest to archaeologists who consider it a workshop. It is testament to the transition from the Middle Paleolithic to the Upper Paleolithic. This heritage is now highlighted in **the Prehistory Museum of Rânes [NG04]**, which was inaugurated in 2015.

Some megaliths also attest to Neolithic occupation. **[G30 – The dolerite dyke of the devil's table]**. Also, a Neolithic whetstone, three dolmens, four menhirs and two covered walkways, rich in legends have been similarly identified and sometimes classified as Historical Monuments. Probably associated with religion, these sites have a symbolic or even spiritual undertone.

Around the fifth century BC, the Geopark territory was a "crossing point" between different Celtic or Gallic peoples coming from Central Europe:
- The Abrincates to the west,
- The Aulerques Diablintes and Cenomani in the south,
- The Viducasses to the north,
- The Sagians to the east, originally from the city of Sees.

Of the old fortified cities (Oppida), the only remaining discernable footprint is at La Lande-de-Goult **[NG13]** and is classified as a Historic Monument. The absence of official maps at this time makes the outline of the land rather imprecise but some places have been identified as historic thoroughfares (Sillé-le-Guillaume, Lignières-Orgères, Saint-Mars-d'Egrenne, Saint-Bômer-the Forges, Saint-Céneri-the-Gérei, Lonlay-l'Abbaye).

The Romanisation of this region began in 56 BC and left few visible vestiges on the territory.

Devil's Table at Passais-Villages

Prehistory Museum at Rânes

The medieval period, however, left us a rich legacy.

Many **motte and bailey castles** bear witness to military activity at the turn of the 10th and 11th centuries. Their presence indicates vague or at least movement in the land boundaries of the duchies at the time. The construction of these mottes by local lords indicates that the ducal power was poorly established in this region. Built in wood and earth, they provided a primitive defence function. Although archaeological and historical sources make it possible to identify them, their visibility is not always easy for the general public since there is often only the mound of earth raised ex-nihilo; the old wooden constructions (tower/dungeon, palisades) having disappeared.

Several motte and bailey castles are found on the territory. One of them is mentioned in the historical trail around Sées **[NG24]**.

From this same period, the Geopark has also inherited a monumental legacy **of castles and strongholds** that crisscross the territory. Dating from the 11th and 12th centuries they were built on rocky outcrops, for example, the Donjon de Domfront **[NG21]**, the Castle of Mortain (destroyed), the Castle of Saint-Céneri-le-Gérei (destroyed), the Castle of Lassay-les-Châteaux **[NG22]**, the Castle of Ambrières-les-Vallées, the Castle of Sillé-le-Guillaume **[NG26]**. They bear testament to the rivalries and/or alliances between powerful families (the Bellême, the Giroie, the Sillé), the Duchy of Normandy and Maine County. Each evolved over time and according to the period.

The fiefdom of Bellême, established in 960, spread progressively over a territory which compares quite accurately with the current northern part of the Geopark, keeping the border with Maine to the south. The domain was then conquered in 1051 by the powerful Duchy of Normandy, established in 911 by a Viking chief: Rollon.

Following this, there were the numerous battles led by his famous descendant, William the Conqueror, future King of England, who built the many strongholds protecting the border with Maine. Vestiges are all that remain of some (retaining walls, fortifications, part of the dungeon at Domfront-en-Poiraie), while others are well preserved and valued by their owner, be they private or public.

The religious heritage is the other strong attestor of the medieval period. Towards the 5th century there was a vast movement of Christianisation, abbeys were established during the Middle Ages either in existing cities (Mortain-Bocage, Sees), or in isolated areas by the forest as with Perseigne abbey or the priory at La Lande-de-Goult linked with Lonlay Abbey. These imposing edifices are either complete or are significant vestiges. The "frontier forest", which connected Chartres to Rennes, stood firm against being cleared for a longer time. It encouraged the settlement of hermits who had an evangelical mission in the "deserts" (as in the toponymy of places such as like Magny-le-Désert, Saint-Patrice-du-Désert). Their presence left a rich little heritage of religious retreats or chapels. The abbatial of Saint Evroult at Mortain-Bocage **[NG20]**, and The church of Notre-Dame-sur-l'eau at Domfront-en-Poiraie **[NG21]** are considered as jewels of Romanesque art.

The dioceses remain well defined today - the west of Avranches, the centre and south of Le Mans and the north-east of Sees. A Gothic cathedral is located in the centre of Sées **[NG24]**, where it stands alongside many other churches. On the whole territory, the current toponymy attests to its religious importance with around forty names of communes relating to a saint.

The indigenous heritage, consisting of wayside crosses, wash-houses, chapels and bread ovens is abundant and also contributes to the quality of the Geopark landscape. Many granite or red sandstone crosses are visible on the paths. They were both places of reverence and landmarks in the travelling landscape. Numerous dry-stone walls are also present.

Sillé Castle © Jérome Houyvet

Lassay Castle © Jérome Houyvet

The Mont-Saint-Michel Routes are historical routes taken by pilgrims from the "Ancien Régime" of the Middle Ages. The path from Paris crosses the Geopark territory from east to west. They are developed and maintained by an association which promotes them, studies them with a historic committee and identifies nearby heritage. The historical route is studied as part of the Inventaire du Patrimoine Jacquaire led by the Ministry of Culture. Today, beyond the religious or spiritual aspect, these routes are used by hikers or travellers in search of personal challenge or sustainable tourism.

Construction heritage is undeniably one of the jewels of Geopark's territory because of its diversity, quality and consistency.

The use of local resources (Armorican sandstone and cob in the west, limestone in the east but also granite, shale, russet sandstone ...) offers a wide range of construction styles. Many castles and manor houses, without a defensive vocation, were built up until the 19th century as can be seen at the Chateaux of Rânes, Sassy, Lonrai and also **the Bonvouloir Tower [NG23]**, ... Some of these sites are open to visitors.

There is also the use of local materials and different construction techniques in agricultural, civil and urban architectures. These constructions are less impressive but they are present throughout the territory giving it a rich construction heritage.

However, it is weakened by the desertification of the countryside and the attraction of new constructions.

Rock is ubiquitous in old buildings. To the west, the Armorican sandstone and even dolerites served as the foundations upon which wattle and daub constructions were built. In this area, the wood frame remains visible. The stone was reserved for the technical or ostentatious parts of the building.

In the central area of the Geopark, granite and shale are dominant. Brick is frequently used to emphasise openings or for chimneys. Its colour is an element of the architectural vocabulary of commercial buildings, as well as for the cafés, restaurants, hotels or bourgeois houses.

To the east, limestone with its lighter hues is more dominant.

In the Alpes Mancelles area, render is common on the facades. A local regulation (AVAP) contributes to the preservation of this heritage. Many other elements such as rooves (slates or flat tiles), openings, skylights or decorative elements all contribute to the uniqueness of the construction heritage on the Geopark.

The territory also presents a much newer construction in the *Belle-Epoque* style at Bagnoles-de-l'Orne-Normandie. This spa, one of the few in north west France, emerges like an island in the middle of the Andaines forest, a kind of architectural parenthesis. Its construction was developed towards the end of the 19th beginning of the 20th century around the thermal activity and was heavily influenced by the wealthy bourgeoisie who were building richly decorated and imposing villas around the same time.

At the end of the second world war, cities on the territory had been affected by the bombings. Beginning in 1954, a vast reconstruction programme made it possible to provide housing and businesses on the damaged streets. The standardised architecture uses local resources, giving unity to these new buildings.

The Chateau of Carrouges © Jérome Houyvet

Carrouges is one of the many frontier posts of the Duchy of Normandy, built between the 14th and 17th centuries. Built on granite foundations, the castle **[NG25]** is impressive with its shimmering brickwork that was made on site. Classified as a historic monument in 1927, it is now the property of the National Monuments Centre.

The Geopark is also rich in pre-industrial and artisanal heritage.

An entire economic activity developed on the margins of the forests. Forges, glassworks, mills, weavers or lace-makers and pottery workshops are closely linked to local resources such as water and wood.

In the north-west of the territory, a large pre-industrial activity involved the extraction and processing of iron ore in forges and furnaces. **The Forges of Varenne [NG19]** at Champsecret, operational from the end of the 16th century to 1866, are one of the most complete and best preserved sites. The forges of the Champ-de-la-Pierre are also remarkable but they are not accessible to the public. This metallurgical activity is the subject of mediation with **the Iron Discovery Centre [NG03]** in Dompierre and the themed trail is supported by a dedicated leaflet. The museum and its supporting media explain the link with the territory's resources, the ore coming from the outskirts of Dompierre and La Ferrière-aux-Etangs and the coal from the Ecouves forest.

Glassworks were also in operation, mainly near the Ecouves forest. Six have been identified, including Gast, the largest (with up to 260 workers) and the best preserved. Linen and Hemp weaving activities were present near the water courses of La Ferte-Macé, Fresnay-sur-Sarthe and Ambrières-les-Vallées where buildings that housed the workers are still visible. This activity employed a large number of workers.

Pottery activity is more associated with the west of the Geopark and is now showcased by **the Ceramic Museum, creation centre [NG02]** in Ger. The poor lands of the highlands of Lande-Pourrie encouraged a development of a complementary activity to agriculture. By the mid-nineteenth century, 700 workers were employed in 21 potters' workshops. The particularity of Ger's pottery is its waterproofness, as a result of the high-temperature baking of "sandstone" clay (with its capacity to transform itself into stoneware) extracted from the Egrenne valley at La Haute-Chapelle.

Calcination kiln for iron ore on the Butte Rouge

Kiln of La Haie © Jérome Houyvet

E.2.3 | Intangible heritage

Numerous skills, traditional customs and artistic practices have contributed to shaping the identity of this territory. Many of them still exist or are highlighted through different initiatives.

The cider-making industry and the fruit heritage. The territory is rich in an impressive diversity of local varieties of apples and pears, for juice or for eating. From the creation of the Normandie-Maine Park in 1975, an awareness has been developed around the fragility of this fruit heritage which was threatened by the partial abandonment of the cider processing and the evolution of agricultural machinery and the expansion of farms.

A fruit inventory was conducted in order to name and describe the varieties and conservatory orchards were planted in partnership with the National Museum of Natural History including the Poiré Museum and the Park and Geopark Visitor's Centre. These orchards are now used to preserve traditional varieties, to distribute grafts to ensure their preservation and to put in place various activities for the general public in partnership with the many existing pomological associations.

Conscious of the need to find an economic outlet to preserve this fruit heritage, the Park has been closely involved with local farmers engaged in cider and perry making.

The expertise has gradually evolved to adapt to contemporary techniques and today *Appellations d'Origine Protégées* (AOP) and *Appellations d'Origine Contrôlée* (AOC) recognise the value of these products and their processing techniques.

In addition to cider processing, fruits also have a strong link to gastronomy. An ethnobotanical study showed that different varieties were chosen for particular uses (juice, perry, alcohol, cooking, jam, table fruit ...).

The Park has recently planted an orchard of table or dessert apple and pear trees whose fruits are available for culinary experiments in restaurants on the territory.

Pear – variety : Plant de Blanc © Gérard Houdou

Pear pressing © Gérard Houdou

The Craftmanship of needle lace-making at Alençon has been registered on the UNESCO Representative List of Intangible Cultural Heritage of Humanity since 2010. A national workshop was created in 1976 to perpetuate the special needle technique used in making this exceptional lace.

Today, about ten lace-makers, employed by the State, continue this traditional technique whilst in contrast to the 17th and 18th centuries, thousands of lace-makers were spread around the outskirts of Alençon, notably on the Geopark territory (Saint-Denis-sur-Sarthon, La Roche-Mabile, Carrouges ...).

Many steps are needed to make a piece of lace and portions of work were passed from village to village between the specialised lace-makers. The assembly was done by the lace-makers of Alençon. The workshop now trains new lace-makers, passes on the knowledge and creates contemporary pieces for the big designers.

Mediation with the public is provided through the Museum of Fine Arts and Lace at Alençon which exhibits many pieces. This important tradition is showcased in the Park and Geopark Visitor's Centre's museographic space, in partnership with the Museum.

Bracelet exhibited at the Museum of Fine Arts and Lace at Alençon © Office du tourisme d'Alençon

Geopark's landscapes, sources of inspiration.

If many painters, whether from the territory or not, were inspired by the Geopark's landscapes (Camille Pissaro and Ludovic Piette in Lassay-les-Châteaux, Théodore Géricault and Gustave Courbet in Mortain-Bocage, John Steel Cotman in Domfront-en Poiraie, Charles Léandre ...) the emulation encountered at Saint-Céneri-le-Gérei is the most remarkable. **[Themed trail at Saint-Céneri-sur-le- motif – NG12]**

The picturesque landscapes of the Alpes Mancelles have seduced and continue to seduce painters, photographers, poets and writers. The rocky escarpments, the mineral character, the chaotic impression of the scree, the construction heritage, the water and the verdant nature are subjects of representation or inspiration. Nicknamed "Le Barbizon normand", Saint-Céneri-le-Gérei was a meeting place in the 19th century and a resort for artists such as Jean-Baptiste Camille Corot who came to paint "on the ground", i.e. on site.

Today, these sessions are perpetuated through an annual event and the auberge that welcomed the artists has been renovated and landscaped by the Park. It houses "*La Salle des Decapités*" (fresco profile portraits of artists and regulars of the auberge), a listed historical monument. The auberge, honoured with an interpretation trail, is managed by the Tourist Office at Alençon, which also organises visits

Map offered to visitors after completing the trail "*La légende Arthurienne*" © Arianne Delrieux

The tormented landscapes of Normandie-Maine, lands of legends.

These legends are very often linked to reliefs, stones or megaliths, fountains or water points or to individual buildings. For example, the waterfalls at Mortain are associated with the Goblin legend, the Argouges Fairy at Ranes, the miraculous waters at Bagnoles-de-l'Orne-Normandie or the legend of Hugues de Tessé, ... Toponymy attests to these story-telling traditions with the Saut du Cerf at Sillé-le-Guillaume, the Valley of Hell at Perseigne and the many devil stones, devil rocks or devil's tables ...

Many beliefs and cults are also dedicated to Christian saints and hermits like Saint Ceneri, Saint Leonard, Saint Ernier and Saint Fraimbault. Rituals around wayside crosses or religious retreats continue today.

The most significant legends on the territory are those relating to the Arthurian legend. The legendary character of **King Arthur** is known far beyond the Geopark territory, especially in the areas that consider themselves Celtic like Brittany and the British Isles. The site of the Fosse Arthour [G19], with the King's Chamber and the Queen's Chamber, was the scene of the death of both spouses. **Lancelot du Lac**, faithful companion of the Round Table, would himself be linked to many sites such as Lassay-les-Châteaux, the appearance of Notre-Dame sur l'Eau at Domfront-en-Poiraie, the Ford at Loré, ... which suggests that the legendary cartography (Kingdom of Gorre, Broceliande forest), could have its epicentre around Domfront-en-Poiraie and Lassay-les-Châteaux.

The Bonvouloir Tower ©PNRNM

E.2.4 | Involvement in topics linked to climate change and natural hazards

The Geopark territory has experienced a temperature increase of 1.2°C since 1860 and the forecasts for 2100 give an increase of 1.7 to 4.7°C according to the forecasts (source: Carbon brief/ weather station Juvigny-sous-Andaine).

The periods of summer drought are already stronger and longer, resulting in an increase in low water levels on small rivers, the drying up of wetlands and ultimately an impact on human activities, foremost amongst these are agriculture and forestry.

Rural populations are also more precarious than urban populations because of their reliance on car travel and fossil fuel heating in homes that are often poorly insulated.

The Geopark is affected by various natural risks but they remain low (floods, shrinkage-swelling of clays and other ground movements, forest fires, level 2 Seismic risk, storms, snow and freezing rain).

Since 2008, the Regional Nature Park has been involved in the fight against climate change and the adaptation of its territory through various actions in partnership with the National Agency for Energy and the Environment.

Forest and hedgerow © Francis Massias

The Tree: the other inhabitant of the territory

Another great feature of this territory is the strong presence of the tree: represented primarily by its forests which cover 46,700 ha or 20% of the territory, then by the wooded countryside with 17,000 km of hedgerows in 2010 - even though it is experiencing a regression due to the intensification of agricultural practices.

These types of spaces are found elsewhere in Europe but their uniqueness here lies in the presence of old hollow trees, pleached hedges (previously carried out to form natural barriers to livestock), and especially wooded countryside. The many services provided by hedgerows contribute to the conservation of resources and constitute an important habitat for biodiversity. With the emergence of wood recycling industries, hedgerows have again become a profitable production. In addition to their role as carbon storage, trees allow a greater adaptation of the territory to periods of drought and extreme weather events.

The Park proposes many actions for its preservation: replanting grants, protection measures, awareness by local stakeholders, educational events, support for the development of the wood energy sector ...

• Forests in mutation

Climate change affects species associated with mild and humid climates such as the beech, which is symbolic of the Park's forests. High areas could become sanctuaries for the most Atlantic of species. Conversely, the plains areas, further east of the territory are natural corridors for the recovery of species of southern origin, already visible in wildlife. The sandstone belt would therefore be a heat retardant, given its cooler microclimate.

Evolutionary trends encourage foresters to use new varieties in forest replanting, such as sessile oak, whose range is likely to expand northward. Since 2008, the Park has implemented a territorial forest charter, encouraging foresters to mix species and maintain a certain diversity, especially with the characteristic hardwood species from the territory. The forests represent an important wood resource, more so than the hedgerows, estimated at 180,000m^3/year (timber, industry and energy), which, if properly managed, can sustainably contribute to self-sufficiency in energy and in materials from the territory.

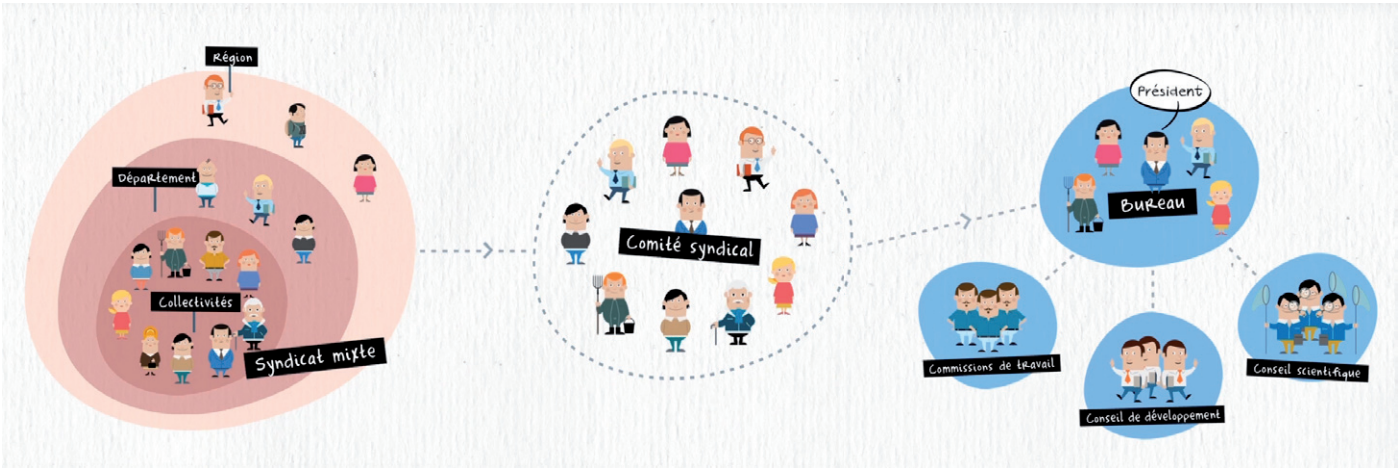
Today, 66% of the Geopark's forests are PEFC certified compared to 33% in France. This certification ensures that the timber sold comes from a sustainably managed forest.

• An experimental programme on the adaptation of farms

Agriculture is the region's largest producer of greenhouse gases. It is also the first activity affected by global warming. For 7 years and in partnership with the 4 chambers of agriculture, the Park worked on a project aimed at adapting farms to these issues, with a pilot group of farmers who experimented with new technologies and agricultural practices. This programme closed in 2018. A video about the experiment is available on line.

E.3 | GEOPARK MANAGEMENT STRUCTURE

The governance of the Normandie-Maine Geopark is ensured by the joint management syndicate of the Normandie-Maine Regional Nature Park. The latter is made up of all the local authorities of which it comprises, i.e. 2 Regions, 4 Departments, 149 municipalities. Its operation is organised around a main body, called a "comité syndical", which brings together 50 elected members. They elect a president and 5 vice-presidents from the members. The mixed syndicate operates in a spirit of strong consultation with local partners through the organisation of commissions and working groups.



Representation of the Park management organisation, taken from the film « What is a Regional Nature Park ? »
© Fédération des Parcs

The Geopark, a dynamic driven by an ambitious territorial project: The Park Charter.

The Charter of a Regional Nature Park is the 15-year contract that realises the conservation and sustainable development project formulated for the territory. It is approved by all the municipalities constituting the territory as well as by the Regions and Departments concerned.

This Charter sets the objectives to be achieved, the protection measures and development guidelines of the territory. It ensures coherence and co-ordination of the actions carried out by the various public authorities. The Normandie-Maine Park certification label was renewed in May 2008, with a new Charter that laid the foundations for our commitment to preserving and enhancing the geological heritage of the territory.

Convince rather than compel

The capacity of a Regional Nature Park to protect its heritage and support sustainable development lies mainly in its ability to convince through consultation. This is why the Park's action is highly dependent on information, animation and awareness of the riches in its territory, the people living, working, settling or passing through.

Geology training for the Park team and elected officials

Geopark Steering Committee

The human and financial resources of the Geopark are those of Normandie-Maine Park.

The Geopark is led by a committee made up of 9 members (7 elected and 2 members of the team). It is chaired by Laurent Marting, First Vice President of the Park with responsibility for the Geopark.

From a budgetary point of view, the Park, like all French communities, has a budget comprising operating and investment expenses. The Park has very little of its own, direct revenue.

This revenue comes either from statutory participations of the members or funding related to the actions carried out (eg Europe, Water Agency, ADEME, ...). These contributions are governed by framework agreements and annual or multi-annual variations.

Activities in the service of the Geopark are therefore included in the mixed syndicate general budget. However, an analytical cost accounting system makes it possible to specifically track expenses. In 2018, €31,500 was allocated to Geopark actions and €73,000 in 2019

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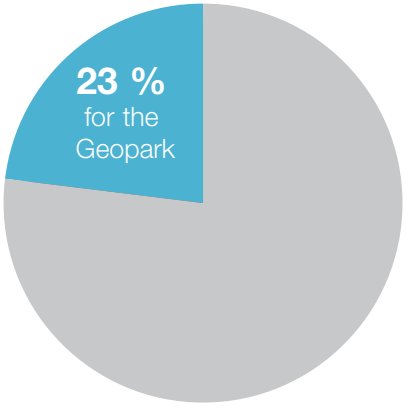
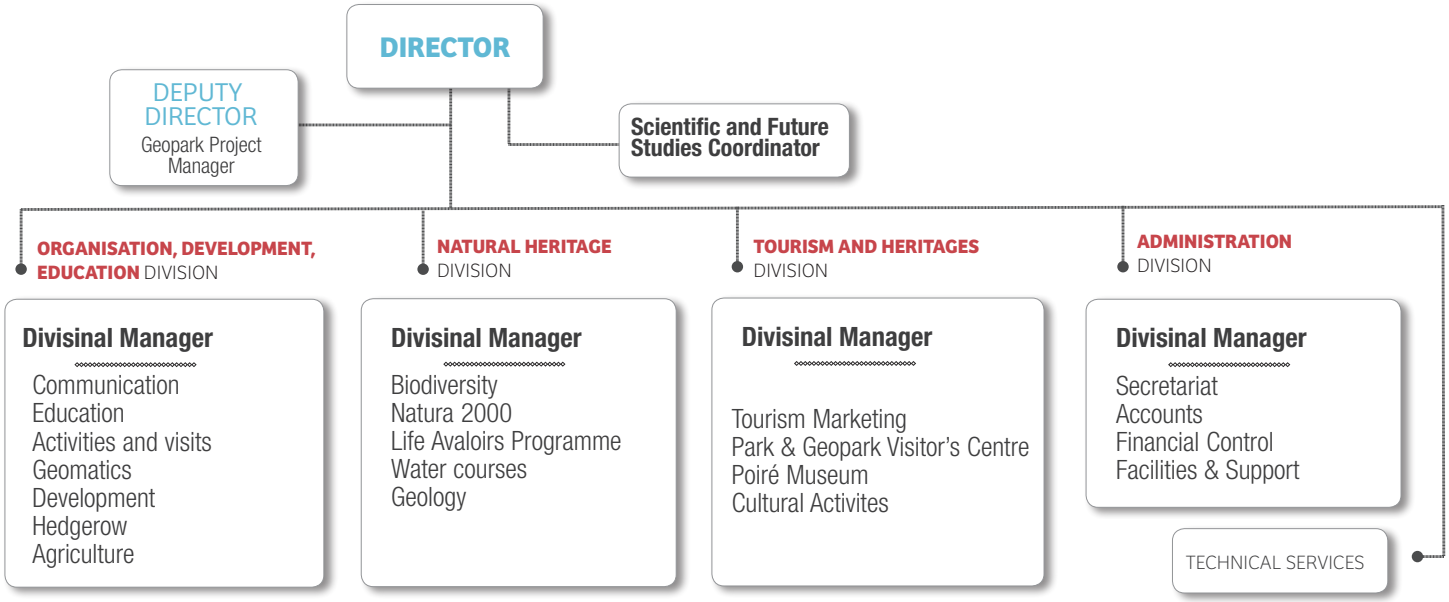


Normandie-Maine Park action plan 2019
(without staff costs)

Simplified organisation chart of the Park team



The Park team has about forty staff in four divisions. It is currently composed of **64% women** and 36% men.

The whole Park team can be mobilised, each bringing their own competence to the Geopark. Twenty people have already been brought in on different actions such as the tourist development scheme, the construction of the new educational programme or the creation of the application dossier for the UNESCO Global Geopark label.

Table (non-exhaustive) showing employees at the Park work on the Geopark

N°	Name	contrat	Job title	Key skill	%	G
1	Mélanie Massias	Permanent	Park Deputy Director. Geopark Project Manager	Management	100%	F
2	Isabelle Aubron	Permanent	Geological Heritage Curator	Geology	80%	F
3	Michel Ameline	Permanent	Scientific & Future Studies Coordinator	Science	100%	M
4	Laëtitia Marie	Permanent	Education Coordinator	Education	100%	F
5	Morvan Debroize	Permanent	Environmental Park an Geopark visits guide	Activities & Visits	100%	M
6	Yolande d'Olier	Permanent	Culture & Activities Coordinator – Park & Geopark Visitor's Centre	Culture	100%	F
7	Marie-Dominique Rousseau	Permanent	Tourism Marketing Coordinator	Tourisme	100%	F

A supportive scientific council.

To help the team and elected officials in the programming of innovative and forward-looking actions, particularly on the theme of climate change and its consequences on the territory, a multidisciplinary scientific council (geosciences, biology/ecology, human and economic sciences) has been formed.

It brings together about twenty researchers from organisations such as the National Centre for Scientific Research, the National Institute for Agronomic Research, Universities or private structures.

Its **President, Jacques AVOINE**, Professor of Geology at the University of Caen, was elected on 18 September 2019.

Other members of the Geopark Scientific Council are:

- **Nathalie AUBOURG**, University of Le Havre *(Management Sciences/ Cooperation)*
- **Michel BALLEVRE**, University of Rennes 1 *(Geology)*
- **Delphine BARBIER-PAIN**, INRAP Grand-Ouest-Cesson-Sevigné *(Paleoenvironnment - Archeobotany)*
- **Jacques BAUDRY**, INRA, Director of the SAD Armorique Unit *(Agronomy, Landscape Ecology)*
- **Olivier CANTAT,** University of Caen / Géophen *(Geography, Climatology)*
- **Saskia COUSIN**, Anthropology Laboratory of Institutions and Social Organisation, Paris Descartes *(Human sciences, Sustainable tourism)*
- **Daniel DELAHAYE**, University of Caen / Géophen *(Physical Geography)*
- **Isabelle DELANOY**, DoGreen and Symbiotic Workshop Paris *(Agronomy, Circular Economy)*
- **Yves GIRAUD**, National Museum of Natural History of Paris *(Education Sciences)*
- **Guy LEMPERIERE**, Research Director at IRD *(Biology, Landscape Ecology)*
- **Guy MARIE**, University of Le Mans *(Geology)*
- **David MONTENBAULT**, Angers School of Landscape *(Agro-Geography)*
- **Claire PORTAL**, University of Poitiers *(Geography)*
- **Anne-Julia ROLET**, University of Rennes 2 *(Geography, Fluvial Hydrology)*
- **Pierre SCHMIT**, Director of the Heritage Factory - Caen *(Ethnology)*

Geopark Scientific Council Meeting - 18 septembre 2019

Jacques Avoine, President of the scientific council

E.4 | OVERLAPPING

The Geopark does not have a direct overlap with another UNESCO designation.

That said however, the classified perimeter of **Mont-St-Michel and its bay** has recently been expanded in 2018 to integrate its entire vista of the surrounding area. Of particular pertinence for the Geopark is the view from Mortain-Bocage, located in the extreme west of the territory. Our territory is in regular contact with the Mont-Saint-Michel bay, particularly in terms of tourism promotion.

A meeting to present our project for the UNESCO Global Geopark label was held in June 2019 with the Administrator of Mont-Saint-Michel.

To the east, also worthy of note is the **Craftmanship of needle lace-making at Alençon** – a UNESCO designation. As previously mentioned, the Park and Geopark Visitor's Centre promotes this world heritage.

The Geopark territory also overlaps with several national classifications with regard to the quality of its natural, cultural and intangible heritage. Numerous conventions and works in partnership clarify the complementary nature of the Geopark's actions with these other stakeholders for which the Park is not directly responsible.

Vista from Mont-Saint-Michel from the little chapel at Mortain-Bocage © France Massias

E.5 | EDUCATIONAL ACTIVITIES

The general presentation of the information, education and research tools deployed by the Geopark (E.1.5) shows the importance of the implementation of educational actions within the Geopark. Here are some examples of actions integrating initiatives in terms of awareness of residents, school projects or involvement of local stakeholders.

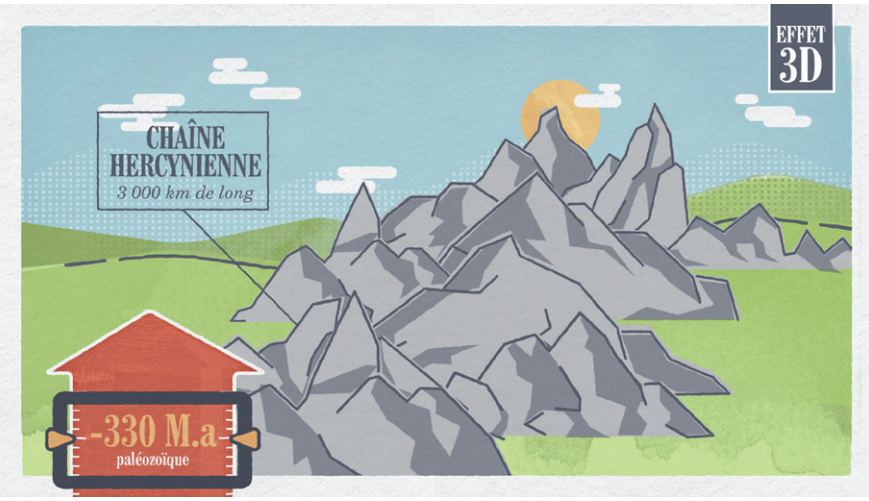


Image of the geological film © White Rabbit Production

An animated film tracing the geological history of the territory.

In order to make the long and complex geological history that foreshadows the formation of our current landscapes more accessible, the Geopark has made a short film. This animation, produced in a non-jargon way, illustrates the 600-million-year history of the territory, is accessible on the Geopark YouTube channel and is also broadcast at the Park and Geopark Visitor's Centre. It also serves as educational support for teachers and discussions are on-going with potential partners to broadcast the film in some cinemas on the territory.

Generation Climate: children's eyes on our 2058 landscapes

In 2018, the Park carried out a project with two local associations on the territory about the impact of climate change on our environment. Entitled "Generation Climate", it has been proposed to four classes on the territory. The goal was to help students discover the energy and climate issues of today and tomorrow. Each class benefited from five sessions on the causes, consequences and potential solutions to change, allowing students to imagine landscapes and life in their respective communities in 2058.

Geopark Discovery Days at the Roc au Chien geological site

A detective novel written by students about the geological heritage of the reserve

On the 10th anniversary of the Normandie-Maine Geological Regional Nature Reserve, the Geopark wanted to reinforce the educational value of the Carrière des Vaux site. A project was conceived and proposed in 2019 to two classes of CM1-CM2 (Years 5 and 6 in UK primary schools) in the neighbouring municipalities. The teachers are motivated and committed to the project, which began in September 2019/2020. Accompanied by a writer, students will write their own story, recounting their investigation that will take them back to 440 million years ago on the trail of the Conodonts. A scientific presentation of the site will be made beforehand by the Geopark's geologist, giving the students the material for writing the novel.

Awareness and education of local stakeholders

Through its very make-up the Geopark weaves many links with local stakeholders through the numerous missions it carries out, thus allowing them to acquire a new understanding and skills. Enabling the training of forest professionals, farmers, tourism providers, animators or members of associations for the protection or enhancement of heritage is a key element for the Geopark's outreach especially for stakeholders in direct contact with the public - locals or tourists.

This training programme, which is currently being structured, is linked to the emergence of the network of ambassadors which itself is currently being discussed. As part of this dynamic, four "awareness and exchange" days took place in May 2019. They made it possible to promulgate the UNESCO Global Geopark label and the Normandie-Maine Geopark.

The Park and Geopark Visitor's Centre, an educational support

Through educational booklets, primary and secondary school classes are invited to use the museum space at the Park and Geopark Visitor's Centre freely. Designed as small questionnaires inviting the reader to seek, to touch and to investigate, these booklets are downloadable from the Geopark website. A section devoted to geological heritage is completed by an educational kit dedicated to the Geopark. These two tools allow teachers to embark upon the geological history of the territory with their students.

A variety of activities for the general public

Each year, a hundred or so activities are proposed to residents and visitors, thereby enhancing the natural and cultural heritage and craftmanship in the area.

Activities specifically focus on enhancing the geological heritage and take on a variety of forms: a chocolate workshop proposing the creation of the Ordovician landscapes, a craft workshop to reproduce a wrought iron conodont, an evening of light painting to draw the inhabitants of the Ordovician period or a show to celebrate the 10 year anniversary of the geological reserve.

Wildlife in cartoons: a comic promoting biodiversity

Over a period of four years, the Park challenged 32 classes of 9 to 11-year-olds to create a comic based on typical species found in the Park - the Freshwater Pearl Mussel, Hen Harrier, Greater Horseshoe Bat and the White-Clawed Crayfish respectively. These species were studied and drawn by 700 young people. This project, combining a naturalistic and artistic approach, gave birth to 4000 comics (1000 per species) which have all been distributed to schools, media libraries on the territory and partners of the Park.

Guided tour in the Alpes Mancelles

Inauguration of the Evolution of Life trail

An exhibition on the geological heritage of the Geopark

Following the National Inventory of Geological Heritage which was initiated in 2007, the Park has created an exhibition to bring this legacy to the attention of the general public. Presented for the first time in 2009, during the International Year of Planet Earth, it traces the geological history of the Geopark through a dozen or so heritage sites. This exhibition is loaned free of charge to the territory stakeholders who request it. A presentation sheet is available on the internet.

Jellyfish drawn by children in 2012 on on the Evolution of Life trail [NG06]

A trail reveals the evolution of life [NG06]

In 2003, the Park, in partnership with "*La Sentine*" Hiking Association and a primary school, initiated an educational trail on fauna, flora and geology using the five senses. In 2012, students added a new educational element with a 700-million-year artistic journey on the evolution of life.

The trail is 3.5 km long. Every metre travelled propels us 200,000 years further on. From jellyfish to Homo-sapiens, the trail explains through sculptures made by a local artist, the appearance of trilobites, fish, ammonites, amphibians, dinosaurs, birds, mammals and finally the Man of Toumaï. This trail, which is accessible free of charge all year round, also welcomes school children and has its own presentation booklet.

A special edition of Les Incollables (The Unbeatables) on the territory

"*Les Incollables*" have made a big impression on generations of children with their question and answer cards on a variety of subjects. In 2015, the Park produced a special edition on its territory. This game of 36 questions & answers allows children and all residents to discover the territory and its uniqueness in a fun way. The geological heritage naturally finds its place among the questions.

E.6 | GEOTOURISM

Since the 18th century, the unique landscapes of the Normandie-Maine Geopark have been identified as a conveyor of tourist mobility. The geology and the exceptional geomorphology of the territory largely explain the picturesque appeal of several typical sites such as the Alpes Mancelles and The Fosse Arthour.

The creation of the Touring Club of France in 1890, on the initiative of a group of cyclists, reinforced the reputation of the territory through the many activities it implemented. For nearly a century, this association ensured the development of tourism in all its forms (tourist routes, tourist guides, cycle paths, tourist signs, ...). It also instigated the development of summer camps and nature tourism of which the territory has many attractive features.

Tourism in France really took off in 1936 with the creation of the "paid holiday week". The Geopark territory then seemed very attractive with its green and picturesque setting and the Alpes Mancelles became a renowned holiday destination.

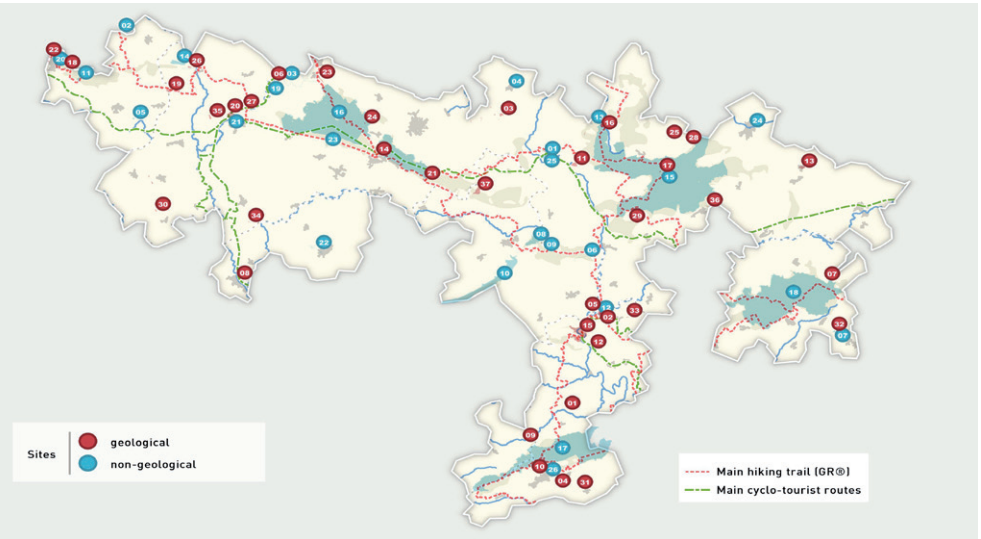
It is in this context and at the time of creation of the Regional Nature Park in 1975 that it invested heavily in the structuring and enhancement of a nature discovery programme through the development of hiking trails, mountain bike and equestrian routes ... It has also been at the centre of the outdoor sports development by providing equipment for many climbing and canoeing sites.

Since then, other local stakeholders have taken over this mission and now ensure its management and development.

The geological, geographical, natural and cultural heritage features have always been promotional levers for the territory. Since 2012, following the implementation of the *"Monts et Marches"* project (mountains and historic borders and strongholds), the Normandie-Maine Park has reinforced its approach by creating a network of sites that is now the foundation of the Geopark's geotourism programme.

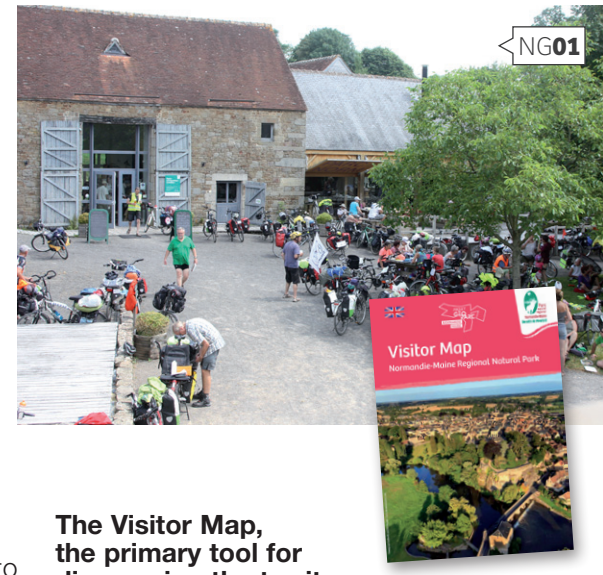
The natural and cultural heritages closely linked to the geological history are therefore the prime assets of the territory. This enhances a varied programme of agritourism and outdoor sports activities for our visitors, who mainly come from neighbouring regions (Normandy, Brittany, Ile de France). It is also worthy of note that there are foreign tourists from Great Britain, Belgium and the Netherlands.

Geological history in Saint-Léonard-des-Bois, inaugurated in 2012, was one of the first sites of the Monts et Marches network. This tour invites visitors to discover the geological history of the Alpes Mancelles **[G15 - The Alpes Mancelles: from the valley of Misère to the Haut-Fourché]**. It explains the contact zone between the Armorican Massif and the Paris Basin, talks about the Cambrian volcanism and presents the scree along the Valley of Misere. Interpretation panels are accompanied by rock samples to look at and to touch.



Geopark site and main hiking and cycling trails

Cyclotourists at the Park and Geopark Visitor's Centre



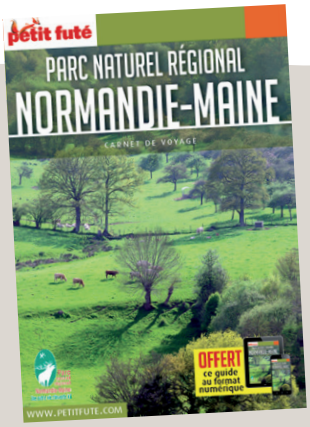
The boom in cycle tourism

Cyclotourism is a sector in very strong growth and France is the second world destination for this activity with significant economic benefits for the territories implicated. The Geopark territory is traversed by two major cyclo-tourist routes: *Véloscénie* and *Vélofrancette*. The first connects Paris to Mont-Saint-Michel and crosses from east to west through the Park and Geopark Visitor's Centre at Carrouges.

The second crosses from north to south, including Domfront-en-Poiraie. It is possible to discover many of the territory's geosites on their routes, as shown on the map above. This will be the subject of a special feature in the next edition of the tourist map.

The Visitor Map, the primary tool for discovering the territory

Revised every 2 years with 40,000 copies printed in French and English, the visitor map, aimed at both visitors and residents, is the main tool for promoting the territory. During its last issue, the Geopark was put in the spotlight for the first time and invited readers to discover several of the developed sites. The next edition will be even more important seeing that it will become the Discovery Map for the Geopark.



In March 2018, the Park published a travel book on the territory with tourist publishers "*Petit Futé*". This guide is the culmination of a long process of awareness and understanding and the selection of tourist stakeholders present on the Geopark. It lists 268 addresses including hosts, restaurateurs, activities, artisans and producers. Since its official launch, many promotional activities have been carried out on the territory including regional and national exhibitions to ensure the highest visibility. A contest on Facebook to celebrate the anniversary of its launch brought together more than 800 participants trying to win short stays offered by stakeholders mentioned in the guide.

A new tourist positioning at the heart of the Geopark

In France, tourism expertise is shared between regions, departments and inter-communalities. Recent laws, leading to a rise in inter-communality, have re-examined the tourism policies of the territories and in particular the positioning of the Normandie-Maine Park in this region.

Since the end of 2017, the ATEMIA consultancy has accompanied the Park in order to clarify its tourist positioning.

This work established that the Park must concentrate its action around the particularities that characterise it: its geological heritage - with the discovery of its steep and craggy landscapes, unexpected for this region.

This positioning confirms the numerous actions undertaken by the Park since 2008 in the promotion of its geological sites through the "*Monts et Marches*" project and it also clarifies the complementary nature of its mediation with other tourist stakeholders.

In fact, the Geopark will be a lever for geotourism serving departmental and regional tourist destinations.

To break down this positioning, three strong approaches have been established:

- Make the territory a UNESCO Global Geopark;
- Structuring an offer of scientific short stays;
- Promote a network of geosites with a fantastic rationale aimed at family customers.

This new positioning entails an adaptation of the missions within the Park team which must orient its actions towards a geotourism programme. Tourist tools and actions are therefore gradually being reworked in this direction.

New tourist positioning presentation

Geological reserve: The Carrière des Vaux

In this new context, the Geopark intends to rely on the uniqueness of its territory to target a particular clientele: students, amateurs and connoisseurs of geology. For this purpose, it is experimenting with the creation of tourist products for this science-loving audience.

From time to time, the Geopark hosts groups of geology enthusiasts (the French Paleozoic group, the Amateur Geologists Society) and groups of students.

A feasibility study is underway to identify potential clientele (secondary schools, colleges, universities, associations, ...) to determine their expectations and needs. This work will be completed by a comparative study of other similar products that exist in France and overseas.

A characterisation of the existing proposition on the territory (accommodation, catering, visits ...) in the area around geosites will also be carried out.

If the feasibility study is conclusive, the goal is to achieve the creation of a first test product in 2020.

The third approach of the new tourist positioning concerns the promotion of sites linked to the Geopark "heights", that are likely to offer a sensational experience for a family audience.

The objective is to reinforce the tourist attractiveness of the territory through developments likely to trigger a stay on the Geopark. At the end of a field study, six sites were identified as not developed or promoted to the level of their potential.

For each of them, a development concept was proposed and a budget estimate established. This stage made it possible to initiate a first consultation with tourism stakeholders and local authorities who will be the main funders and managers of the equipment on the site. Of the six sites selected, four are identified as geological sites.

The other two sites are the Signal d'Ecouves, located in the heart of **The Forest of Ecouves [NG15]** and Le lagon bleu, located in the heart of **The Forest of Sillé [NG17].**

For each site, technical reviews have been drawn up in order to take into account the natural and cultural heritages, the potential conflicts of use and the activities already present. These elements serve as a basis for carrying out feasibility studies. As of today, commitments have been established for three of the six sites. For each, a local steering committee is formed and chaired by the Geopark

Geodesic granite marker at the Signal of Ecouves

Focus on the six development projects :

❶ The Signal of Ecouves at L'Orée d'Ecouves. The highest point in Normandy. Today it has a geodesic granite marker placed in the heart of the forest. The aim of the development would be to create a belvedere to invite visitors to get up close to the canopy in a fun way and so discover the vast Ecouves forest from another viewpoint.

❷ The Blue Lagoon at Saint-Rémy-de-Sillé. Access to this former quarry, whose activity stopped in 1969, is now prohibited to the public. The aim is to be able to secure it, re-qualify it in order to propose a suspended trail and develop a fun approach in which to discover the geological history of the Geopark.

❸ The Roc-au-Chien Scree at Bagnoles-de-l'Orne-Normandie [G14]. Located in the heart of a spa town, this scree has been classified as a Regional Nature Reserve since 2018. The challenge is to re-qualify the path and enable visitors to better appreciate this heritage and to accentuate the feeling of height with a look-out point overhanging the scree. The development will also include a platform to facilitate visiting groups getting closer to the scree.

The Blue Lagoon

The Roc-au-Chien

❹ The Fosse-Arthour at Saint-Georges-de-Rouelley [G19]. This site is classified by the State for its picturesque and legendary character. It is also recognised under the Natura 2000 scheme. It already has a large flow of visitors (about 30,000 per year) but only around a quarter of visitors climb the sandstone belt and discover the superb panoramas on the west of the Geopark. The development project aims to offer a more accessible path for a family audience.

❺ The Canyon of Toyères at Saint-Pierre-des-Nids [G05]. Accessible by an isolated communal road, this little-known site offers a striking panorama over the meandering Sarthe. The stopping point is currently limited to a look-out point. The project aims to allow a wider audience to descend to the river and enjoy the wilderness and mountainous character and get across the rocks in a safe way.

❻ The Valley of Misère at Saint-Léonard-des-Bois [G15]. This site benefits from multiple measures of protection for the quality of its heritage and in particular for its exceptional geology. It already benefits from development through the implementation of an interpretation trail inviting visitors to discover its geological history. The development project focuses more on improvements favouring group visits with an architectural structure accentuating the feeling of height.

E.7 | SUSTAINABLE DEVELOPMENT AND PARTNERSHIPS

E.7.1| Sustainable development policy

The Geopark territory already has a national certification label as a Regional Nature Park. This implies the existence of a Charter which defines on the one hand a common ambition for this territory but also measures to achieve it. Achievement and outcome indicators are associated with each measure in order to evaluate the effectiveness of the actions taken.

As well as the sharing of a common project, the Charter also has a regulatory significance for local development. All Geopark communal and inter-communal planning documents must therefore be compatible with its positioning and the Park ultimately gives its view on the document. In a consultation framework, the Park's planner accompanies all the communities as far as possible in advance of the drafting up of their planning document in order to better take into account the heritage and specificities of the territory. The same applies to development projects subject to an official environmental classification procedure (*Installation Classée pour la Protection de l'Environnement - ICPE*), the Park's opinion must be sought.

Through its stewardship of the territory, the Geopark has built up an expertise over many years and through various analyses it can provide essential data enabling informed decisions to be made. Different evaluation indicators of the territory can therefore be analysed to understand the current dynamics (land use, hedgerow, tourism, education, ...).

Consequently, the Geopark has a valuable infrastructure enabling it to support locally elected officials towards a sustainable development of their territory.

E.7.2| Partnerships

The Geopark is heavily involved with the economic stakeholders of its territory, particularly tourism and local producers.

Pear trees in bloom

Bottles of Poiré (perry) © Gérard Houdou

Tasting © Gérard Houdou

The Domfront Poiré

The western part of the Geopark's territory is characterised by its orchard-like landscapes. It is home to magnificent, centuries-old pear trees, unique in Europe. **This is where Domfront Poiré (Perry) was born**. This iconic cider production now has an *Appellation d'Origine Protégée* (AOP) for about twenty producer-harvesters, with an annual production of around 150,000 bottles.

Since 1975, in partnership with the National Museum of Natural History, the Park has conducted a census of apple and pear varieties in the area. This has led to the creation of conservatory orchards and the installation of an oenology laboratory at the Poiré Museum and the recruitment of an oenologist by the Park. Its mission was to support producers in the stabilisation of Poiré. This work has led to the creation of specifications and the recognition of the product by an *Appellation d'Origine Contrôlée* (AOC) and then *Protégée* (AOP) since 2002. The Park support is now much more focused on promotion thanks to the Poiré Museum which it is entirely dedicated to it. Not forgetting the shops at the Museum and at the Park and Geopark Visitor's Centre.

Numerous communication activities have also been carried out with the publication of books on production methods and ideas for gourmet recipes. A documentary entitled "From the forest of Eden to the orchards of Normandie-Maine", produced in 2017 by director Catherine Peix, highlighted the importance of maintaining a varietal diversity on a global scale. This film makes the link with the wild apple forests of Tian Shan in southern Kazakhstan, from where the apple originates.

This sparkling drink that plays on a sweet-acidity balance lifted by a touch of astringency is served at each official reception at the Geopark. The Geopark also promotes it on all the fairs and events in which it participates, for example, in Paris for the large market organised for the 50th anniversary of the French regional nature parks where more than 2,000 bottles were sold. The *Fédération des Sites Remarquables du Goût* has proposed five productions for registration on to the French list of Intangible Heritage including "the production of Poiré in Domfrontais". An audit took place in autumn 2018.

Artisanal Market

Farmers' & Local Producers' Market

A chocolatier at work

Gastronomy and crafts

The Geopark is also involved in the promotion of other productions present on the territory **through official quality certifications**. (*Appellation d'Origine*, organic farming, ..)

The **"Camembert de Normandie"** is among the most symbolic. The pear tree, whose fruits are used for the manufacture of Poiré Domfront, is historically associated with an agricultural system of pre-orchard. In these wooded meadows, Normandy cows are at the heart of the Normandy dairy industry and produce an exceptional quality milk.

Gastronomy holds a very important place on the territory. Farmers' markets are organised like the regional markets and the activities proposed by the *Site Remarquable du Goût du Domfrontais* (dinner conferences, tastings ...).

In its annual programme of events, the Geopark also proposes "*Rendez-vous gastronomiques*" with a chef or a producer on a discovery of the local produce and savoir-faire in the territory.

The Geopark is working on the **creation of geoproducts** to increase its visibility among the residents. Work is underway to create chocolates representing the most emblematic fossils on the territory (conodonts, trilobites, ammonites). The mould for the creation of these chocolates has been created by the Geopark. It is being tested with some chocolatiers on the territory in order to make it accessible to all the chocolatiers on the Geopark who would like to produce and market it.

Only one condition is stipulated: use the packaging provided by the Geopark. Another initiative is underway with the *Biscuiterie de l'Abbaye* for the creation of a specific box of biscuits for the Geopark. This local company, created in 1909, recently received the national label "*Entreprise du Patrimoine Vivant*" (Living Heritage Company).

Arts and Crafts are also very visible and the Geopark uses various actions and activities to promote it. In addition to support through them sale of art objects in the shops, the exhibition sites on the Park and the Park and Geopark Visitor's Centre are dedicated spaces for promoting the artisans by offering a "shop window". A study is underway with local jewellery manufacturers to develop ideas on how their creations can be linked to the Geopark.

The **Park and Geopark Visitor's Centre** is a showcase for the region's productions through its shop which offers nearly 300 references of local products. Nearly 60 producers, selected annually, enable the discovery of a wide variety of cider products, preserves, cosmetics, cakes, jams, honey ... The shop also offers some craft products such as jewellery, clothes, candles which are all locally produced.

A bookshop space has been organised in partnership with the Alençon bookshop. The Poiré Museum shop is more oriented towards cider products with *Poiré Domfront* and *Calvados du Domfrontais* its key products. Between them, the shops managed by the Geopark generate an annual turnover of around €80,000.

Park and Geopark Visitor's Centre shop

E.7.3| Local community involvement

The Geopark territory now has **98,000 inhabitants** who all speak the same language and generally share the same culture.

Through its structure, the governance of the Geopark integrates the representatives of each municipality through the elected official but the Geopark also strives to inform and when it is possible, to involve the inhabitants in the Geopark's actions through citizens' committees or local events. There are different ways to take into account the contributions of the inhabitants.

The Geopark also regularly sends messages via various channels (print, radio, TV, internet) to inform residents and each year it puts forward information and articles to insert into their communal newsletters which are distributed in all mailboxes.

In order to take into account the potential conflicts of use in the various actions and activities undertaken, **the Geopark is closely linked to local associations and particularly to user associations**. These are generally structured at a local level, then county, regional and sometimes national level.

For example, the Geopark works in partnership with **the Fishing and Hunting federations** whose activity is still very present on the territory.

The stag remains the most majestic animal of our forests. It is also the emblem of Normandie-Maine Park. When it is not hunted, it is its call that attracts the curious, during its breeding season in September.

Park General Assembly in 2018

Amongst the forest activities, let us not forget blueberry picking and mushroom collecting, for which the territory's forests are renowned.

Mycological exhibitions take place every autumn on the territory. In the field of gastronomy, the Geopark also works with organisations defending the origin and identity of productions.

The Geopark also participates in **ethnographic collection activities** by accompanying local associations such as *La Loure*, which promotes the traditional woodland songs or by working with the *Fabrique des Patrimoines*, one of the 10 labelled ethnopoles. In 2019, the Geopark inaugurated a new exhibition at the Poiré Museum, the culmination of a lengthy work on a collection of stories and history on the Calvados fraud.

The Geopark is also regularly involved in activities for the development of traditional crafts such as hedge-laying, pruning and grafting of fruit trees, varietal identification, building with cob ...

The involvement of local stakeholders is indispensable for the Geopark to have a strong standing with all inhabitants. A study is underway to structure a network of Geopark ambassadors.

"Fête du Parc" in 2018

An event that brings everyone together at the Park and Geopark Visitor's Centre

The *Fête du Parc* is an event organised by the Park at the Park and Geopark Visitor's Centre. All residents are invited to come and discover the Park and its activities in a day of fun and friendship.

The last event on 27 May 2018 proposed a varied programme consisting of naturalistic walks, shows, concerts, workshops, tastings of local products, ... The 1500 visitors enjoyed the multitude of entertainment activities for all ages, taking it easy in the relaxation and exchange spaces throughout the day. The next event will take place on 14 June 2020.

E.8 | NETWORKING

The Normandie-Maine Geopark is heavily involved in various networks on the territory. As its mode of intervention is essentially based on consultation, it is essential to work in the long term with local stakeholders to initiate structuring actions and change practices.

The Geopark is also involved in various national knowledge structures and promotion of geological and geomorphological heritage. The Geopark's geologist is also a member of the **Geological Heritage Commission of the French Nature Reserves (RNF)** Steering committee and **secretary to the Geomorphological Heritage Commission of the French National Committee of Geography.**

A delegation of 4 people from Normandie-Maine Geopark was present at both **the 8th World Meeting of Global Geoparks** held in Italy at the Adamello Brenta Geopark and also at **the 15th European Meeting** in the Sierra Norte de Seville Geopark.

Amongst the initiatives undertaken within the network, a study tour was organised from 29 to 31 October 2018 in **the Bauges Geopark**. A delegation made up of eight elected representatives and eleven members of the Geopark team participated and were able to gain a more concrete understanding of the foundations and requirements of the label, in particular with thanks to a presentation **by Jean-Luc Desbois, President of the National Committee of French Geoparks**.

The Deputy Director of the Park with responsibility for the Geopark also participated **in the 11th edition of the intensive course on UNESCO Global Geoparks** organised on the island of Lesvos in June 2019. This edition, which brought together 35 people from over 20 different countries, was an exceptional opportunity to learn more about the Global Geoparks network and the dynamics required to set up a Geopark. It was also an opportunity to share issues and build partnerships among participants and to present our Geopark to the network.

Like the Global Geoparks, the network of French Regional Nature Parks is also made up of members who work together in a convention of sharing experiences and cooperation. In this sense, Normandie-Maine Park has long been involved in this network. Each year, the participants take part in the thematic seminars of their field of expertise and the Park is represented in the official meetings.

French delegation at the 8th Global Geoparks Network meeting

11th edition of the intensive course at Lesvos

E.9 | SELLING OF GEOLOGICAL MATERIAL

As far as we know today, there is no sale of geological materials (fossils, minerals) on the Geopark territory. However, nine quarries are active on the territory.

In the Park Charter, it is stated *"Located mainly on an old bed of varied mineral resources, the Park encourages the rational exploitation of the materials on its territory and ensures the respect of the quality of its landscape by the systematic analysis of the impact of the work undertaken. Areas of strong natural interest and/or strong landscape sensitivity are not intended to be areas for the extraction of materials."*

Contact exists between quarry operators and the Geopark. In 2016, the Geopark geologist participated in an "open day" at the Rouperroux quarry. In 2019, a partnership with this same quarry will allow students to discover this site in the framework of the annual educational project: **Geopark "*à la carte*".**

Rouperroux quarry

F INTEREST AND ARGUMENTS FOR BECOMING A UNESCO GLOBAL GEOPARK

The dynamic triggered by this application has a double resonance. It salutes the work undertaken by the Park and many partners over more than 10 years in terms of understanding, conservation and enhancement of the legacy of our planet's history.

It particularly generates new ideas for collective action and reinforces the determination of the territory's stakeholders to work together.

Visit by the elected officials in 2016, with a stop at Bagnoles-de l'Orne-Normandie for a geological heritage discovery

The meetings in which the Normandie-Maine Geopark took part made it possible to understand the network of the Global Geoparks and thus to subscribe to a dynamic that goes beyond our territory. This co-operation on all levels (national, European and global) is a source of exchange and new avenues of action. **This is why, the Normandie-Maine Geopark commits itself, through its candidacy, to continue its participation in the UNESCO Global Geoparks networks**.

The territorial activities initiated by the Geopark is already a source of pride for a territory that is too often overlooked, yet is home to the mountains of western France, on the borders of Normandie and Pays de la Loire.

The distinction of the UNESCO Global Geopark label would bring **international recognition** to the territory for the quality of its sites and landscapes which are of international geological significance. This prestigious spotlight will contribute to **the development of the Geopark's renown and its residential and tourist attractiveness.**

It is **a lever of economic development** that the Geopark intends to grasp, particularly through **geotourism** and **geoproducts**.

Tourism stakeholders will be able to propose a specific offer of site discovery trails developed for the general public. Artisans and tradesmen will have an additional lever of communication serving local productions and expertise. These aspirations are possible only on the condition **of a preserved geological heritage**. To do this, in addition to its action to acquire new knowledge, the Geopark works with local stakeholders to educate residents and tourists on the wealth of its heritage and therefore helping to preserve a part of the memory of the Earth's History.

The introduction of the general public to geology makes it possible to draw attention to the relation of the human being with the notion of time-scale. It enables a decentring that accelerates the awareness of the impact of Man on the planet.

It is the link between this relationship with time and the urgency to act, individually and collectively, that the Geopark wishes to use as a lever against climate change and the decline of biodiversity. It is a way to set the territory in motion to anticipate future disruptions, minimise their effects and evolve to a new state in dynamic balance that preserves its functionality.

It is about creating resilience systems, together. It is also these hopes and desires that support our application for this prestigious label and that we wish to drive forward in respect of Normandie-Maine.

This is the sense of our application.

Parc naturel régional
Normandie-Maine
Une autre vie s'invente ici

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