

宁德联合国教科文组织世界地质公园  
Ningde UNESCO Global Geopark



周宁 Zhouning

九龙瀑 Geosite!

九龙瀑简介

Introduction to Jiulongji of Ningde UNESCO Global

九龙瀑景区位于宁德联合国教科文组织世界地质公园西北部，景区集火山岩山岳峡谷地貌、花岗岩地貌、水体景观等地质地貌于一体；千姿百态的火山岩山峰、险峻幽深的火山岩峡谷和众多不同类型的火山岩地貌景观密集分布，与优良的生态环境一起构成了一幅精彩的风景画卷。区内主要出露形成于距今9000万年前火山喷发形成的火山岩以及花岗岩，特殊的岩石、地质构造和外动力地质作用，造就了九龙瀑独具特色的峡谷地貌和水体景观。

Jiulongji is located in the northwest of Ningde UNESCO Global Geopark, integrating volcanic rock mountain landform, granite landform, water landscapes and so on; various types of landscapes of volcanic rock mountains, steep and deep volcanic gorges and different types of volcanic landscapes are densely distributed in the area, which constitute a beautiful picture with favorable ecological environment. The exposed rocks in this area were formed in the Late Cretaceous (90 million years ago), which are volcanic rock and granite. The special rock types, geologic structure, climate, and other external geologic forces jointly make the distinctive valley and water landscape at Jiulongji .

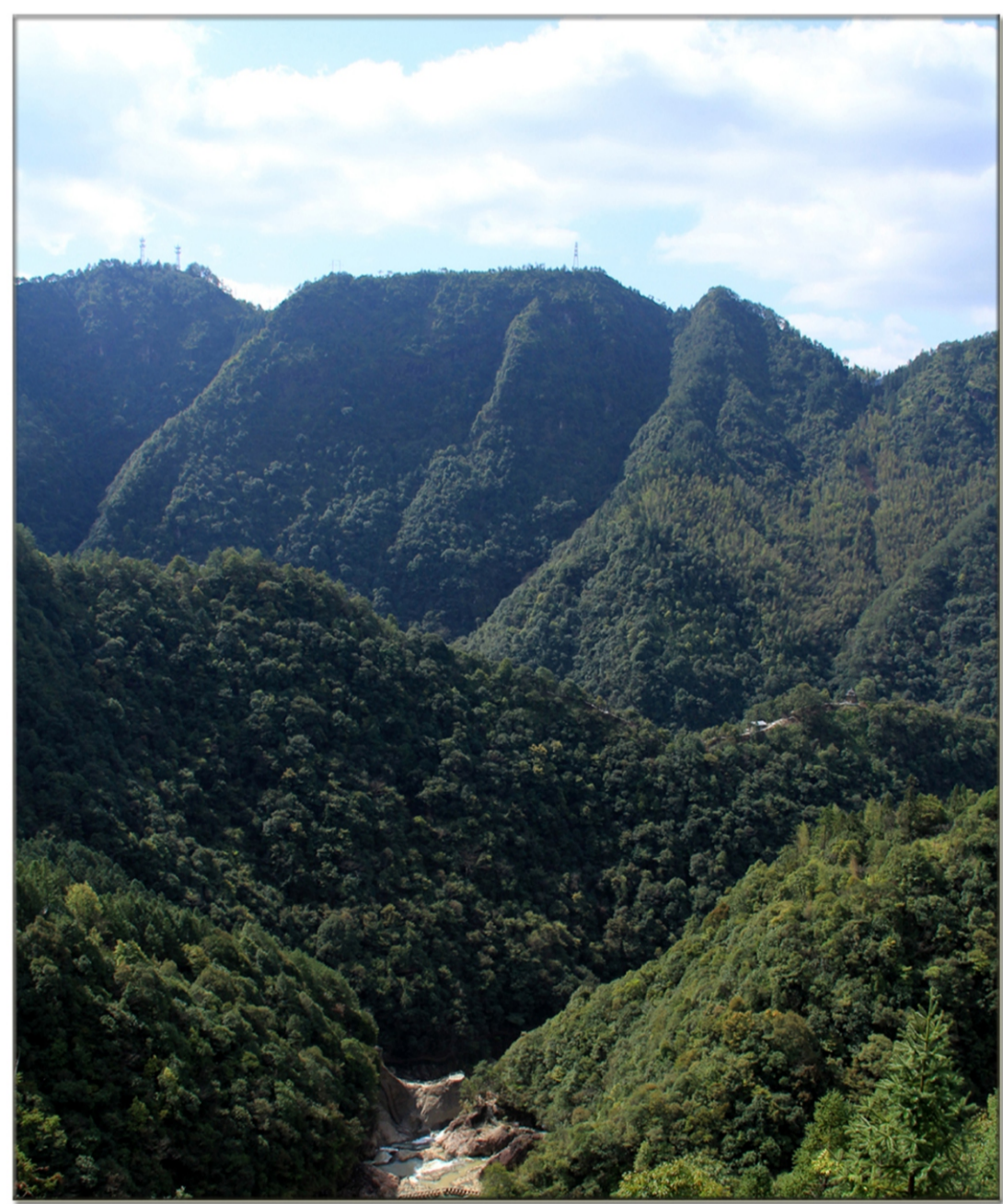


九龙瀑瀑布群由九级瀑布组成，长800多米，落差200多米。九级瀑布逐级奔腾而降，虎啸雷鸣，气势磅礴，是罕见的群瀑景观，享有“华东第一瀑”的美誉。瀑布是河流地貌景观的一种，在地质学上被称为“跌水”，瀑布是水流过溪流或河流的一系列陡峭下降的河道而垂直跌落。那么瀑布是怎么形成的呢？

Jiulongji Waterfalls: It a nine-level waterfall, with a total length of 800 meters and the total drop is more than 200 meters. The magnificent nine grades roaring waterfalls, enjoying a reputation of "the biggest waterfall of eastern China, descending step by step, sounded like roars of tigers and thunder, which is a rare waterfall landscape. A waterfall is a place where water flows over a vertical drop or a series of steep drops in the course of a stream or river. How do waterfalls form?

周宁地区在白垩纪（时间在约一亿年前后）发生了大规模的火山喷发和岩浆侵入活动，形成了大面积的火山岩和花岗岩。经过后期的断裂切割、地壳抬升和以水流为主的风化剥蚀作用，周宁形成了现在地势总体向东南倾斜，东、南、西三面为深切峡谷环绕，中部为海拔较高的山地的地形格局，同时也形成了多姿多彩的火山岩和花岗岩地貌景观。

A large scale volcanic eruption and magma intrusion occurred in Zhouning area at the Cretaceous (about 100 million years ago), which thereof formed a big area of volcanic rock and granite landscapes. After the fractional cutting, the crustal uplift and the weathering denudation caused by running water, the present landform in Zhouning, that is overall dipping southeast, had eventually formed, who has high mountains in the center and is surrounded by deep-incised valleys in the east, south and west sides, as well as the varied and graceful volcanic rock and granite landscapes .



周宁九龙瀑地区属于河流的上游，常常发育有典型的河流地貌，比如V形谷和交错形山咀，河流的上游还常常发育瀑布、壶穴。

Jiulongji of Zhouning in Ningde UGGp is located at the upper course of the river and has developed typical river landforms in upperstream, such as V-shaped valleys, waterfalls, Zig-zag bends (interlocking spurs), and potholes.

瀑布是怎么形成的？  
How do waterfalls form?

形成瀑布的原因很多，主要原因有两个：

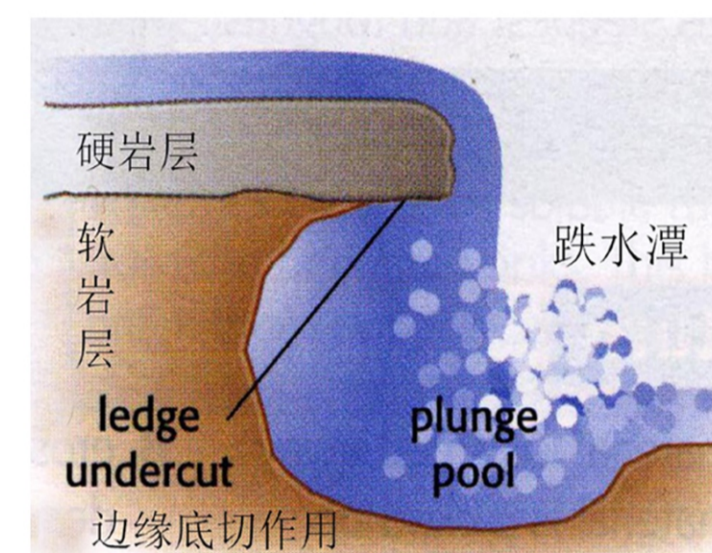
1. 由于软硬岩层不同，差异风化与侵蚀而形成瀑布

1. Due to the different rock types of soft and hard rock formations, the differential weathering and erosion lead to the formation of a waterfall.



软岩层容易被侵蚀，但相对坚硬的岩石抗风化和侵蚀能力强，随着时间的推移，比较坚硬的岩石发育成突出的边缘。

Soft rock is easy to erode, but the hard rock is resistant So over time a ledge develops.



流水冲刷过突出的岩壁，飞流而下，通过磨蚀和水的作用侵蚀而成瀑布下方的跌水潭。

The water rushes over the ledge and erodes a plunge pool by abrasion and hydraulic action.



突出的岩石边缘（较硬的岩石）被侵蚀崩塌到跌水潭，岩石碎片有助于加速侵蚀。

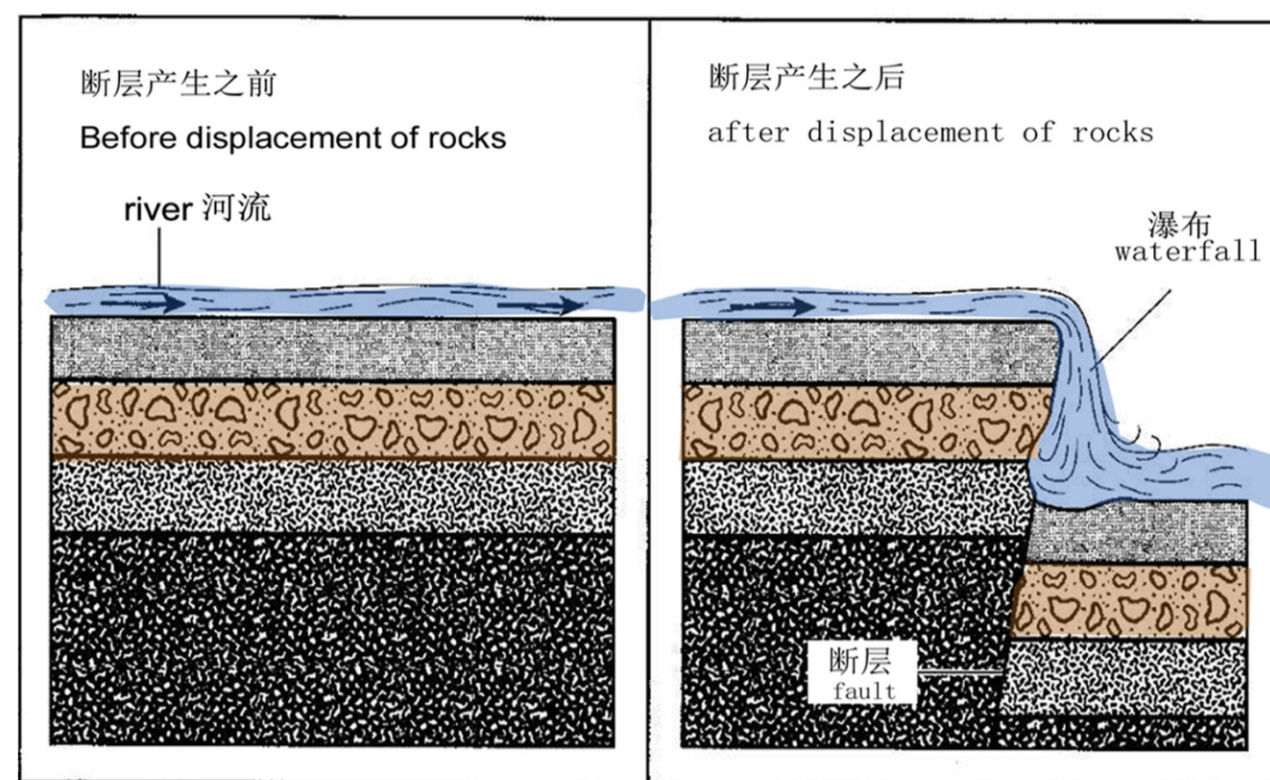
The ledge collapses into the plunge pool, where the debris helps to speed up the erosion.

瀑布可能因为流水流经抗侵蚀能力不同的岩石而形成，或者由于断层的产生而形成。

Waterfalls are normally formed in two ways. They may be formed through the erosion of rocks of different resistance or through faulting.

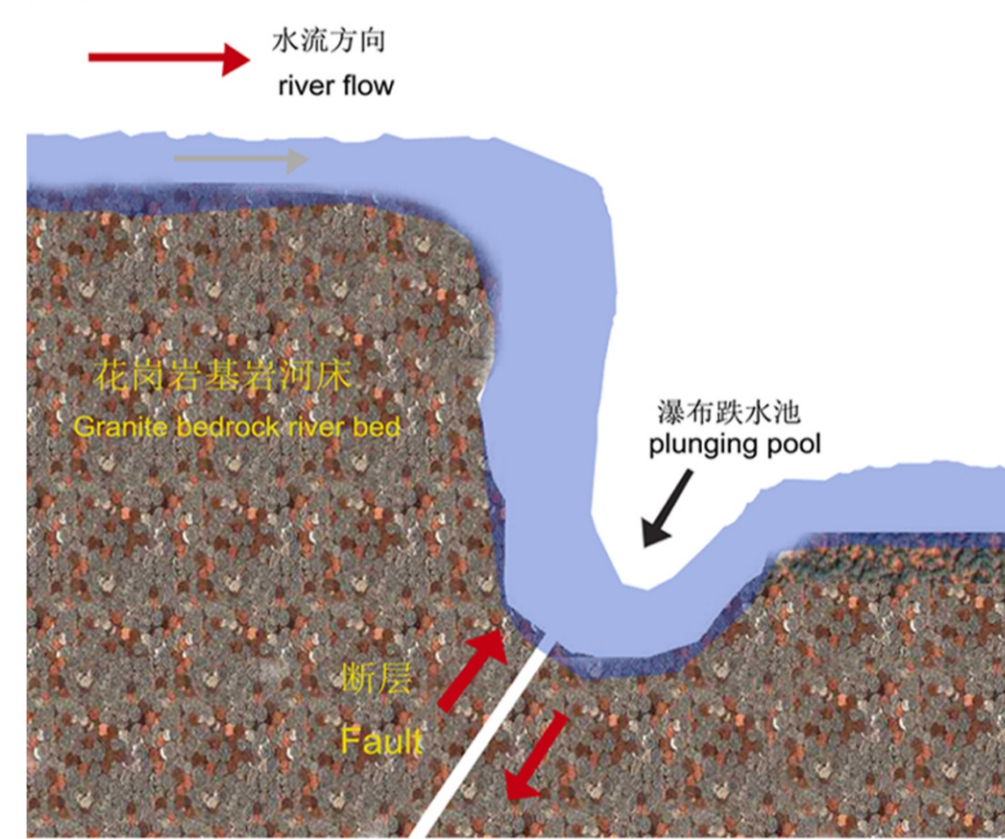
2. 第二种形成瀑布的可能原因：由于断层而发育成瀑布

2. Waterfalls may form by faulting



当发生断层时，岩石会发生位移，其中一块岩石隆起并高于另一块。因此，这两块岩石之间的高度有所不同。因此，当一条河流穿过发生断层的地区时，沿断层的位移将导致河流从高处坠落形成瀑布。其中一个例子就是九龙瀑瀑布。宁德世界地质公园的九龙瀑瀑布就是由于断层发育而形成的瀑布。

When faulting occurs, there is a displacement of the rocks with one rock being uplifted and is higher than another. As a result, there is a difference in height between the 2 rocks. Thus, when a river flows through an area where faulting has occurred, the displacement along the fault will cause the river to plunge from a great height to form a waterfall. An example is Jiulongji Waterfall. Jiulongji Waterfall in Ningde Global Geopark is formed by faulting .



Sketch map to show the formation of Jiulongji Waterfall in Ningde UGGp by faulting

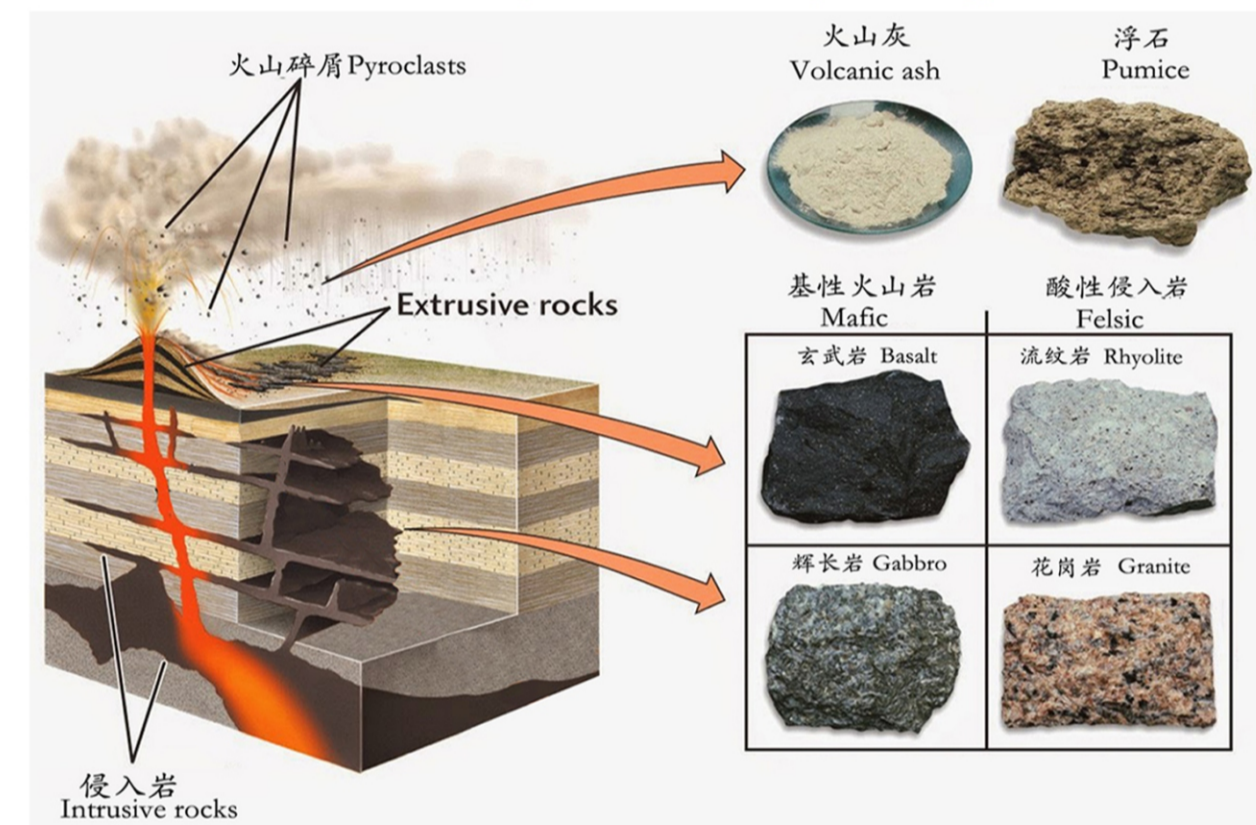
九龙瀑瀑布群位于周宁县城七步溪下游，离县城14公里。瀑布群由九级瀑布组成，长1000米，总落差300余米，是全国最大瀑布群之一。其中第一级瀑布落差46.7米，宽75米，丰水期宽83米，规模雄踞华东之首。景区内群山如黛，苍松翠绿，峡谷深切、峭崖高耸。九级瀑布腾空而降，气势磅礴，雄伟壮观。

Jiulongji waterfalls are situate in the downstream of Qibu stream, and they are 14km away from the Zhouning town. The waterfalls consist of nine steps of water fall, with a length of 1000 m and total drops of about 300 m, it is one of the largest waterfalls countrywide. The first rank waterfall—grand waterfall is in 46.7m drop and 75m wide, or 83m wide in high flow period, it's the largest scale waterfall in east China.

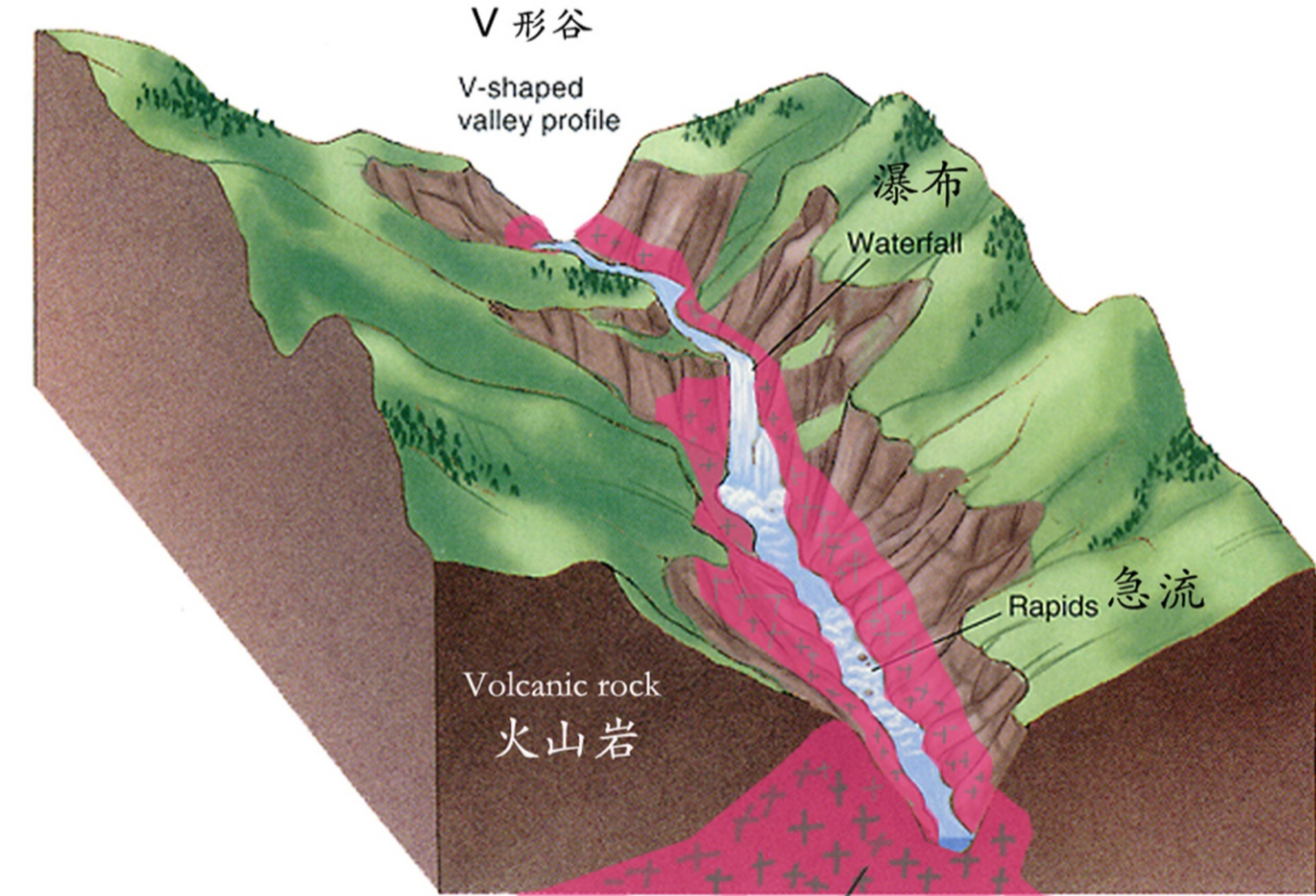


岩浆作用按其侵入于地壳之中或喷出地表又分为侵入作用和火山作用(或喷出作用)两种方式。在不同的地质环境形成不同的火成岩类别。花岗岩是常见的一种侵入岩，流纹岩是化学成分上相当于花岗岩的相对应的喷出岩。

Igneous rock or magmatic rock, is one of the three main rock types, the others being sedimentary and metamorphic. Igneous rock is formed through the cooling and solidification of magma or lava. Rhyolite can be considered as the extrusive equivalent to the plutonic granite rock.



Near the source of a river there is more vertical erosion as the river flows downhill (upstream). As a result the channels are narrow and shallow and may contain large boulders and angular fragments eroded and weathered from the steep valley sides. As the river approaches the mouth, velocity and energy increase due to increased discharge. The river performs more lateral erosion making the channel wider, and smoother (at middle and lower streams).



Sketch of the upstream profile at Jiulongji

九龙瀑瀑布群主要出露在白垩纪花岗岩若小岩体之上。花岗岩体北东向断裂发育侵入到火山岩岩体中。发育的断裂将西北-东南方向的河床切割成阶梯状，形成落差。高落差的河床和充沛的水源造就了九龙瀑的峡谷地貌和水体景观。而瀑布四周的则是火山岩形成的山岳峡谷风光。周宁主要的造景岩石是白垩纪（时间在约一亿年前后）形成的中酸性—酸性火山岩，它们是火山喷发形成的产物。酸性火山岩（岩石的SiO2的含量>65%）岩石坚硬,经过后期的断裂切割、地壳抬升和以水流为主要动力的风化剥蚀作用，容易形成陡峻的崖壁，进而形成深切峡谷、山峰等大型地貌景观。

Jiulongji waterfalls mainly distribute on a small Cretaceous granite intrusion, the northwest and southeast direction stream bed is cut into steps by northeast striking faults developing in granite, to form the water drop. High drop stream bed and abundant water are creating the gorge and water landscapes of Jiulongji. Around the waterfall, there is volcanic mountain landscape. Landscape-forming rocks are chiefly Cretaceous (about 100 million years ago) middle-acid or acid volcanic rocks; they are the products of volcanic eruption. The acid volcanic rocks (its SiO2 content is more than 65%) are quite hard, and easy to form precipitous cliffs, or furthermore to form deep-cutting gorges and peaks—large scale landscape.

九龙瀑地学科普游步道导览图

Geo-trail of Jiulongji in Ningde UNESCO Global Geopark

