17 New candidates

(for evaluation in 2022)

2 Area modifications > 10 %

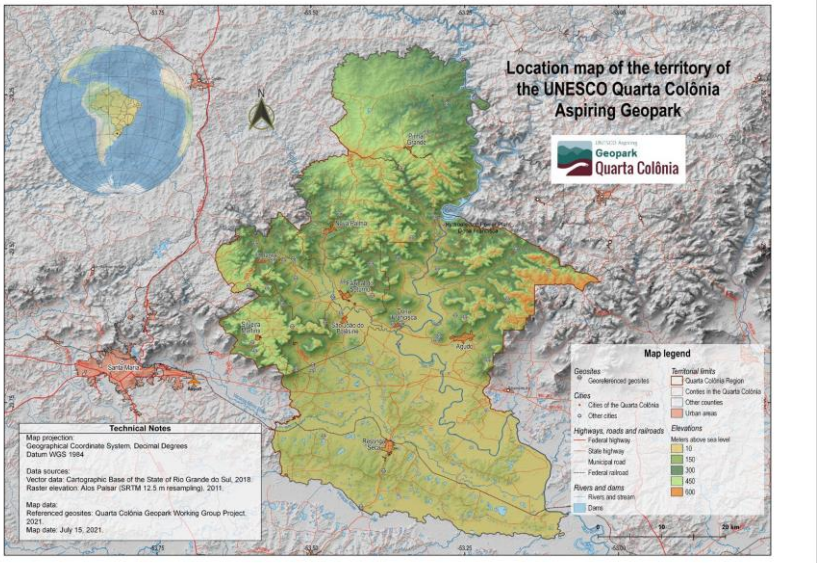
4 Area modifications < 10 %

Applicant UNESCO Global Geopark

Quarta Colônia, Brazil

Geographical and geological summary

Location of the Quarta Colônia Aspirant UNESCO Geopark (QCAG)



1. Physical and human geography

The Quarta Colônia aspiring UNESCO Global Geopark (QCAG) covers an area of 2,923 km^2, comprising a territory that demonstrates the transition between the Brazilian Meridional Plateau and the Sul- Riograndense Peripheral Depression (Depressão Periférica Sul-Riograndense) and between two major Brazilian ecosystems: the Atlantic Forest and the Pampa, with enormous biodiversity covering forests and grasslands.

The QCAG territory is formed by the boundaries of nine municipalities (Silveira Martins, Ivorá, São João do Polêsine, Agudo, Dona Francisca, Restinga Seca, Nova Palma, Faxinal do Soturno and Pinhal Grande), which, all together, have a population of 62,193 inhabitants. The QCAG has a strategic location in the center of Rio Grande do Sul. It is accessible by an airport just over 20 km away in the city of Santa Maria and is located at a road junction that connects to all regions of the state. The capital, Porto Alegre, is 270 km away, accessible by the RSC- 287 highway. QCAG was home to the most varied forms of animal and plant life 230 million years ago, at the dawn of modern ecosystems, and is today endowed with Triassic fossils of great international relevance. The territory of European descendants and quilombolas, which has millennial traces of indigenous settlements, also holds the records of the oldest dinosaurs on the planet and welcomes its visitors for a real trip back in time, diving into the history of the Earth, of the ecosystems and of human culture. In the Quarta Colônia Geopark, among fossils, trails and vantage points, among colonial villas, bountiful spreads and memories, time becomes scenery and space becomes an invitation to discovery.

2. Geological features and geology of international significance

The geological succession at the QCAG is the opening of the Atlantic Ocean and the break-up of the Gondwana during the Mesozoic. Subjacent to those, lie the Triassic sedimentary successions that yield the QCAG greatest Geoheritage treasure: a rich fossil fauna and flora recognized internationally, and which has been scientifically documented for decades of research. This fossil record helps document a crucial moment in the history of life on Earth, for Triassic ecosystems represent life's takeover after the massive Permo-Triassic extinction at the end of the Paleozoic.

In that sense, the Triassic witnessed the rise of modern lineages, which began shaping modern ecosystems. For instance, the QCAG area yields a rich fossil record of cynodonts, a group of vertebrates that include the forerunners of mammals; early lepidosauromorphs, which include forerunners of modern lizards and rhynchocephalians; and the oldest records of unequivocal dinosaurs yet discovered, which document the rise of the most iconic fossil group in Paleontology that dominated the planet through most of the Mesozoic, finally giving rise to modern birds. Fossils like Bagualosaurus, Buriolestes, Gnathovorax, Brasilodon, Riograndia, Hyperodapedon, Ixalerpeton, Prestosuchus and Exaeretodon are just a small sample of a great taxonomic fossil diversity that still today is unearthed from red beds at the QCAG, and which is consistently being updated with new discoveries.

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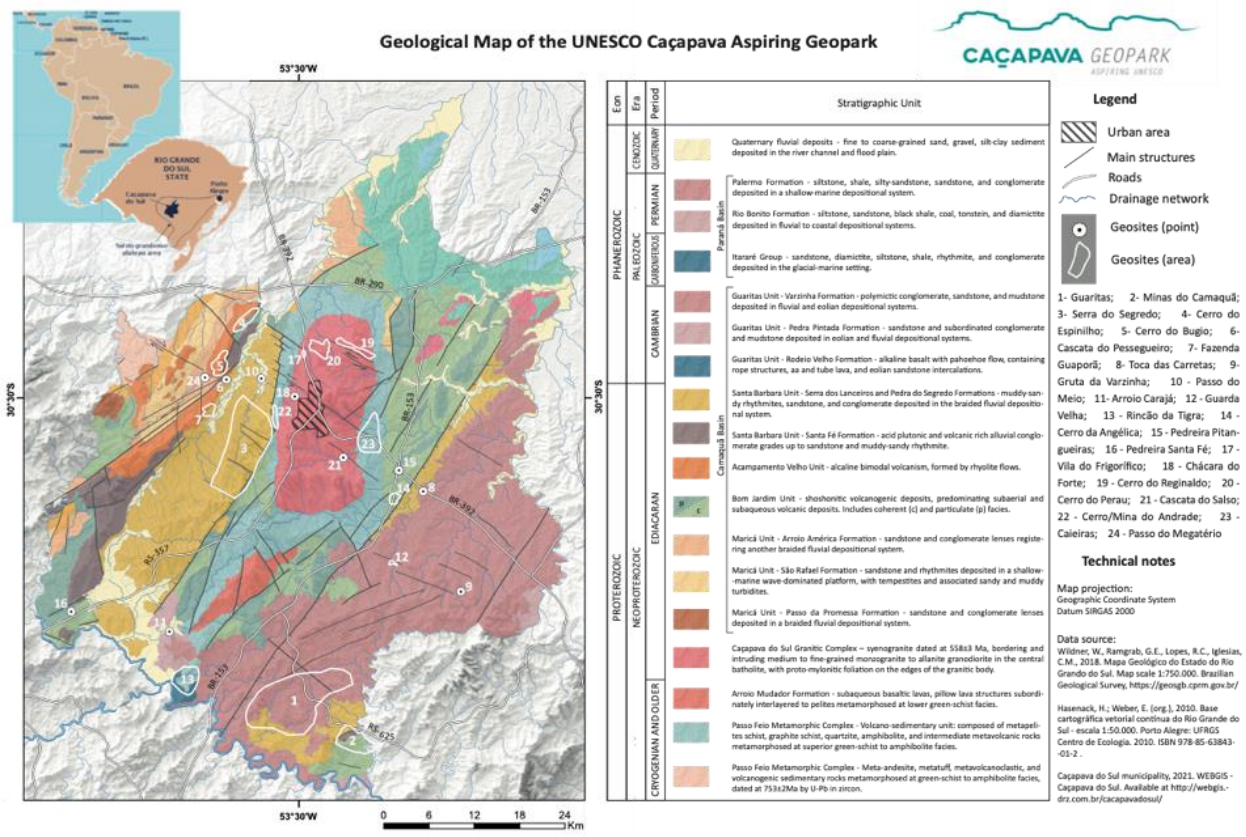
Applicant UNESCO Global Geopark

Caçapava, Brazil

Geographical and geological summary



1. Physical and human geography

The territory of the Caçapava aspiring UNESCO Global Geopark is located in south-eastern South America, around the 30°S parallel, in the so-called Latin-American “southern cone” (Cone Sul Latinoamericano). The geographical area is located in the Rio Grande do Sul State, in southernmost, subtropical Brazil, near (some 200km away from) the national southern border with the Republic of Uruguay. The territory, whose boundaries coincide with those of the municipality of Caçapava do Sul, has an area of 3,047 km^2. A very relevant character of the territory is its position of “sentinel”, a perfect place for watching and guarding the surrounding landscapes. Hills and ranges in the Caçapava territory have been chosen as indigenous settlements (in pre-Colombian times), as borderline areas between Portugal and Spain (in the 18th century), as a theoretically impregnable place for a revolutionary capital (around 1839), and as a perfect place for the construction of a fortress (around 1850), for defending the frontiers of the Brazilian empire.

In terms of geomorphology, the region is part of the Sul- rio-grandense Plateau, also called Serras do Sudeste (‘south-eastern ranges’), an area of relatively high altitudes (reaching 500 m.a.s.l.) with respect to the low- lying, younger, sedimentary terranes of the central and coastal plains. Within the territory, structure-controlled, N-S and NE-SW elongated ranges, developed upon granites, rhyolites, and very resistant conglomerates, are the dominant features in the northern portion (the Caçapava high, the Santa Bárbara range, and the Segredo dissected cuesta). Meanwhile, the southern portion of the territory is marked by the presence of the Guaritas dissected plateau, developed upon sandstones and conglomerates. In the central portion of the Caçapava aspiring UNESCO Global Geopark, there is an important water divide: to the north, running northwards, the Irapuá, Santa Bárbara, and São Rafael rivers, affluent of the Jacuí river watershed (the largest river entirely within Rio Grande do Sul State); to the south, running southwards, the shorter affluent rivers of the Camaquã river watershed.

2. Geological features and geology of international significance

From a geological point of view, the territory of the Caçapava aspiring UNESCO Global Geopark is part of the Sul-rio- grandense Shield, the area comprising the oldest geological materials and the most complex geological evolution in Rio Grande do Sul State. Gneiss, marbles, diverse schists, amphibolites, granitoids, rhyolites, andesites, basalts, sandstones, and conglomerates are some of the rocks that record craton-related, as well as collisional and post-collisional events. Ages for those rocks (or individual minerals within them) range from the Archaean to the Ordovician. The territory also displays important tectonic and magnetic features, from simple fractures and faults to crustal-scale lineaments or sutures, as well as world-class sulphide ore minerals. Fluvial deposits of Quaternary age, including fossils of the Pleistocene megafauna (especially the remains of three genera of ground sloths), are also present.

Among the multiple interesting geological and geomorphological contexts represented by geosites and materials within the territory of the Caçapava Aspiring Geopark, one of them is undoubtedly of international significance: the so-called 'Camaquã basin' deposits (ca. 630 to ca. 470 Ma). This petrotectonic association comprises a series of sedimentary and volcano-sedimentary stratigraphic units spanning the limit between Ediacaran and Early Paleozoic times and including the oldest (micro)fossils in southern Brazil. Deposition began in coastal, marine, and deep lacustrine settings, in foreland to strike-slip basins, and evolved towards continental, alluvial, fluvial, and eolian/desert settings, in rift basins. The associated volcanism evolved from basalts/andesites of calc- alkaline, shoshonitic affinity, towards rhyolite/ignimbrite/basalt with

alkaline affinity. The 8 km- thick volcanic/sedimentary package is the most important record of the so-called “transition stage of the South-American platform”, connecting the orogenic and taphrogenic phases of the Gondwana continent amalgamation. The robustly studied, understood, and isotopically dated deposits of the ‘Camaquã Basin’ are very important in all the attempts to correlate processes of that time span (630 to 470 Ma) between South American and African basins. Moreover, at least two of the ‘Camaquã Basin’ broad sedimentary units (the Santa Bárbara and Guaritas units) are exposed in ruin- shaped hills that display well-developed, widespread, world-class (though still under-researched) cavernous weathering features, such as arcades, tafoni, honeycombs, gnamma, diverse ledges, as well as speleothems. Bare hilltops, slopes and cavities of those ruin-shaped hills, by the way, are the most important habitats for the preservation of endemic and threatened flora, for both the Guaritas and Serra do Segredo areas, where the populations of cactuses, bromeliads, and endemic flowers are impressive. For its geodiversity-related singular habitats, approximately half of the territory of the Caçapava Aspiring Geopark is considered as being of high conservation relevance by the Brazilian Ministry of the Environment. Part of the grassland areas of Caçapava do Sul are also certified as “valuable grassland areas”. Such native grasslands retain and preserve a unique, sustainable way of living, that of the family sheep and goat ranchers (“pecuaristas familiares”), especially in the Guaritas area of the Caçapava Aspiring Geopark. These people are considered to be a “traditional population” of the Pampa of southernmost Brazil.

All of those geological, geomorphological, ecological, and historical processes and moments have left indelible marks in the landscape of the Caçapava Aspiring Geopark. Today, the memory of human presence and of Earth processes are key features that fuel the sustainable development of the region, and for a rebirth as a UNESCO territory: a UNESCO Global Geopark.

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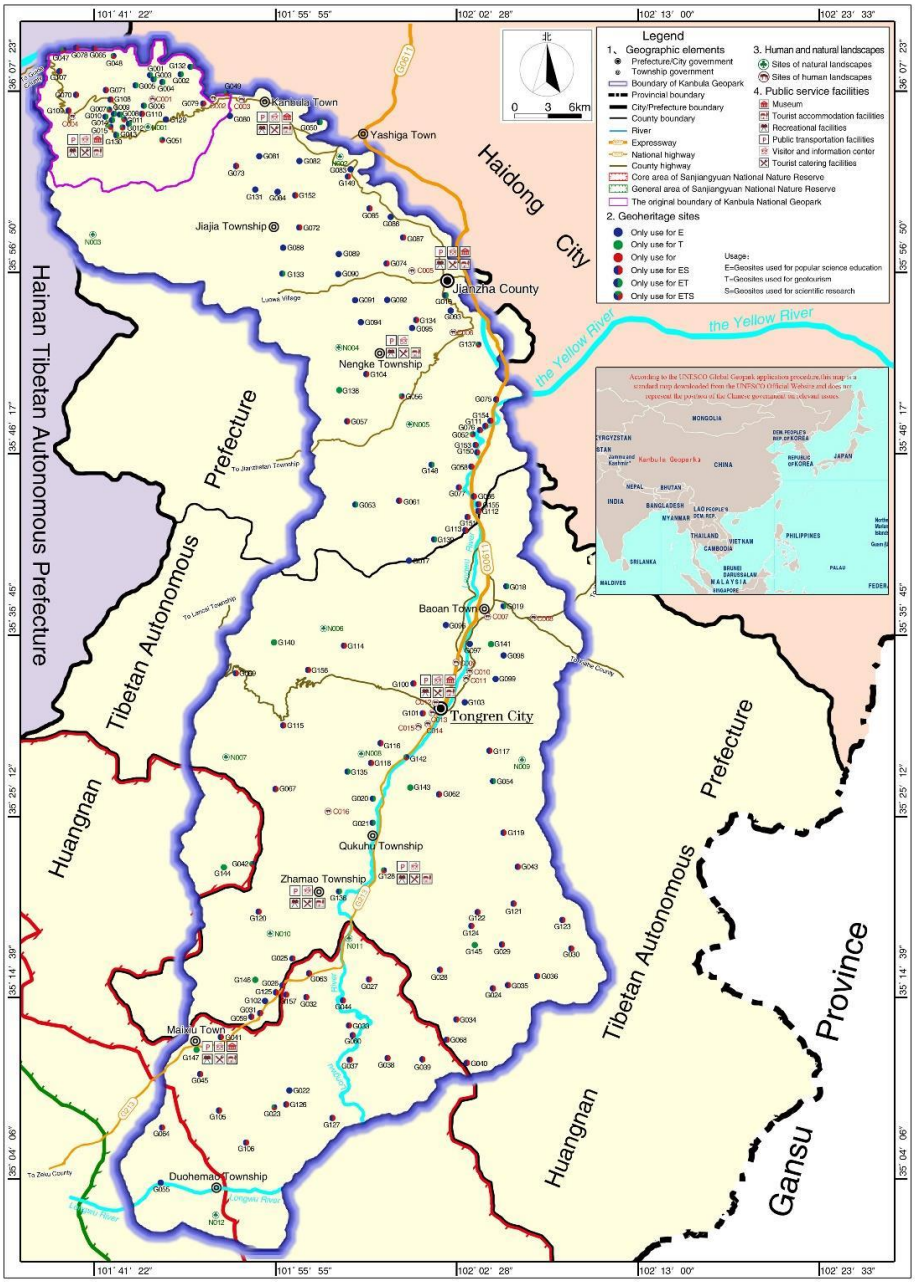
Applicant UNESCO Global Geopark

Kandula, P.R. China

Geographical and geological summary



1. Physical and human geography

Kanbula aspiring UNESCO Global Geopark is located in Huangnan Tibetan Autonomous Prefecture of Qinghai Province of the People's Republic of China, its geographic coordinates are 101°38 '02 "~ 102°11' 05" E, 35°00 '14 "~ 36°10' 12" N, with a total area of 3136.95 km^2. It is about 1350 km away from the capital Beijing and 100 km away from Xining. The aspiring UNESCO Global Geopark is located in northeast margin of the Qinghai-Tibet Plateau, the south bank of the upper reaches of the Yellow River, and the eastern foot of Shenbao-Xiaqiong Snow Mountain. In terms of climate, it belongs to a cool and semi-arid climate on plateau, featured by rainy and hot in the same period, long windy winter, short and cool summer, distinct dry and wet seasons, long sunshine time, and high evaporation.

The aspiring UNESCO Global Geopark has a profound religious culture. The Aqiongnanzong Temple, with more than 1,100 years of history, is the birthplace of Tibetan Buddhism in the later period of prosperity. Jianzha County of Huangnan Tibetan Autonomous Prefecture, where the Geopark is located, is "the hometown of Chinese national archery" and "the hometown of colourful arrow culture and art". There are 721 items of intangible cultural heritages at all levels in the prefecture, among which the Geopark has two world-class intangible cultural heritages (Regong Art, Huangnan Tibetan Opera) and 5 Guinness World Records, 6 items of national intangible cultural heritages, 5 national key cultural relics protection units, 27 Chinese traditional villages, and Luoduojiezhihe Grotto Temple, known as "the Mogao Grottoes on the Qinghai-Tibet Plateau".

2. Geological features and geology of international significance

Kanbula aspiring UNESCO Global Geopark is located at the junction of three orogenic belts: West Qinling, South Qilian and East Kunlun. It belongs to the transition zone of Zeku foreland basin of West Qinling and magmatic arc of south Qilian. The unique geographical location and complicated geological processes have created rich and typical geological heritage in the Geopark, making Kanbula a comprehensive aspiring UNESCO Global Geopark consists of Maixiu ancient volcano group, Triassic strata profile of Longwu River, landslide group along the Yellow River, Ophiolite at Longwu Canyon, Danxia landform, medium and small-sized geological structure, fluvial landform, scenic river, etc. The ancient volcano group in Maixiu region, featured by central-fissure eruption in Qinghai-Tibet Plateau intraplate, is rare in the world. It is the largest and best-preserved volcano group, with most abundant content in Qinghai-Tibet Plateau formed in the Mesozoic era. Triassic strata profile of Longwu River has a deposition thickness of nearly ten thousand meters, which completely record the Indosinian sedimentary paleogeographic evolution history of the central orogenic belt in the junction area of Qinling Mountains, Qilian Mountains and Kunlun Mountains. The Yellow River is the fifth longest river in the world and the second longest river in China. The uplift of the Qinghai-Tibet Plateau and the headward erosion of the Yellow River led to the formation of geological landscapes such as landslides, Danxia landform and terraces along the Yellow River. It is a ideal place for geoscientific research and highly valuable for science popularization. In addition, The Regong Culture and Art Corridor integrates Regong art, Tibetan customs and natural scenery, making the aspiring UNESCO Global Geopark become the Tibetan culture center in the region of Amdo.

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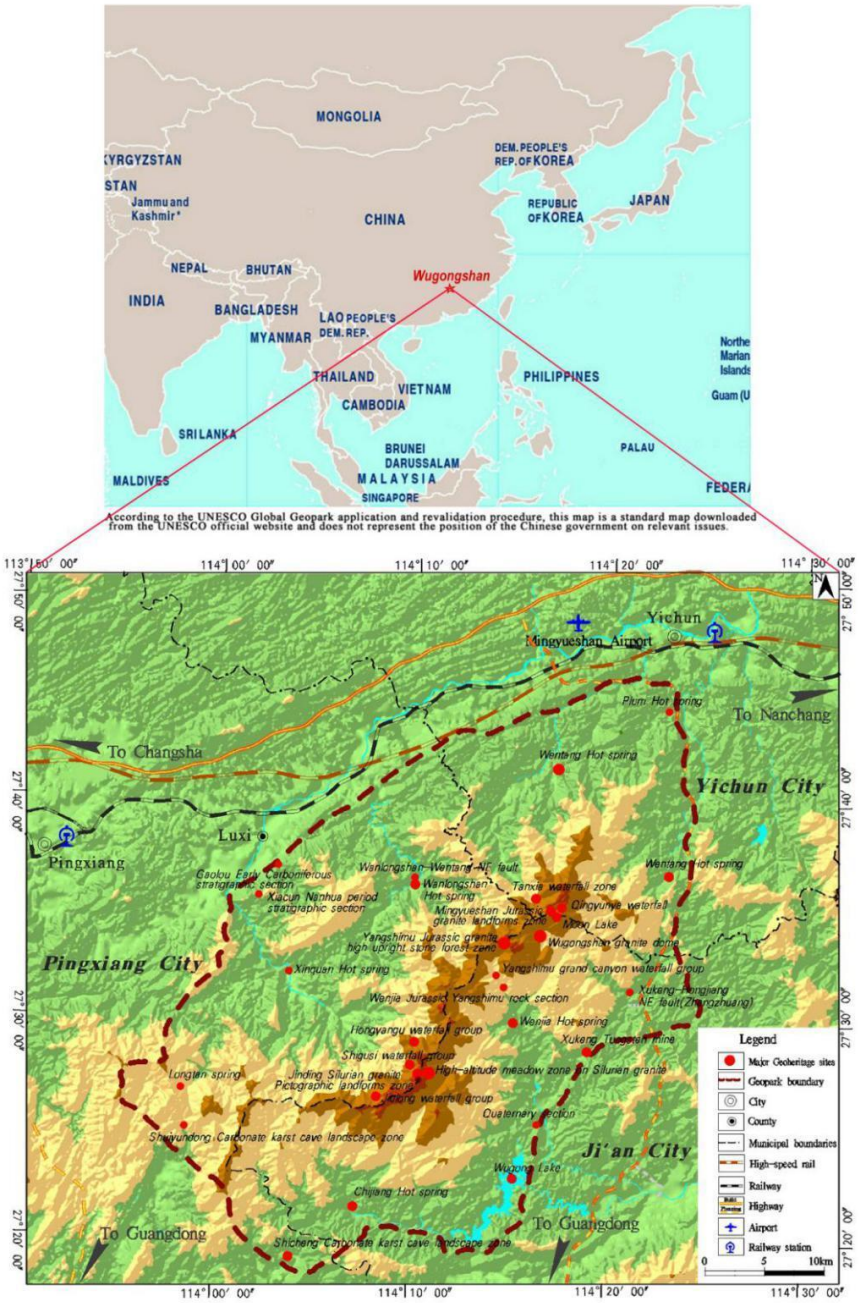
Applicant UNESCO Global Geopark

Wugongshan, P.R. China

Geographical and geological summary



1. Physical and human geography

The Wugongshan aspiring UNESCO Global Geopark is located in the junction area of Pingxiang City, Yichun City, and Ji'an City in the western part of Jiangxi Province in eastern China. The geographical coordinates of the Wugongshan Geopark are 113°55′17.99″ E–114° 24′41.73″ E, 27°18′35.53″ N–27°45′45.78″ N, covering an area of 1,470.82 km^2. Being 220 km away from Nanchang City and 130 km away from Changsha City, the Geopark is within a 1-hour tourism economic circle with the surrounding cities and a 4-hour tourism economic circle with other large and medium cities such as Shanghai City, Guangzhou City, Wuhan City and Hangzhou City. The Wugongshan aspiring UNESCO Global Geopark is situated in the northern section of the Luoxiao Mountains on the border of Hunan and Jiangxi Provinces, belonging to the eastern edge of the second step of the Chinese terrain. The Mount Wugongshan spreads north-eastward and the terrain is high in the middle and low in the surrounding areas with an altitude of 150.0~1,918.3m. The Mount Wugongshan belongs to the subtropical monsoon climate zone, with the annual average temperature being 15°C and the annual average precipitation being 1,624.3~1,832.6mm. The water system belongs to the Yuanshui River and Lushui River of the Ganjiang and Xiangjiang tributaries of the Yangtze River. The flora belongs to the East Asian plant region with rich biodiversity. About 242,000 residents, mainly Han nationality, now live in the aspiring UNESCO Global Geopark, eesidents in are mainly engaged in agriculture, breeding and tourism services. The aspiring UNESCO Global Geopark is rich in natural and cultural landscapes and the Mount Wugongshan is a holy place for three religions, including Taoism, Buddhism, and Confucianism.

2. Geological features and geology of international significance

The Wugongshan aspiring UNESCO Global Geopark is located in the south of the suture zone of the Yangtze and Cathaysia blocks and belongs to the interior of the South China Block (SCB). It has experienced multiple tectonic events since the Neoproterozoic. The geological heritages are rich and well-preserved, making it a key area for studying the early formation of the SCB and the later intracontinental compression and extension. The most distinctive geological feature is a Mesozoic granite dome, which was developed on the Precambrian basement and the Early Paleozoic granites. As the Paleo-Pacific plate subducted underneath the SCB during the Mesozoic, the early Paleozoic granites in the core area of the Mount Wugongshan began to uplift, and the overlying sedimentary cap rocks slipped to the south and the north. A granite dome was finally formed during the Early Cretaceous, which is composed of the Early Paleozoic and Late Mesozoic granites in the core, detachment faults in a ring shape between the core and cap rocks, and Paleozoic-Early Mesozoic sedimentary cap rocks.

Affected by regional uplift and denudation during the Cenozoic, various unique geological heritage landscapes were formed in different structural locations of the Wugongshan granite dome, showing obvious vertical zoning characteristics. From the top to the foot of the mountain are developed the alpine meadow on the Early Paleozoic granite weathering crust, the Late Mesozoic granite peak forests, the Z-shaped steep slope waterfall groups and the ring-shaped "hot springs chain". The multi-level spatial distribution of these geological heritages together with the granite dome constitute a unique aspiring Geopark among the UNESCO Global Geoparks and are of high international significance.

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Applicant UNESCO Global Geopark

Nisyros, Greece

Geographical and geological summary

1. Physical and human geography

The Nisyros aspiring UNESCO Global Geopark occupies a total area of 481 km^2 within the south-eastern part of the Aegean Sea. It features exceptional onshore and offshore geomorphic features. The surrounding islets are Strongyli, Pachia, Pergousa (volcanic) and Kandeliousa (non-volcanic). The marine area between them consists of basins and ridges with volcanic fractures, craters, lava flows, hummocks and volcanic domes, representing the continuation of the volcanic relief onland below the sea.

The circular shape of Nisyros which is entirely composed of volcanic rocks covers an area of just 42 km^2 with a total width of 8.5 km and a coastal circumference of about 25km. The prominent cone shape makes it the most fascinating stratovolcanic edifice in Greece. It features volcanic eruption vents (necks, dome vents, cones) as well as hydrothermal explosion craters and emission spots (fumaroles, hot steam and hot springs). The most distinct structural feature of the island is the caldera, a huge collapsed crater among the island's peaks with a diameter of around 3.6 km. It is almost circular featuring steep walls with a drop of 300-400m between the northern and eastern rim. Inside the caldera, there is the Lakki plain of 110m above sea level to the east, and the voluminous rhyodacitic domes of up to 698m in height (Profitis Ilias) filling the western part.

Nisyros has a population of 1008 residents, while the surrounding islets of the Geopark are not inhabited. The capital of Nisyros is Mandraki and is the largest of the four villages (Emborios, Pali, Nikia). It is home to 681 residents out of the total population. All the settlements are considered as historically preserved areas and built with an eastward orientation, in order to be shielded from the western wind.

2. Geological features and geology of international significance

Nisyros aspiring UNESCO Global Geopark is part of the South Aegean Volcanic Arc, one of its most active and geotectonically complex regions that generated the largest volcanic eruption in the Eastern Mediterranean Sea (Kos Plateau Tuff), 161.000 years ago. The volcanic history of Nisyros has been generally assigned to five major episodes. In the beginning subaerial basaltic-andesitic volcanism determined the submarine volcanic base and the early shield volcano cycles, followed by the development of a composite stratovolcano surrounded by several satellite eruption centers. Two major rhyolitic Plinian type eruptions may have followed a caldera collapse, in the caldera forming cycle, followed by the final phase of rhyodacitic dome effusion that filled the western interior of the caldera. Following the last lava effusing stage, the volcano developed an active hydrothermal field that produced many phreatic eruptions, giving birth to its unique hydrothermal craters (Stefanos, Flegethron, Andreas, Mikros and Megalos Polyvotis, Kaminakia) lie at the bottom of the caldera. The last volcanic magmatic eruption dates to at least 24.000 years, leaving behind a hydrothermal system (steam and fumaroles) that is still active up to this day, while the last hydrothermal eruption occurred in 1887. The major faults cut Nisyros volcano into different tectonic blocks and all the Lakki hydrothermal craters are associated with them. The minor faults might be a result of the dominant conjugate fault systems. Thermal springs, partly combined with CO2 and H2S emissions and temperatures up to 60°C are bound to faults along the northern, north-eastern and southern shores at sea level. Their waters are mixtures of magmatic, meteoric and marine origin.

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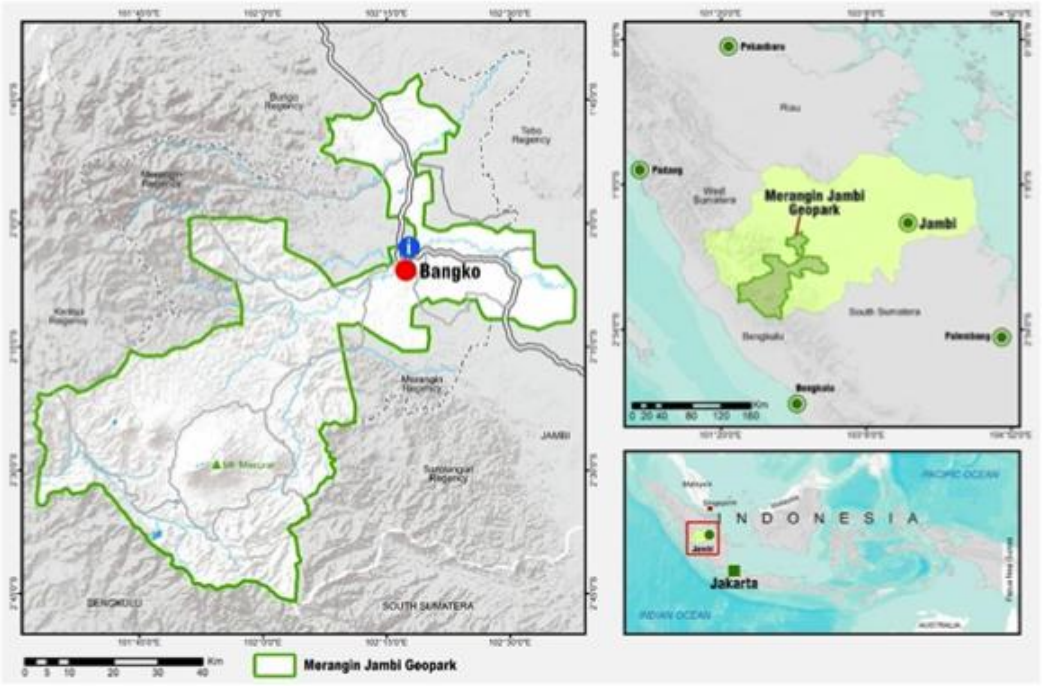
Applicant UNESCO Global Geopark

Merangin Jambi, Indonesia

Geographical and geological summary



1. Physical and Human Geography

The Merangin Jambi aspiring UNESCO Global Geopark (MJGp), with coordinates of 101° 32' 18.745" E - 102° 37' 54,745" E and 1° 42' 1.822" S - 2° 45' 58,555" S, is located in the central part of Sumatra Island, with Bangko as most important urban settlement (±150 km from Jambi City, 5 - 6 hours by road). This 4,832.31 km^2 area is entirely land based, with Mount Masurai (> 2,900 m asl) as highest peak. The MJGp, marked by a great diversity of landscapes, composed of mountains, craters, valleys, waterfalls, rivers, lakes and caves, is home to more than 4000 types of plants and 372 types of fauna species., including many rare and endangered species.

The population is predominantly of Malay ethnic origin (213,288 p.), the majority of whom are engaged in the agricultural sector. In an era where the world is increasingly shaped by technology and modern development, the local community here still maintains their ancestral culture, and the several traditional villages in the region are testimony of that. To support regional activities, there are several transport infrastructures available, such as public transport routes that connect regencies, cities and provinces, as well as a road network, most of which are in good condition. Several locations have provided facilities like interpretation panels, equipment for special interest activities, guides/ interpreters, printed and digital information media, and a MJGp information centre.

2. Geological Features and Geology of International Significance

The MJGp counts three main geological attractions that are truly unique: the fossils of “Jambi Flora”, representing the West Sumatra Terrane of Cathaysialand with Euramerican Flora, the karst landscape representing a Mesozoic era with prehistoric artefacts and the Masurai Caldera representing the Quaternary volcanic.

In the Early Permian, at the end of the Paleozoic glaciation, the ecosystem changed in such a way that the taxonomic statis that existed for plants forest in the Late Carboniferous was drastically disturbed. The early Permian fossils collection from the Geopark in the Mengkarang Formation consists of Parasequences, while the flora fossil Permian is composed of seed ferns flora like Pecopterids, Calamites and Cordaites, and rare new Permian Flora like Gigantopterids. Early conifers can also be found in Mengkarang, like the Tobleria bicuspis in the Merangin river.

The geological diversity in the MJGp area is also increasingly complemented by the karst stretches in the Manau River, resulting in a variety of landscapes, including exokarst and endokarst. The karst is formed by limestone, rock units shaped by a shallow sea exposure deposit, orientated towards the southwest. It belongs to the Peneta Formation of the Late Jurassic Member of Mersip. The rock layers contain molluscs and small veins of quartz and calcite.

The MJGp is completed with the Masurai Complex with tectonic volcanic phenomena, still active today, that have caused the formation of several landscapes such as lakes, waterfalls, and hot springs. The Caldera Masurai was formed by a large eruption, 6 on the VEI scale, that happened 33,000 years ago.

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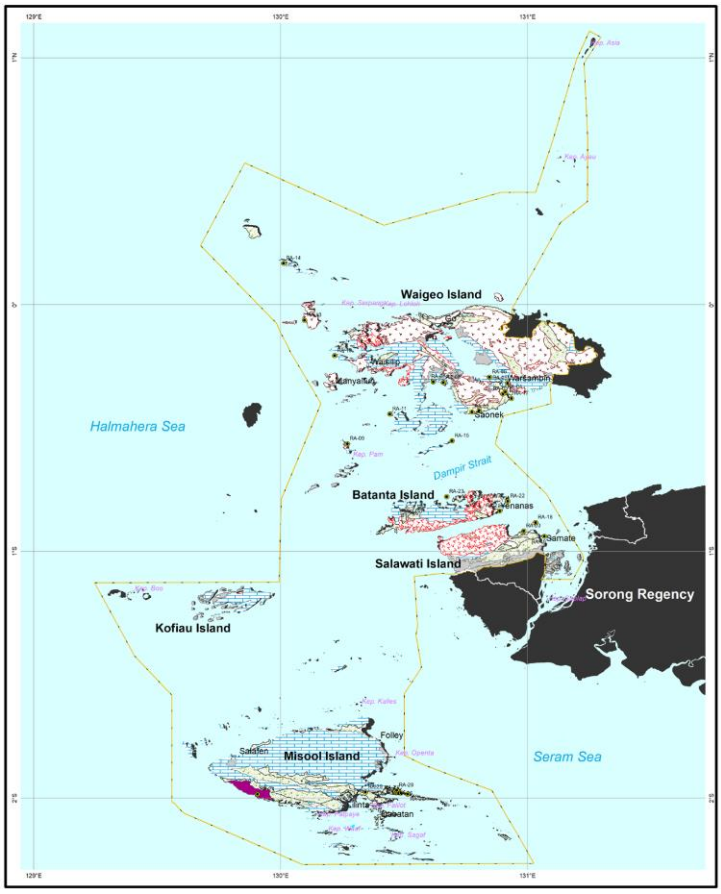
Applicant UNESCO Global Geopark

Rajah Ampat, Indonesia

Geographical and geological summary

aspiring UNESCO Global Geopark - Raja Ampat Geopark



The location of the

1. Physical and human geography

Aspiring UNESCO Global Geopark Raja Ampat is located in Raja Ampat Regency, West Papua Province, with coordinates 2°25'N-4°25'S & 130°-132°55'E. The Raja Ampat Geopark area includes 4 main islands, namely Waigeo Island in the north (including the Wayag Islands in the northernmost region), Batanta Island and Salawati Island in the middle, and Misool Island in the south. The sea area between the large islands and the surrounding small islands is an integral part of the Raja Ampat aspiring UNESCO Global Geopark area, which has an area of not less than 36,660 km^2.

Raja Ampat is bordered by North Seram Regency, Maluku Province in the south. In the west it is bordered by the Central Halmahera Regency, North Maluku Province. In the east it is bordered by Sorong, City and Regency, West Papua Province. To the north, it is directly bordered by the Pacific Ocean and the Republic of Palau. Raja Ampat district consists of 24 subdistricts, 121 villages, and the capital is Waisai, located in Waigeo Island. The main access towards Raja Ampat district is by the sea from the city of Sorong to Falaya Harbour in Waigeo and Yellu Harbour in Misool. It can be reached by plane through Marinda Airport in Waigeo. Raja Ampat District is populated by 64.141 people, with the density around 50 people per km^2. The most populated area is the city of Waisai and the population distribution is not even. The agricultural sector of Raja Ampat produces commodities such as banana, Morning Glory, coconut and farm animals. As an archipelagic region, it produces abundant maritime products, especially fish. The locals catch the fish in traditional ways such as by using fish rods, nets, spear guns, bubu, spears, and noose.

2. Geological features and geology of international significance

The area of aspiring UNESCO Global Geopark Raja Ampat exposes an old rock unit (Silurian-Devonian), with an age of almost one tenth of the age of the Earth. The overlain Mesozoic rocks include ultramafics, representing the ocean floor rocks, and together form the basement of karstic limestones. Strikingly, the karst topography is well developed in old (Eocene) as well as young (Miocene-Pliocene) limestones units.

The most unusual and omnipresent landscape in Raja Ampat is the Tropical Islands Karst, shaped by sea level rise in the Quaternary Period. The formation of this "archipelagic karst" in Raja Ampat continues until now, resulting in many caves, including those below the sea level. These places have become famous diving locations, because of the beauty of its underwater cave system, combined with the extraordinary marine mega-biodiversity.

In some places, on steep limestone cliffs and dissolving holes at the seafront, cave paintings are found. This rocks-art was made by prehistoric humans who had lived in the aspiring UNESCO Global Geopark area about several thousand years ago, demonstrating the close relationship between geological and cultural heritage in the Raja Ampat area.

The beautiful and well conserved landscapes are another attraction for visitors, to explore further the aesthetic value of the aspiring UNESCO Global Geopark k area. They come to Raja Ampat not only as tourists, but also as explorers. Geological structures such as joints and faults that facilitate dissolution and denudation produce islands of limestones of odd and unique shapes, such as those in the Wayag, Piaynemo, Kabui, and islets east of Misool.

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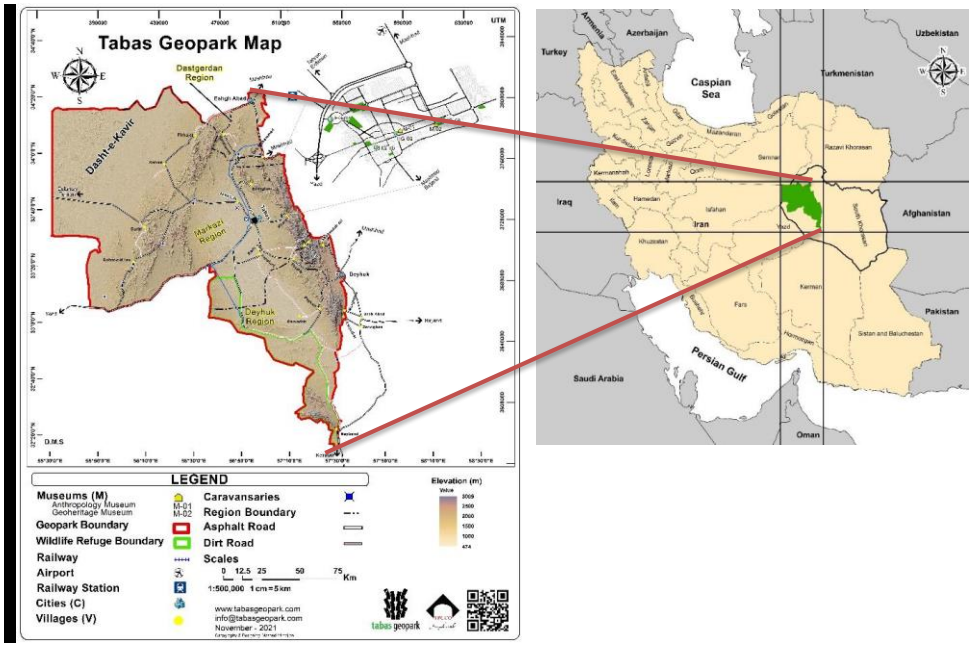
Applicant UNESCO Global Geopark

Tabas, Iran

Geographical and geological summary



1. Physical and human geography

Tabas aspiring UNESCO Global Geopark with geographical coordinates of 55,29,15E & 57,33,36E - 32,16,31N & 34,24,19N is located in the northwest of the South Khorasan Province and covers an area of 22,771 km^2. Tabas City is about 690 m above sea level and the highest peak of the region is Nayband Mountain (in the south of the Geopark territory) with a height of 3009 m a.s.l. There are also two other cities inside the Geopark territory: Deyhuk (85 km southeast of Tabas City) and Eshghabad (110 km north of Tabas City).

According to the 2016 census, the last census in Iran, the aspiring UNESCO Global Geopark is home to 72,617 people. They speak Persian and Tabas Local Language. A variety of landscapes from the plains to the high mountains is observed throughout the region and many valleys (Sardar, Jenni, Tafto, etc.) have been formed in the region due to active tectonics. Deserts and sand dunes are among other landforms typical for the area. Three important rivers in the east of the aspiring UNESCO Global Geopark originate from the Shotori Mountains. The climatic conditions are hot and dry. The air temperature varies between -8 to +50 degrees throughout the year. Agriculture is flourishing in this area, and a significant number of the residents are working in the various mines in the region. Tabas is considered as a transportation hub that connects the southwest, west and centre of Iran to the east and northeast of it with road, railway and air. The great cultural, historical and natural diversity attracts many tourists every year.

2. Geological features and geology of international significance

Tabas aspiring UNESCO Global Geopark has an active geological and structural history and is one of the complex geological units in Iran. This area is a collection of suspect terrains, which have been connected to each other during long geological periods along with tectonic movements and have formed a single territory. Nayband Fault in the east and Kalmard fault in the west of the aspiring UNESCO Global Geopark are among the most important basement faults in Iran. These faults have been formed since the beginning of the structural evolution of Central Iran and they divide the Facies and different sedimentary basins from the Infracambrian to Quaternary. Due to the specific geological conditions of this region, the process of geological and structural evolution in the Paleozoic does not correspond to the surrounding areas and the absence of obvious evidence of Eifelian hiatus (Middle Devonian) can be pointed out. In addition, this aspiring UNESCO Global Geopark features late carboniferous rocks that are found nowhere else in central Iran. The occurrence of intense subsidence during the Paleozoic and Mesozoic to the Cretaceous is another remarkable feature of this area.

Tabas aspiring UNESCO Global Geopark is unique, with a spectacular and great diversity of geological attractions, like the most complete Paleozoic sediments of Iran and West Asia and more than 20 type and reference sections of various formations. Hence, it is possible to see and study here all the geological attractions, including tectonics, sedimentology and sedimentary petrology, palaeontology, economic geology, petrology, and various mineral resources.

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Applicant UNESCO Global Geopark

Joyce Country & Western Lakes, Ireland

Geographical and geological summary

1. Physical and human geography

The Joyce Country and Western Lakes aspiring UNESCO Global Geopark is situated in the west of Ireland, which is located in northwest Europe. The coordinates, in decimal degrees, of the geographical centre are 53.563° lat, -9.459° long. The wider area, outside the aspiring Geopark region, is served by Galway City (30km from the boundary), and the larger towns of Clifden (20km away), Castlebar (10km away) and Westport (5km away). The boundary, covering 1560 km^2, is cross-county, crossing counties Mayo and Galway.

Two distinct geological regions are separated by three lakes. The uplands to the west in Joyce Country are made up of numerous mountains, rising from 400-800 m, and the lowlands to the east include the Western Lakes – Lough Carra (16 km^2), Lough Mask (81 km^2) and northern Lough Corrib (180 km^2). The climate is temperate (5.7 to 15°C) and moderated by waters from the Gulf Stream and prevailing westerly winds off the Atlantic. The region therefore receives regular rainfall and mild winters. Numerous habitats, such as peatland, limestone pavement, woodland, grassland, and freshwater, support the wide variety of flowers, insects, birds, and mammals living in them.

Our rural region is sparsely populated, with around 20,000 people, and 20 towns and villages. The largest concentrations of people are located to the east of the lakes. About a third of the area is Gaeltacht (native Irish speaking). Crafts indigenous to this part of Ireland are still practised and preserved, as are local styles of dancing, music, and sports. Economic activities in the area include agriculture (lamb and dairy), aquaculture, angling, outdoor activity providers, hospitality (accommodation and eateries), crafts and tour guiding.

2. Geological features and geology of international significance

The geology of international significance seen within Joyce Country and Western Lakes aspiring UNESCO Global Geopark can be seen over a small area of 1560 km^2. It is the opening of the Iapetus Ocean and the most complete record of the Grampian-Taconic Orogeny associated with its closing. It is part of an international story that spans from North America to Scotland and to Norway. Ten geosites help tell this story, and specific outcrops, such as the Currywonguan metagabbros, are important in the geoscience community as they allowed geologists to date the rocks and determine the sequence of events. Others, such as Connemara Marble, are important not only to tell part of our geological story, but as Ireland's national stone, it is also linked to the culture and heritage of the region and the country. Geological features seen in the region include igneous intrusions, structural geology, karst and glacial features.

The bedrock geology comprises rocks from the Precambrian, Ordovician, Silurian, Devonian, Carboniferous, Palaeogene and Quaternary and represent the various climates and conditions that Ireland experienced throughout its tectonic history. As a result, rocks from the three main rock types can be found throughout the region. Structural features include faults, folds, and unconformities. Eggbox pitting, limestone pavements, turloughs, caves, 'boulders in their sockets' (unique to the region), tube-karren, and springs, such as one the fastest flowing spring complex in the world at the village of Cong, make up the karst landscape found in areas of limestone bedrock. Geomorphological features, such as U-shaped valleys, drumlins, glacial deltas, moraines and Ireland's only fjord at Killary Harbour, are remnants of the glacial legacy which shaped the region to what we see today.

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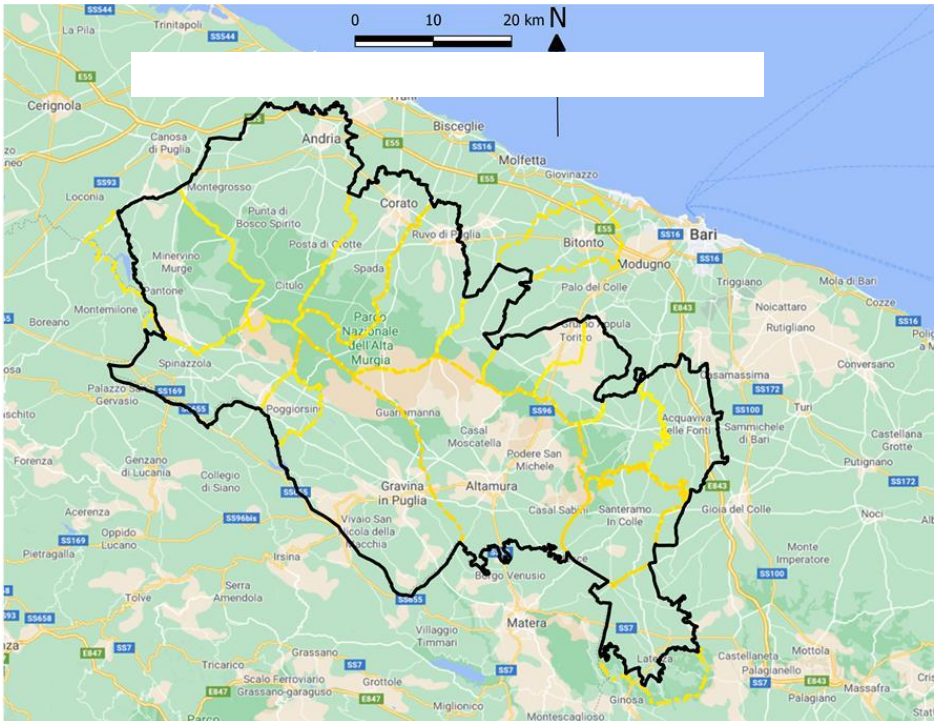
Applicant UNESCO Global Geopark

Murge (MurGEopark), Italy

Geographical and geological summary

Location of the Murge aUGGp (MurGEopark, Italy)



1. Physical and human geography

The area basically corresponds with the north-western Alta Murgia and the Premurge area of Puglia. The whole area is mainly hilly, with altitudes up to about 680 m a.s.l. (Torre Disperata, 686 m; Monte Caccia, 680 m). The Alta Murgia area is characterized by the occurrence of woods, karst caves, sinkholes, escarpments, depressions caused by water erosion (known as “lame” and “gravine”), extensive pastures, architectural elements and towns related to agricultural activity and pastoralism. The area comprises the Alta Murgia National Park, a protected area which covers approximately 68,000 hectares, and includes several Natura 2000 sites. The Premurge area is mainly clay with rounded hills hosting small villages.

The area includes the municipal territory of fifteen towns between the provinces of BA (Bari), BAT (Barletta-Andria-Trani), and TA (Taranto). The total population reaches about 440,000 inhabitants.There is a natural balance between the ancestral landscapes and the traditional houses (farms, jazzi, cisterns, dry stone walls), the agro-pastoral activities (pastoralism and agriculture), traditional food products, medicinal herbs and ancient routes of transhumance, called "tratturi". The aspiring Geopark area is marked by a rich biodiversity with different types of steppe and sub-steppe habitats, unique in Italy. There are about 124 wild species present, representing about 25% of the 500 recorded for Italy. The avifauna of the Murgia is among the most important of the steppe and semi-arid areas of the Mediterranean basin. Several international, national and regional laws protect the sites, justified by the richness of the environmental, landscape and historical-cultural components. (Directive 43/92/EEC, Directive 79/409 / EEC).

2. Geological features and geology of international significance

The aspiring UNESCO Global Geopark of Murge (MurGEopark) is located southeast of Italy and comprises the Alta Murgia area, where a Cretaceous sector of the Apulia Carbonate Platform crops out, and the adjacent Premurge area, where the south-westward lateral extension of the same platform turns toward the south Apennines Chain and is thinly covered by Plio-Quaternary foredeep deposits. The main features of international value to propose the area as a UNESCO Global Geopark are:

- the Alta Murgia area represents a virtually undeformed sector of Adria, a continental plate located between Africa and Europa, involved in subduction/collision processes. In the aUGGp, the crust is still rooted to its mantle, and the Cretaceous evolution of Adria is spectacularly recorded in the Murge area thanks to the limestone’s succession of one of the biggest peri-Tethyan carbonate platform (Apulia Carbonate Platform);
- the Premurge area represents the outer south-Apennines foredeep, whose Plio-Quaternary evolution is spectacularly exposed. An “anomalous” regional middle-late Quaternary foreland uplift led to expose a complete foredeep succession from the bedrock;
- the fact of hosting in situ two paleontological findings of very different age, a Neanderthal skeleton preserved in speleothems and one of the world’s widest surfaces with dinosaur tracks (with about 25.000 footprints) testify of its uniqueness.
- the water acts as a unifying element between two linked but extremely contrasting territories. The use and conservation of water in a karstic area, in addition to archaeology, ancestral urban settlements and caves used as traditional religious sites, show the close relationships between man and geology in the area and represent a good opportunity to disseminate the geological culture in a large and diverse audience.

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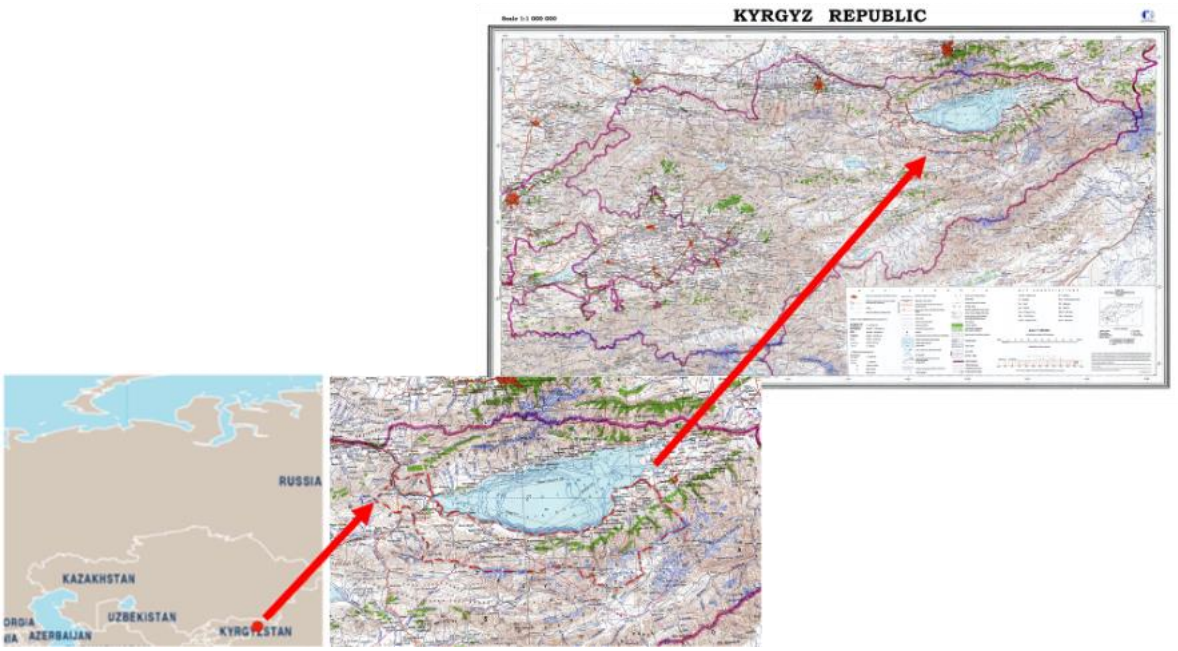
Applicant UNESCO Global Geopark

Teskei, Kyrgyzstan

Geographical and geological summary



1. Physical and human geography

Teskei aspiring UNESCO Global Geopark is located in the Teskei Ala-Too Mountains along the southern shore of the Ysyk-Köl Lake in Kyrgyzstan. The Teskei Ala-Too Mountains emerged as a result of the tectonic processes in Central Eurasia and the geomorphology of the Teskei aspiring Geopark is the reflection of these tectonic processes. They extend from east to west and are arranged sub-parallelly, which creates valleys in between the mountain ranges. Such a diversity of landscapes and landforms allow the visitors to observe diverse geological processes in a relatively small area. The Teskei aspiring Geopark's altitude ranges between 1,600 m and 5,000+ averaging at around 2,800 m above sea level. The diversity of landscapes includes coastal desert, semi-desert, steppe, forest, subalpine, tundra, and glacial landscapes.

The Teskei aspiring UNESCO Global Geopark is home for 170,000 people, with the vast majority of them (around 85%) being Kyrgyz, while the remaining 15% are made up by ethnic minorities such as Russians, Uzbek, Kazakh, Tatar, Dungan, and others. The residents are mainly engaged in livestock breeding, horticulture, and tourism services. Local households breed cattle, sheep, goats, and horses. The main horticulture crops are apricots and apples, which are exported mainly to Russia. The Ysyk-Köl region attracts from 0.5 to 1 million tourists annually and the vast majority of those tourists also visit the zone of the Teskei aspiring Geopark. The main powerhouse of tourism in the aspiring Geopark of Teskei are: 1. community-based tourism,

local households offer “bed and breakfast” services to local and international tourists; 2. eco- and ethnotourism, the zone is home for the local craftsmen who produce felt, traditional carpets, yurts, and horse tack.

2. Geological features and geology of international significance

The aspiring UNESCO Global Geopark contains rocks ranging from Proterozoic to Holocene. Geopark’s landforms comparative analysis of sediments and tectonic processes during different epochs. The geological evolution continues within the Teskei aspiring UNESCO Global Geopark and the area is prone to earthquakes, landslides, and other geohazards. Currently, the Ysyk-Köl depression continues to shrink by 4 mm per year due to the tectonic processes occurring in southern Eurasia. In general, the geological diversity is the result of the tectonic movements occurring far beyond the Tien Shan, which represents the Geoheritage of universal value of this geological site in terms of scientific research.

The Tien Shan’s basement was shaped during the pre-Paleozoic and covered by the geosynclinal troughs in the Paleozoic. The Teskei aspiring UNESCO Global Geopark contains Miocene-Pliocene (N1-2) formations, which are called the Ysyk-Köl Formation. The Juukinskaya Formation is composed of gray conglomerates. Its thickness is 500-750 m. The Ysyk-Köl Formation is composed of fine-clastic breccias, loams, sandstones, and gravelites. Its thickness is 500-1500 m. Different geological structures of the section in different places indicates different geological conditions of formation of these formations in a relatively small area. There are also the deposits of the Kyrgyz Formation from the Oligocene-Miocene (P3-N1) in the Teskei aspiring UNESCO Global Geopark. Numerous organic residues were found in the strata. The Teskei aspiring UNESCO Global Geopark also has the Kokdzhai Formation (C2 kd) from the Upper Paleozoic sediments. The underlying stratotype contains thin-layered cherry siltstones with sandstone interlayers (30 m) on top of them are dark gray layered sandstones (52 m). The section is crowned by the cherry-coloured fine-layered sandstone conglomerate (125 m). The total thickness is 207-960 m. The Kokdzhai Formation is the youngest member of the Paleozoic section, so its upper boundary is unknown.

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Global Geoparks

Applicant UNESCO Global Geopark

Rutas del Agua, Mexico

Geographical and geological summary

1. Physical and human geography

The Ruta del Agua aspiring UNESCO Global Geopark is located in the western sector of the state of Aguascalientes, 430 km northwest of Mexico City. It borders in the north, east, and west with the state of Zacatecas, and in the south with Jalisco. The aspiring UNESCO Global Geopark is basically rural, and includes the municipalities of Calvillo, San José de Gracia, Rincón de Romos, Pabellón de Arteaga, and Tepezalá in Aguascalientes, at the west and north of the state; with a surface of 246,244 hectares, almost 44% of the state surface. Aguascalientes is the third smallest state in Mexico, with 0.3% of the total surface of the country. The aspiring UNESCO Global Geopark has considerably lower population density, a bit over 194 000 inhabitants in 740 towns, most of them in the municipalities of Rincón de Romos, Pabellón de Arteaga (both in the Valley), and Calvillo, at the southwest of the entity, with a predominantly agricultural activity.

The municipalities in the proposed area for the aspiring UNESCO Global Geopark, offer a variety of touristic and recreational services based on natural and cultural resources of the northwest region of the state. They represent a contribution of 3.5% of economic units, 1.3% of occupied personnel, and 0.2% of the value of the total gross production related to tourism. It is worth mentioning that the entirety of the touristic companies of these municipalities are locally based, and not national or international franchises.

2. Geological features and geology of international significance

Aguascalientes is a state in central Mexico, located in the conjunction of three geological-physiographical provinces: the Central Plateau, which occupies the eastern and central part of the entity; the Western Sierra Madre, to the west, and a small entrance in the south of lacustrine and volcanic deposits which are part of the Neo-volcanic Axis or Trans-Mexican Volcanic Belt. The first two are part of the aspiring UNESCO Global Geopark, which takes up most of the Western Sierra Madre territory in the state, and a smaller portion of the Central Plateau in the north-east. The Western Sierra Madre is the largest outcrop of ignimbrites in the world, as a result of the volcanic activity and of the development of cauldrons during the Oligocene and the Miocene. In its relief we can identify a large lava plateau, canyons of up to 1,500 m in depth, a marginal slope on the west, and mountain lava elevations. The Central Plateau is considered as an intermountain depression, filled out in the Cenozoic by volcanic and carrying materials. Its relief corresponds to an inclined surface from south to north with ridges and isolated mountains. There are volcanic rocks, Mesozoic sedimentary, as well as intrusive and metamorphic. The plateaus and foothills are common.

The geology is predominantly volcanic, upon a sedimentary and volcano-sedimentary base, with igneous intrusion events. In its relief we can identify ridges, plateaus, eroded slopes, and valleys. The modelling of its relief is mainly originated by hydric erosion, whose transportation is directed towards the south of the state, inside the basin of the Verde River. The geological events can be identified according to their temporality as follows: 1. Mesozoic Units: calcareous and volcano-sedimentary sequences; 2. Mesozoic Intrusive: rhyolitic granites and porphyries; 3. Tertiary Volcanic Units: rhyolites, tuffs, andesites, and basalts; 4. Quaternary Units: alluvium and residual soils.

The rocks and structures that are present in the territory date as far back as the Jurassic and the Quaternary. They can be observed in outcrops of extrusive igneous rocks with higher predominance, intrusive igneous rocks, sedimentary rocks, metamorphic rocks, and alluvium and residual soils. Throughout the Jurassic and the Cretaceous sandstone and limestone were

deposited, which were deformed at late Cretaceous and early Tertiary, and which were affected by the positioning of intrusive igneous bodies. In the Inferior Tertiary continental clastic deposits of conglomerate eroded. After this phase, there were faults and fractures that produced volcanic eruptions that covered or filled out the topography. In the Mid-Tertiary, there were normal faults which created tectonic pits, as in the case of the valleys of Aguascalientes and Calvillo. During the late Tertiary and throughout the Quaternary, these tectonic pits were filled out by clastic and volcano-clastic material.

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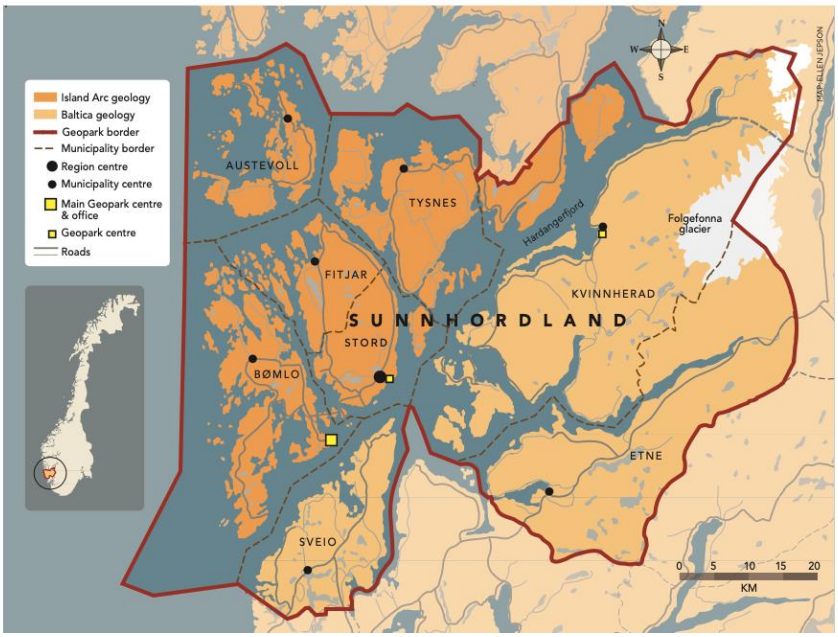
Applicant UNESCO Global Geopark

Sunnhordland, Norway

Geographical and geological summary



1. Physical and human geography

The aspiring UNESCO Global Geopark of Sunnhordland spans over 4.764 km^2, including a sea area of 1.765 km^2 and a land area of 2.995 km^2. It consists of the 8 municipalities in the region of Sunnhordland, in Vestland County on the west coast of Norway, with a population of 64.000 inhabitants. The region is easily accessible by air, boat, bus, or car. The highways E39 and E134 run through the Geopark crossing fjords on bridges or ferries. Most areas can be reached in 2-3 hours from the cities of Bergen and Stavanger. Within the aspiring UNESCO Global Geopark, most of the inhabitants live in villages and small towns, leaving large areas sparsely inhabited. The town of Leirvik in Stord municipality is the regional centre and a hub for infrastructure where the biggest shipyard and a university branch are situated.

The landscape offers a wide range of different sights appealing to various interests. The western part, facing the North Sea, consist of an archipelago at the mouth of the 183 km long Hardanger fjord. Many of the low islets that are exposed to the open sea barely have any vegetation. In contrast, larger islands in more sheltered waters are often overgrown with pine, deciduous forests and heather. At the eastern part of Sunnhordland alpine mountains are overlooking the fjord with the outer coast facing the North Sea. The largest mountain rises 1565 m.a.s.l. and is embraced by the Folgefonna Ice Cap, the 3rd largest glacier in Norway. The glacier is part of a national park and covers an area of 214 km^2. From the steep mountain sides waterfalls dive into the fjord, waterfalls and glaciers that have attracted tourists since early 1800's. Geologists took a special interest in the region when pyrite became a valuable resource in the 1850's, and exploitations of geo-resources have long traditions. This landscape became exposed as the ice rapidly retreated around 11.000 years ago.

The territory then became colonized by life and inhabited by humans. Stone age settlements started mining of the raw materials, and greenstone from the area became a valued commodity spread widely along the Norwegian coast. Numerous mines were later established as the demands for building materials, industrial minerals and metals developed. Today the landscape continues to sustain the society. The archipelago harbours fish farming, the glaciated mountainous areas support hydroelectric power production and aluminium production plants, and the sheltered deep fjords enables the construction of platforms for offshore petroleum industry and for the harvesting of wind energy. The diversity and quality of the exposures in the territory was recognized as a gift for teaching and training almost hundred years ago: The landscape is so distinct in its form, and so varied in display, that in many ways it can be viewed as a lecture book in geology. Since then, the area has been extensively used as a training-ground for students. Several thousand geology students enrolled at University of Bergen have had their first eye-opening field experiences in this area. The territory continues to be a key area for elementary and more advanced training, as well as for research in geology, archaeology and botany.

2. Geological features and geology of international significance

Most of the current growth of continents are related to magmatism associated with island arcs and continental arcs. Today, this growth takes mainly place along subduction zones within and along the margins of the Pacific Ocean. Old Mountain ranges represent ancient growth zones and, within aspiring UNESCO Global Geopark of Sunnhordland, two of the major ancient growth zones on Earth are juxtaposed. Whereas the oldest zone formed by continental arc magmatism, the younger formed by island-arc magmatism and by arc-continent and continent-continent

collision. The variety of plutonic and volcanic rock complexes that are exposed within these contrasting terrains display the rock types that make up the crust. The geology of the aspiring UNESCO Global Geopark is unusually varied. Within a small area a wide range of magmatic, metamorphic, and sedimentary rocks give insight into the deep crustal and surface processes that build continents.

This geology is exceptionally well exposed in spectacular and contrasting landscapes shaped by glaciers. The eastern part the territory is composed of an alpine and partly glaciated terrain that is crosscut by deep fjords. Westwards the landscape transforms into a low-relief archipelago composed of several thousand smaller and larger islands. A wide diversity of rock types, landscapes and climate zones result in habitats that range from the harsh environments of the glaciated mountains and the wave-washed skerries - to the rich boreal rain forests. A national park covers the glacier and the surrounding mountainous areas, and more than 50 natural reserves have been established within the archipelago.

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Applicant UNESCO Global Geopark

Busan, Republic of Korea

Geographical and geological summary

1. Physical and human geography

The Busan Aspiring Geopark is located on the south-eastern coast of the Korean Peninsula, a mid-latitude temperate climate zone with seasonal winds. The region is situated at the southernmost part of a geopolitical belt that connects Asia, Siberia and Europe, while being a main gateway to the Pacific Ocean. Due to its location, the city serves as one of the main hub ports within the global maritime transportation network. The aspiring UNESCO Global Geopark area has four seasons and stronger winds compared to other areas in Korea. The annual average temperature is 14.9°C and the annual average precipitation is 1,442mm. The size is 805.2 km² with a population of approximately 3.4 million residing within it.
The region is the perfect example of a harmonic landscape with rivers (e.g. Nakdonggang), sea and beaches (e.g. Dadaepo, Taejongdae, and Haeundae) and mountains (e.g. Geumjeongsan and Jangsan). There are beautiful offshore bars near the estuary, a coastline featuring superb beaches and scenic cliffs, mountains with excellent hiking trails and extraordinary viewpoints, and hot springs scattered throughout the city.

2. Geological features and geology of international significance

Geologically, the aspiring UNESCO Global Geopark area is composed of (1) dacitic and andesitic volcanic rocks of the Yucheon Group intercalated with (2) tuffaceous sedimentary rocks of the Dadaepo and Taejongdae formations, (3) rhyolitic rocks of the Yucheon Group, (4) Bulguksa Granitic Rocks intruding into older rocks, and (5) Quaternary alluvium, in ascending order.
The aspiring UNESCO Global Geopark shows the complex history of tectonic evolution, crustal deformation, basin development, and volcanic activity, as well as depositional pattern from the Cretaceous to the Holocene in East Asia. The area provides vast information on the paleoclimate, paleoenvironment and paleoecology during the period. There are five particular geological features of international significance.

- The Nakdonggang Estuary in this region is located where the Nakdonggang River meets the sea. This is the largest modern estuary with a delta at its mouth in Korea. The site shows the typical depositional pattern of Holocene deltas, with offshore bars, varying environments within the estuary system, and possesses high biodiversity (migratory birds, reeds, halophytes, etc.).
- Dadaepo Basin, located in the southeastern part of this region, contains well-preserved Late Cretaceous sedimentary deposits and geological structures (syn-depositional faults, neptunian clastic dikes, flower structures, soft sediment deformation structures, etc.). As such, it has important geological value for understanding crustal deformation, tectonic evolution, and the depositional history of the southeastern part of the Korean Peninsula.
- The Jangsan Volcano is a cauldron formed in the Late Cretaceous. It records the history of felsic volcanic activity in the SE Korean Peninsula. The Songjeong Pseudotachylyte is a fault rock formed during the collapse of the Jangsan Caldera and has important value for paleoseismic studies.
- Sand and gravel beaches (e.g. Dadaepo, Songdo, and Haeundae), small islands (e.g. Oryukdo), and erosional landforms, such as sea cliffs, wave-cut platforms and sea stacks (e.g. Taejongdae and Igidae) have developed along the coast. In addition to the outstanding sceneries, the sites possess great value for understanding the geomorphological process along the coastal areas.
- Orbicular gabbro, with less than 10 known localities throughout the world, has been reported in the Busan aspiring UNESCO Global Geopark area in Korea.

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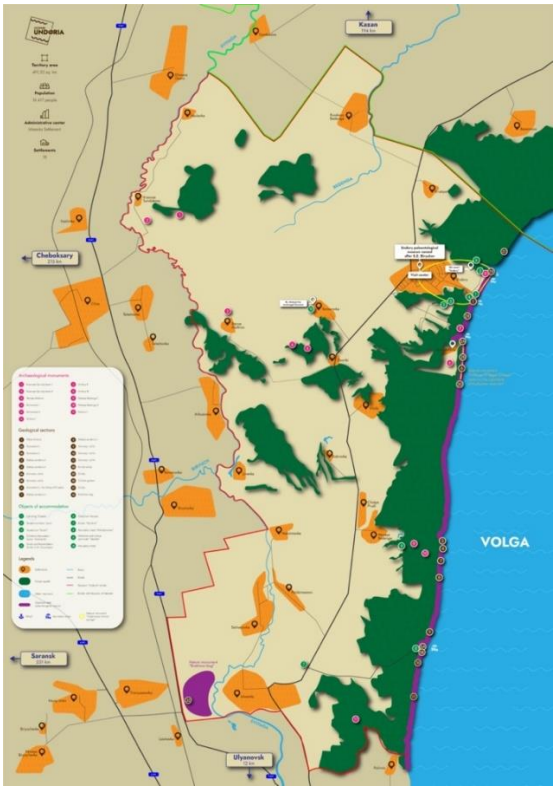
Applicant UNESCO Global Geopark

Undoria, Russian Federation

Geographical and geological summary



1. Physical and human geography

Undoria aspiring UNESCO Global Geopark is located in the Ulyanovsk district of Ulyanovsk region, in the central part of the Russian Federation, near the regional center, the city of Ulyanovsk. The Undoria aspiring UNESCO Global Geopark is in the interfluve of two rivers Sviyaga and Volga (partially the left bank of the Sviyaga River), bordering with the Republic of Tatarstan.

The surface of the Volga-Sviyaga interfluve, except the left bank of the Sviyaga, is a high plain, the so-called lower plateau of the Volga highlands, with absolute heights of 180-220 m a.s.l. The highest absolute mark is 238.6 m in the southern part, near the right slope of the Volga River valley. The lowest mark is represented by low-water edge of the Volga River - 48 m. The relief is eroded and, in some places, dissected, like for example the coastal part of the Volga River. The relief of the Volga River on the territory of Undoria aspiring UNESCO Global Geopark is shaped by wave abrasion and landslides. Landslides and landslide- flows are a common feature within the coastal strip. The Undor area is known as a mineral water outlet, the Volga River is the largest water body adjoining the territory along its eastern border and measures 39 km wide near Undory.

2. Geological features and geology of international significance

Tectonically the territory of the Undoria aspiring UNESCO Global Geopark is located in the eastern part of the East- European (Russian) platform, which covers most of the European territory of the Russian Federation. According to the drilling data, the platform basement is located within the territory at the depth of 1500-1600 m and is composed of Precambrian age rocks - granites, gneisses, and crystalline schists. On the left bank of the Volga River, Neogene and Quaternary deposits usually come to the surface, while on the right bank more ancient rocks are exposed - from Upper Jurassic to Paleogene inclusively. The deposits of the right bank of the Volga River form an extensive, but relatively shallow Ulyanovsk-Saratovsk (Simbirsk) trough (syneclise), whose axis runs along the western border of the Ulyanovsk region and has a sub meridional (southwestern) direction. Its central part is composed of Paleogene rocks, and at the periphery, layers of older rocks of the Cretaceous and Jurassic systems are exposed. The predominant southwestern dip of the strata causes the replacement of older rocks by younger rocks on the surface in the same direction. The aspiring UNESCO Global Geopark area is located northeast of the right bank of the Volga River, where Upper Jurassic and Lower Cretaceous rocks are developed. In the south-west direction, outside the aspiring Geopark, they are replaced by Upper Cretaceous and Paleogene.

The study of Upper Jurassic and Lower Cretaceous deposits of the Middle Volga region has a history of almost two centuries. The most representative Jurassic-Cretaceous boundary interval is revealed in a series of sections located on the Volga shoreline within the boundaries of the Geopark. These very transects are of great scientific interest and serve as a place for constant discussions on the topic of establishing the Jurassic-Cretaceous boundary - the only boundary between the systems for which the transect and point of the global stratotype boundary (GSSP) have not yet been selected. To date, no key event has been identified and no candidate transects have been proposed. This situation is caused by the specific paleogeographic situation on the Earth, which caused a high provincialism of fauna and flora at this time. The gradual change of regional complexes of guiding groups, together with the absence of any striking global "event" near the boundary of the systems, resulted in the impossibility of interregional correlation of

deposits. In Russia and other "boreal" regions, the Volga and Ryazan stages have been used for more than a century as equivalents of the Tithonian and Berriasian stages of the tethic scale, but their comparison is still debatable and has several unresolved issues. In 1964, the extended session of the Bureau of the Jurassic Commission of the Interdepartmental Stratigraphic Committee chose the Gorodishchi section as the lekto stratotype of the Volga Stage.

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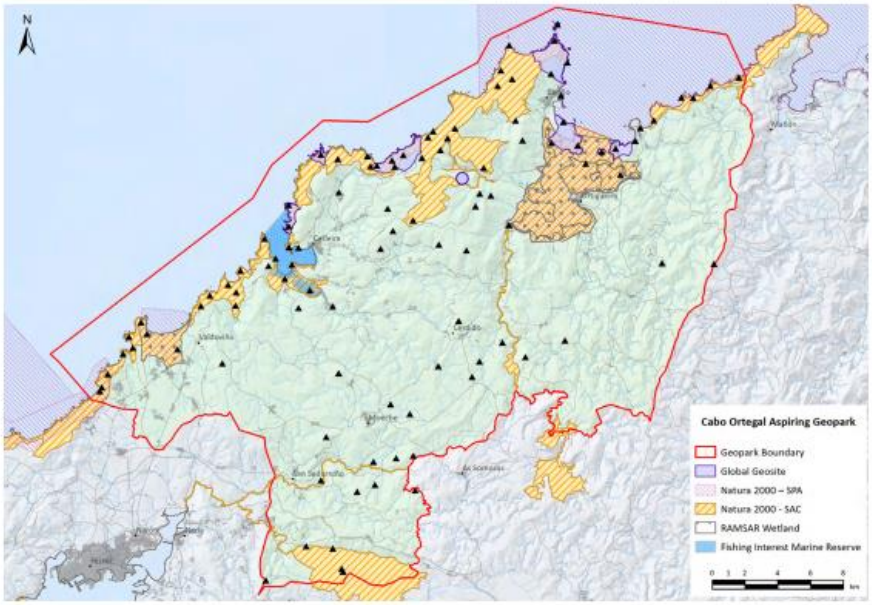
Applicant UNESCO Global Geopark

Cabo Ortegal, Spain

Geographical and geological summary



1. Physical and human geography

The surface area of the Cabo Ortegal aspiring UNESCO Global Geopark project is 631 km^2, spread over 7 municipalities. The total population of the territory is 27,683 inhabitants, with a total population density of 43.87 inhabitants/km$^{2.}$ There are however important differences between the coastal municipalities (75 inhab./km^2) and the inland municipalities (25 inhab./km^2). The territory is undergoing an important demographic crisis, since, in addition to the high dispersion, there is a clear tendency towards depopulation, due to the loss of nearby industrial activity (demographic loss rate of 29.62% in the last decade) and high population aging (population aging rate of 33.19%).

In terms of economic structure, there are 7 municipalities with rural characteristics, with a business structure dominated by microenterprises (1-2 people), and a strong dependence on the service sector (63% of employed people). It is followed in importance by the primary sector (12%), with an important fishing sector, and agricultural activities such as horticulture and fruit growing. It is therefore a territory highly dependent on tourism, both directly and indirectly, due to its commercial dynamism.

From the physical point of view, the territory is formed by low mountain chains that, in the north, lead to a very steep coast, with spectacular cliffs over 600 metres high. Also noteworthy are the rias, islets, coves and extensive sandy beaches, some associated with coastal lagoons, of great biodiversity. The inland area is dominated by small mountain chains, between 200-600 metres in altitude, cut by river valleys. The climate is oceanic, with abundant rainfall and mild temperatures throughout most of the year.

2. Geological features and geology of international significance

The geological characteristics of the territory of international relevance are related to the origin and rarity of the materials found there. Most of the geological formations are related to the closure of the Rheic Ocean during the Variscan Orogeny. An orogeny that allowed the exhumation of a large number of rocks present today in the territory of the Cabo Ortegal aspiring UNESCO Global Geopark. This explains the presence of Upper Mantle rocks (peridotites, pyroxenites and serpentinites) and Lower Crust rocks (eclogites, granulites, amphibolites, gneiss, gabbros...) that have made this place a true geological showcase of the interior of our planet. But the international importance of this territory is also due to the excellent visualization of the Mohorovicic discontinuity, showing good examples of mantle layering: the largest eclogite outcrop in the world, a complete ophiolitic sequence of the Upper Palaeozoic, acidic-intermediate submarine Ordovician volcanism, chromium and platinoid mineralizations associated with mantle rocks, the presence of recumbent folds affecting the crust-mantle interface, the wide and varied outcrops of granulites or the important shear zones and structures associated with strike- slip faults during the tectonic stacking of the Variscan orogeny.

These are some of the many examples of geological heritage of international importance. But also, from a geomorphological point of view, it is an outstanding territory. The cliffs of the coastline, formed during the Alpine Orogeny and in some cases over 600 metres high, have undoubtedly given the landscape of this area its most distinctive feature.

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Applicant UNESCO Global Geopark

Costa Quebrada, Spain

Geographical and geological summary

1. Physical and human geography

Costa Quebrada aspiring UNESCO Global Geopark spans over an area of 473 km^2 on the rolling hills of the central coast of Cantabria, north of Spain, in the district historically known as La Marina. The Mesozoic and Cenozoic deposits over which the area lies are clearly separated from the more rugged reliefs of the interior valleys (La Montaña) by the thrust fault and straight ridge of the Escudo de Cabuérniga and its Carboniferous and Permian outcrops. The lower stretches of rivers Pas and Saja run meanderingly across this territory to meet the Bay of Biscay, forming well developed estuaries. Several prominences stand out in this gentle relief. The periclinal terminations and mesas at the axis of the San Román-Santillana syncline reach its highest altitude at El Tolío (La Picota) Hill, with 246 m. above sea level. Some other prominent reliefs include the limestone outcrops of Camargo and the interfluvial hills in southern Piélagos.

The dominant oceanic climate provides mild summers and winters, and moisture loaded oceanic air masses deliver 1.129 mm/year rainfall when stopped by the Cantabrian Mountains. The broad-leaved woodlands naturally occurring in the area have largely changed along time into a meadow and agricultural landscape, due both to historical and economic reasons. Livestock farming and agriculture, still active in most of the area, has progressively been substituted by tourism and services industry. Also, in urban areas, industry was important in the recent past before its decline.

The eight municipalities comprised in the park add up to a population of 265.079 inhabitants that are asymmetrically distributed. The eastern part is the most densely populated, as it includes the urban and metropolitan areas of Santander, the capital city of Cantabria.

2. Geological features and geology of international significance

Costa Quebrada is geologically located in the North Cantabrian Basin, next to the Asturian Paleozoic Massif. It is characterized by sedimentation in terrestrial first, and marine environments later, during some 200 Ma throughout Mesozoic and Cenozoic Eras, with the Cretaceous as the best represented period. During the depositional history of the area, a sequence of alternating regressive and transgressive stages-controlled erosion and deposition in the basin. Terrigenous sediments from the Asturian Massif alternated with carbonate formation in sequenced deltaic to marine environments from Early Cretaceous until Eocene. During the Eocene to Miocene, the Alpine Orogeny formed the major geological structure in the aspiring UNESCO Global Geopark area.

The WSW-ENE San Román-Santillana syncline is characterised by contrasting lithological types and different structure/coastline orientations. The progressive continental uplift, and some other sea level variations, also gave rise to a sequence of several levels of raised wave-cut platforms and beaches, formed during the periods between elevation pulses. Some of them are still clearly visible in the area, albeit retouched by rivers and gravitational processes.

The strata tilt and orientation, from subvertical to horizontal, and parallel to perpendicular to the coastline, or the contrasting lithologies regarding erodibility determine to a great extent a rich and expressive catalogue of littoral geomorphology, representative of a retreating coastline. The evolution of erosive modelling in the area can be clearly observed and reconstructed through the analysis of a great variety of morphologies and outcrop erosive behaviour. Also, the presence of limestones forms valuable cavities listed as UNESCO World Heritage.

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Applicant UNESCO Global Geopark

Busan, Republic of Korea

Geographical and geological summary

2. Physical and human geography

The Busan Aspiring Geopark is located on the south-eastern coast of the Korean Peninsula, a mid-latitude temperate climate zone with seasonal winds. The region is situated at the southernmost part of a geopolitical belt that connects Asia, Siberia and Europe, while being a main gateway to the Pacific Ocean. Due to its location, the city serves as one of the main hub ports within the global maritime transportation network. The aspiring UNESCO Global Geopark area has four seasons and stronger winds compared to other areas in Korea. The annual average temperature is 14.9°C and the annual average precipitation is 1,442mm. The size is 805.2 km² with a population of approximately 3.4 million residing within it.
The region is the perfect example of a harmonic landscape with rivers (e.g. Nakdonggang), sea and beaches (e.g. Dadaepo, Taejongdae, and Haeundae) and mountains (e.g. Geumjeongsan and Jangsan). There are beautiful offshore bars near the estuary, a coastline featuring superb beaches and scenic cliffs, mountains with excellent hiking trails and extraordinary viewpoints, and hot springs scattered throughout the city.

2. Geological features and geology of international significance

Geologically, the aspiring UNESCO Global Geopark area is composed of (1) dacitic and andesitic volcanic rocks of the Yucheon Group intercalated with (2) tuffaceous sedimentary rocks of the Dadaepo and Taejongdae formations, (3) rhyolitic rocks of the Yucheon Group, (4) Bulguksa Granitic Rocks intruding into older rocks, and (5) Quaternary alluvium, in ascending order.
The aspiring UNESCO Global Geopark shows the complex history of tectonic evolution, crustal deformation, basin development, and volcanic activity, as well as depositional pattern from the Cretaceous to the Holocene in East Asia. The area provides vast information on the paleoclimate, paleoenvironment and paleoecology during the period. There are five particular geological features of international significance.

- The Nakdonggang Estuary in this region is located where the Nakdonggang River meets the sea. This is the largest modern estuary with a delta at its mouth in Korea. The site shows the typical depositional pattern of Holocene deltas, with offshore bars, varying environments within the estuary system, and possesses high biodiversity (migratory birds, reeds, halophytes, etc.).
- Dadaepo Basin, located in the southeastern part of this region, contains well-preserved Late Cretaceous sedimentary deposits and geological structures (syn-depositional faults, neptunian clastic dikes, flower structures, soft sediment deformation structures, etc.). As such, it has important geological value for understanding crustal deformation, tectonic evolution, and the depositional history of the southeastern part of the Korean Peninsula.
- The Jangsan Volcano is a cauldron formed in the Late Cretaceous. It records the history of felsic volcanic activity in the SE Korean Peninsula. The Songjeong Pseudotachylyte is a fault rock formed during the collapse of the Jangsan Caldera and has important value for paleoseismic studies.
- Sand and gravel beaches (e.g. Dadaepo, Songdo, and Haeundae), small islands (e.g. Oryukdo), and erosional landforms, such as sea cliffs, wave-cut platforms and sea stacks (e.g. Taejongdae and Igidae) have developed along the coast. In addition to the outstanding sceneries, the sites possess great value for understanding the geomorphological process along the coastal areas.
- Orbicular gabbro, with less than 10 known localities throughout the world, has been reported in the Busan aspiring UNESCO Global Geopark area in Korea.

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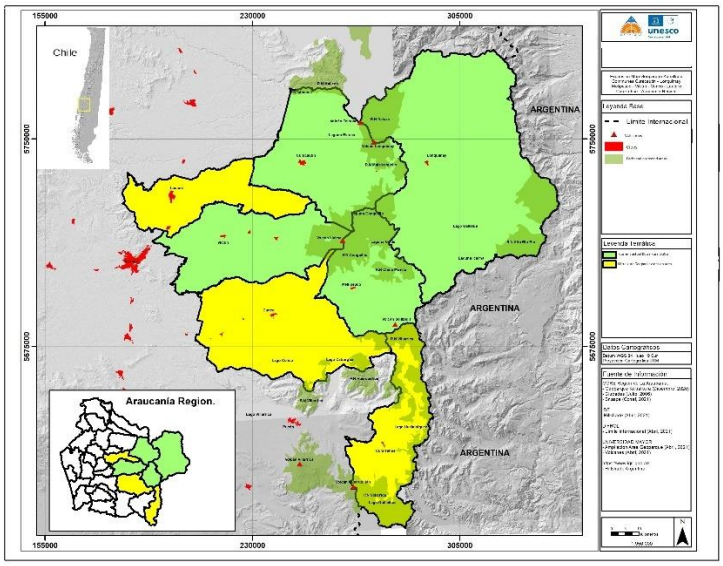
UNESCO Global Geopark Extension > 10%

Kutralkura, Chile

Old area: 8.053 km^2
New area: 12.078 km^2

Geographical and geological summary



1. Physical and human geography

Kutralkura UGGp is located between 38°05'S and 39°38'S, and between 70°50'W and 72°40'W, approximately 15 km from Temuco and 700 km from Santiago. The eastern limit coincides with the border of the Republic of Argentina. Its original area covers the municipalities of Curacautin, Vilcun, Lonquimay, and Melipeuco, with a surface of approximately 8,053 Km^2. With the present application dossier, the UNESCO Global Geopark proposes expanding the territory to 12,078 Km^2, including now also the communes of Lautaro, Cunco and Curarrehue, and the Association of Cordilleran Municipalities of Araucania, the entity responsible for its management.

The main geographic characteristic is the presence of six active volcanoes: Tolhuaca (2,806 m), Lonquimay (2,865 m), Llaima (3,179 m), Sollipulli (2,282 m), Quetrupillan (2382 m) and Lanin (3,776 m). The extinct Sierra Nevada (2554 m) volcano is also an important element of the area. Additionally, the geomorphology shows the action of glaciers that covered part of the territory about 20,000 years ago. The most important water bodies are of glacial origin: Galletue, Icalma, Collico, and Caburgua Lakes. The main rivers are Cautin, Trancura, Lonquimay, Curaco and Allipen. The average annual rainfall is 1,550 mm, while the averages of the minimum and maximum temperatures are -18 °C and 39 °C, respectively. The ecosystems include forests, wetlands, high Andean prairies, scorias and areas of high peaks. Within the extended Kütralkura UGGp, the total population increased to 124,981 inhabitants, mostly rural (45,6%). There are 7 main urban centres: Cunco, Curacautín, Curarrehue, Lautaro, Lonquimay, Melipeuco and Vilcún and numerous Mapuche-Pewenche indigenous communities.

2. Geological features and geology of international significance

The rocks of the territory record a geological history of more than 300 million years associated with the convergent margin of the South American plate. In these active plates margin, several oceanic plates have been recycled under the continent through the subduction process, generating intense volcanic and tectonic activity. Currently, it is the Nazca plate that subducts under the continent and that gives rise to the Andes Mountain range. The active volcanoes within the Geopark are Llaima, Lonquimay, Tolhuaca Nevados de Sollipulli, Quetrupillan and Lanin. In particular, the Llaima volcano is one of the most active in the country, concentrating, together with the Villarrica volcano, more than 50% of the historical eruptions recorded in Chile since the 16th century. The territory features a great geodiversity:

- Futrono – Riñihue Batholith (upper Carboniferous – Permian)
- Strata of Huenucal Ivante (Pre-Jurassic?)
- Nacientes del Biobio Formation (Lower to Upper Jurassic)
- Jurassic and Cretaceous Batholith (Upper Jurassic to Upper Cretaceous)
- Volcanic Rocks from Cretaceous to Paleogene
- Cura Mallin Formation (lower to middle Miocene)
- Eocene - Miocene Batholith (Eocene – Miocene)
- Strata of Huichahue (Miocene)
- Mitrauquen Formation (Upper Miocene)
- Western Volcanic Association (Pliocene-lower Pleistocene)
- Volcanic Association of the Eastern Precordillera (Lower Pliocene to Upper Pleistocene)
- Volcanoes of the Principal Mountain Range (Quaternary)
- Glacial Deposits
- Non-Consolidated Deposits (Quaternary)

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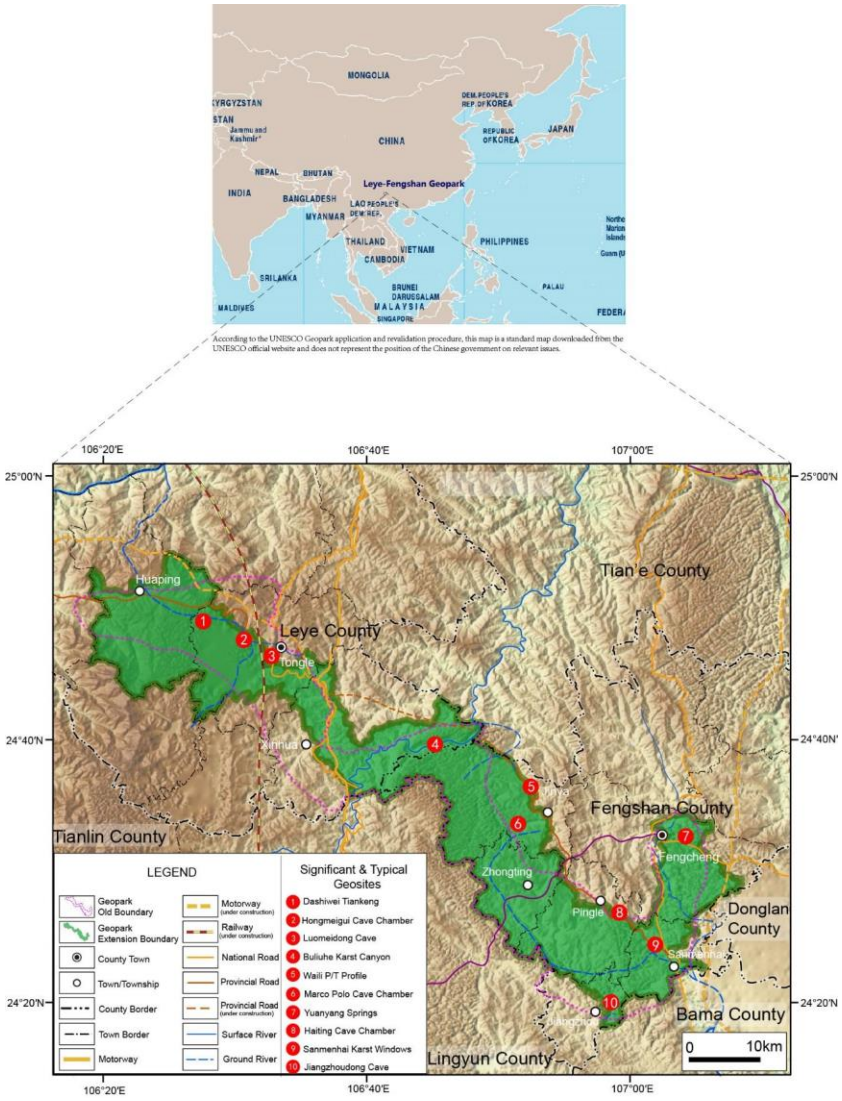
UNESCO Global Geopark Extension > 10%

Leye Fenshan, P.R. China

Old area: 930 km^2
New area: 1.113 km^2

Geographical and geological summary



1. Physical and human geography

Leye-Fengshan UNESCO Global Geopark (extension) is situated in Leye County and Fengshan County, Guangxi Zhuang Autonomous Region, China. It covers a total area of 1,113 km^2 after extension of its 930 km^2 original area. It consists of 2 communities and 59 villages belonging to 9 townships bordering clearly the administrative boundaries with geographically coordinates of 106°18'50" - 107°08'42"E, 24°18'21"- 24°54'33"N. Leye and Fengshan county towns are 350 km and 365 km from Nanning City, 250 km and 366 km from Guiyang City, 89 km and 140 km from Baise City respectively by motorways.

Leye-Fengshan UNESCO Global Geopark is located in the transition zone between the Yunnan-Guangxi Plateau and Guangxi Basin, sloping down from northwest to southeast, with elevations of 1982-412 m. The Geopark region belongs to the mid-subtropical humid monsoon climate area with abundant rainfall and distinct dry and wet seasons. The annual average temperature is 16.4-19.2 °C, and the annual average rainfall is 1356.4-1550.7 mm. The rivers in the area belong to the Hongshuihe River catchments area and eventually flow into the Pearl River. There are three main rivers, i.e., Bailang subterranean River, Poyue subterranean River and Buliuhe surface river in the UNESCO Global Geopark. The population is 131,400 in the whole area of the UNESCO Global Geopark till 2020, accounting for 32.54% of the total population of Leye County and Fengshan County. It is a gathering place of many ethnic minority groups including Zhuang, Han, Yao, Miao, Buyi, Yi, etc., and has rich culture heritages.

2. Geological features and geology of international significance

The geo-tectonic structure of the UNESCO Global Geopark is situated at the southwestern margin of the Yangtze block and the northwest of the Youjiang Basin of the East Tethys tectonic region. It covers the Yangtze stratigraphy region and the Nanpanjiang stratigraphy region; The exposed strata are mainly of Devonian, Carboniferous, Permian and Triassic rocks, 99% of them are sedimentary rocks, 75.09% are carbonate rocks; in addition, intrusive rocks such as granite are scattered near the fracture zone, without any metamorphic rocks.

Leye-Fengshan UNESCO Global Geopark is famous for "the kingdom of tiankengs and the country of caves" and features international significant geo-heritages such as Dashiwei tiankengs (great collapsed doline cluster), Sanmenhai karst windows (cluster), caves and very large cave chambers, huge natural bridges and P/T Profile, etc. From subterranean rivers to cave chambers, from karst windows, to tiankengs, dolines and valleys, the area vividly records the evolutionary sequence of karst landforms. It consists of six major categories of geosites, including geological heritages of karst landforms, strata, paleontological fossils, rocks, structures and water. The UNESCO Global Geopark is a unique high-quality, multi-type karst Geopark with magnificent karst landscape as the core tourism resource.

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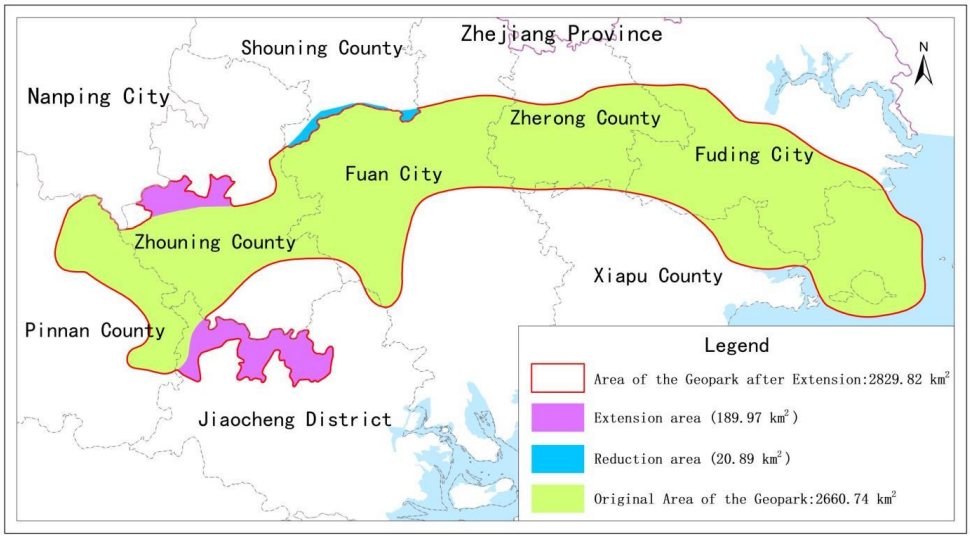
UNESCO Global Geopark Reduction < 10%

Ningde, P.R. China

Old area: 2,660.74 km^2
New area: 2,829.82 km^2

Map of Ningde UNESCO Global Geopark's Area Adjustment

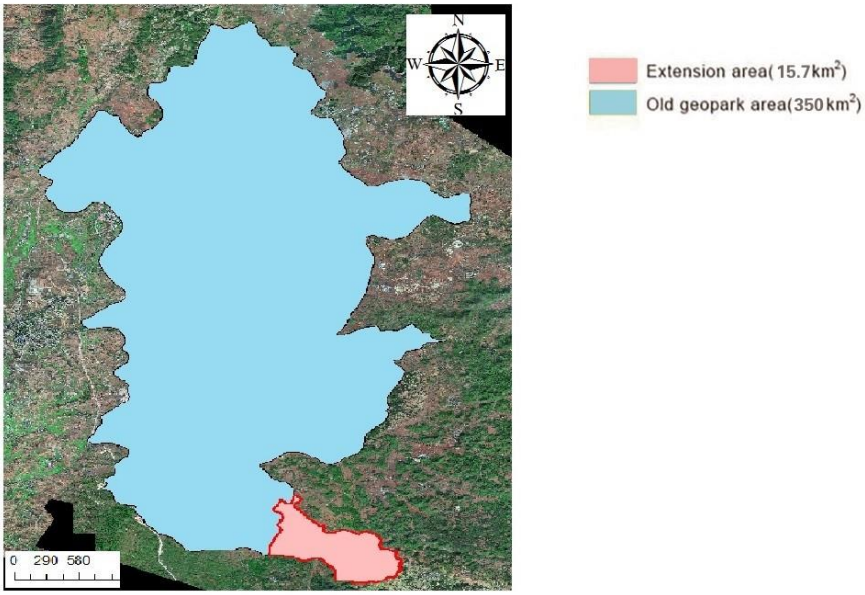


UNESCO Global Geopark Reduction < 10%

Shilin, P.R. China

Old area: 350 km^2
New area: 365.7 km^2

Map of Shilin UNESCO Global Geopark indicating the extension area

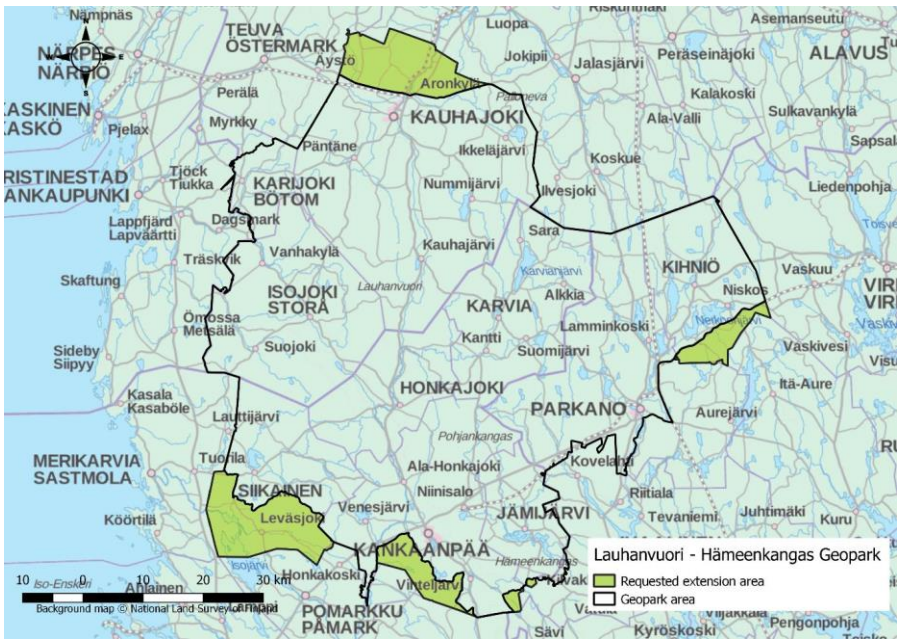


UNESCO Global Geopark Reduction < 10%

Lauhanvuori- Hameenkangas, Finland

Old area: 4.908 km^2
New area: 5.394 km^2

● Location of Lauhanvuori - Hämeenkangas UNESCO Global Geopark



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UNESCO Global Geopark Reduction < 10%

Toya Usu, Japan

Old area: 1.180 km^2
New reduced area: 1.064 km^2

* This map is a standard UN map downloaded from the UNESCO official website and does not represent the position of the Japanese Government.