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# 世界瑰寶 太魯閣峽谷

A World Treasure – Taroko Gorge





一場場驚心動魄的大地造山運動，創造了太魯閣峽谷氣勢磅礴的壯麗面貌，山高谷深、斷崖千仞，是東南亞罕見的特殊地景。從太魯閣口到天祥的這段峽谷風光，大自然把鬼斧神工的奇蹟寫在每一處轉彎的山壁上。

Out of a series of thrilling orogeneses the magnificent Taroko Gorge is created. Its great spectacle of towering mountains and abyssal chasms is most unique in Southeast Asia. The uncanny craftsmanship of the Nature is carved on every cliff wall from the entrance to Taroko Gorge to Tiansiang.

清晨，台灣東海岸的陽光從立霧溪口探入太魯閣峽谷，片刻間，晨光成線成片地蔓延開。峽谷裡，向陽的山壁與背陽的山壁，正好一亮一暗、一熱一冷，形成強烈的對比；而滾滾的立霧溪，使出年輕河川的活潑性子，用力切過太魯閣厚厚的大理石岩層，霸氣地開出一道水路，造就斷崖千仞的奇景。

中部橫貫公路東段沿著立霧溪水路而建，在太魯閣峽谷山壁間穿入鑿出，一下子鑽入谷底，一下子又爬高到谷頂，路況驚險。站在谷底，仰望峽谷高不見巔的峭壁，不自覺地為大自然原創的力量感到讚佩。峽谷裡怪石峭立，其雄偉峻麗的姿態形成一股致命的旅遊吸引力，讓中外遊客對太魯閣峽谷的景色再三讚嘆。

On the eastern coast of Taiwan, when the morning sun from shines through Taroko Gorge, its rays flood over Liwu River. A sharp contrast is formed between the bright and warm stone walls receiving the sunshine and those hidden in the dark. The torrent of young Liwu forces through the thick marble and creates a wonder of the precipice.

The eastern part of Central Cross-Island Highway is built along Liwu River through the Gorge, winding up and down the valley. People would marvel at the power of the Nature as they cannot see the top of the cliff wall when looking up from the bottom of the valley. With rocks of various shapes standing out everywhere, the majestic Gorge holds a fatal attraction for tourists.

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1 綠水秋色（太管處提供，陳明忠攝）  
Autumn at Lyushui (by Ming-chung Chen, provided by TNP)

2 砂卡礑溪（太管處提供，林金樹攝）  
Shakadang River (by Chin-shu Lin, provided by TNP)



## 海底花園是峽谷的前身

對於太魯閣峽谷而言，「變動」是成就它美麗的最大力量。

在台灣島尚未出現的遠古地質歷史中，也就是大約2億5千萬年前，歐亞大陸的東側海域是一片溫暖乾淨的熱帶海洋世界，海底有著各式各樣的珊瑚。陽光恣意灑落海面，亮出整片的光燦，展現珊瑚礁美景，如同海底花園般地綺麗婀娜。

「太魯閣大理岩層的前身，就像澳洲大堡礁的珊瑚礁，住著各種海洋生物。」研究太魯閣地質的國立台灣大學地理環境資源學系退休教授張石角說，只要站在太魯閣峽谷裡，閉眼想到2億多年前，整個峽谷在當時其實是一處很熱鬧的海底花園。他指出，從太魯閣峽谷的大理石岩層中，發現了屬於古生代的紡錘蟲、溝鞭藻化石，就證明太魯閣地區在遠古時代是地處熱帶的淺海環境。

在海底花園裡，有分泌碳酸鈣形成堅硬群體骨骼能力的硬珊瑚，不斷地往上生長，在海底中日積月累堆積形成礁石。這些礁石的迎海面受到海浪作用，礁體被浪拍擊而崩落成碎塊，成了陡坡。碎裂的礁石塊沉入陡坡下方，也造成堆積。於是，礁石一面生長堆積、一面被海浪拍擊而碎裂沉落，如此循環不已，產生一大片厚厚的礁石鋪滿海底，沈積達1萬公尺以上的厚度。

這層厚礁石後來經歷地殼變動，被包入地殼岩層裡，並且受到岩層擠壓、地心岩漿熱力的作用，組織變得更緊密，經過膠結及再結晶而形成厚層的石灰岩。

## A Sea Garden was Antecedent to the Gorge

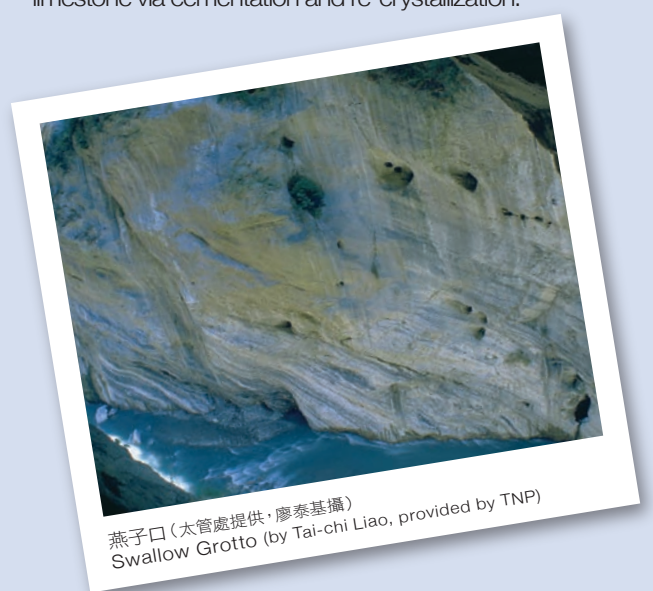
For Taroko Gorge, “change” is the greatest power that accomplishes its beauty.

In the ancient geological history when Taiwan was not born yet, approximately 250 million years ago, to the east of Eurasia Continent is a warm and clean tropic ocean. In the bottom of the ocean variety of beautiful corals grow into a colorful garden.

The marble rock stratum of Taroko Gorge in ancient times was like the Great Barrier Reef in Australia where all kinds of marine creatures inhabited,” says Professor Shih-chiao Chang who is now retired from Department of Geography, NTU. When you come to Taroko, try to imagine yourself in a blooming garden under the sea. He points out that the fossils of fusulina and dinoflagellate in the Paleozoic Era discovered in the Gorge can prove that it was situated in the shallow tropic sea long ago.

Stiff coral in the sea garden secreted calcium carbonate to form a hard assemblage of skeleton that piled up into reefs. These reefs were crashed by waves and formed a steep slope when the broken pieces fell and deposited in the bottom. While the reefs grew, their broken pieces continued to accumulate, and the seabed was covered with a 10,000-m-thick carpet of reef shards.

In the Earth's crust movement, this thick reef bed was wrapped in the rock formation. There it became more compact through the crush and heat from the magma, and later became thick limestone via cementation and re-crystallization.



燕子口 (太管處提供·廖泰基攝)  
Swallow Grotto (by Tai-chi Liao, provided by TNP)





## 台灣島的生成與地質

接著，台灣的造山運動出現了。這層石灰岩受到造山運動，以及伴隨造山運動的變質作用，轉變為大理岩，同時在多次的造山運動中，造山的強大力量彎曲了大理岩層，形成複雜的褶皺。

不過，這些閃著光芒、質感細緻，白中帶灰黑色彩如同水墨畫意境的大理岩，卻深埋在黑暗的地底。直到大約400萬年前，菲律賓板塊與歐亞大陸板塊不斷地碰撞，終於把古台灣島嶼「撞」出來，隆起成中央山脈突出海面，而大理岩層就在台灣島東部隆起的山脈裡。

由於山脈上覆蓋的岩層，受到風化侵蝕而剝落，造成位在下層的大理岩層抬升露出地表，被立霧溪強力沖刷。因為大理岩層膠結緊密、不易崩落，從合歡山與奇萊北峰間發源的立霧溪，便以高向低的流勢，產生強大的下切力量沖刷這些大理岩堅石，開拓出一條水路，在太魯閣地區產生陡峭狹窄、幾近垂直的U型峽谷地形。垂直的谷壁，加上散布大片直切或塊塊渾圓、裸露黑白灰色階紋路的大理石，就是年輕立霧溪的快速下切傑作。

太魯閣的地質堪稱是中央山脈東側地質區域的縮影，構成岩石除了大理岩外，還有片岩、片麻岩、千枚岩等變質岩。

由於台灣島的地殼目前還在隆起中，每年大約以1公分極快的速度持續抬升。由於地層抬升快，相對地也會遭受到風、雨水、溪水的侵蝕，在快速抬升與快速侵蝕的互相作用之下，太魯閣令人歎為觀止的峽谷地形仍然青春永駐，不曾走入穩定平緩的中老年期。

## The Formation and Geology of Taiwan Island

Then with the onset of orogenesis in Taiwan and the following metamorphosis, the limestone was turned into marble. The strong bending power of multiple orogeneses helped create complicated folds in the marble stratum.

Still, this glowing delicate marble formation was buried deep in underground until 4 million years ago when Philippine Plate and Eurasia Plate clashed constantly. The ancient island of Taiwan was born out of the clash, and the Central Mountains, with the marble formation resembling a gray-and-white ink painting lying within, also rose above the sea.

As the upper rock formation of the mountains scaled off through weathering, the marble stratum rose from below. The compact cementation of marble made it difficult to collapse and endure the washing of Liwu River. The river flowing down from between Mt. Hehuan and the north peak of Mt. Chilai cut through the hard marble, created a waterway and formed the almost vertical U-shaped gorge near Taroko. The naked steep cliffs and scattered marble stones with gray-and white stripes now we see are works by the rapid young Liwu River.

An epitome of the geological area of eastern Central Mountains, the rock formations near Taroko consist of marble, schist, gneiss, phyllite and other metamorphic rocks.

Now the crust of island Taiwan is still rising at a fast speed of 1cm per year. The fast elevated rock strata are prone to the erosion by wind, rain and river. Suffering from the fast elevation and erosion, the landform of Taroko Gorge still remains young and spectacular, far from the slow and even senile period.

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1 太魯閣的大理石岩層褶皺  
(太魯閣提供，林茂耀攝)

The folds in the marble stratum of Taroko (by Mao-yao Lin, provided by TNP)

2 砂卡礑步道 (薛湧 攝)  
Shakadang Trail (by Yung Hsueh)







## 落石是大地能量的釋放

「台灣還在造山，算是很年輕的島嶼，所以太魯閣峽谷抬升與侵蝕作用都很快速，峭壁上表面的岩石有片理發達的石英雲母片岩、片麻岩，這些岩石受到風化、震動、雨淋後，隨時都會崩塌。所以只要發生颱風、地震或雨量大一點，就會出現落石的狀況。」張石角指出，太魯閣壯麗的峽谷地形每年吸引大批中外遊客造訪，但難免會有落石的風險，太魯閣國家公園對於區內落石發生的機制與受災範圍，都已有相當程度的掌握，唯獨對落石發生的時間無法預料，這也是人類無法免於受到地質災害衝擊的原因。

由於太魯閣峽谷潛藏落石的危險，而中橫公路落石危險的路段都已逐漸隧道化，但是部分原本不在隧道、會有落石危險的中橫路段，多成為國家公園的步道。「像過去是台電施工道的白楊步道、日治時期開發的文山溫泉，其地層結構較不穩定，就曾發生落石崩塌，而威脅到遊客安全。」張石角說，在這種情形下，太管處在遊憩安全上更面臨嚴峻的考驗，應該以維護遊憩安全為首要考量，規劃出「危險」和「不穩定」的步道路段，透過「有效保護遊憩安全」、「無礙景觀視野」及「無礙自然生態」的遊憩安全防護設施，提供遊客前往太魯閣峽谷一遊時，更多的安全保障。

## the Earth Release Energy to Occur Rock-Fall

“The Orogenesis in Taiwan is still going on, and the island is quite young, therefore the elevation and erosion of Taroko Gorge is fast. The quartz-mica schist and gneiss on the surface of the cliff wall are liable to collapse after weathering or shaking. That’s why rocks fall when a typhoon, earthquake or heavy storm happens.” says Chang. While attracting a lot of tourists, Taroko Gorge must face the risk of rock falls. Though the mechanism and possible sites may be known, the timing is unpredictable and people cannot be guaranteed against geological disasters.

Due to potential rock falls, tunnels are built on most parts of the Cross-Island Highway, but some parts of the Highway where there are no tunnels and prone to rock falls are turned into trails. “Rock falls has happened near Baiyang Trail, Wenshan Hot Spring where the rock structure is not stable, and the safety of tourists was threatened.” Under this circumstance, Chang says that Taroko National Park Headquarters must take the recreation safety into primary consideration and mark the “risky” and “unstable” parts of the trail system. Through protection facilities that offer effective recreation safety, obstacle-free view and natural ecology, tourists to Taroko Gorge will have more security.

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1 荖西溪 (太管處提供, 游連柯攝)  
Laosi River (by Lien-ke Yu,  
provided by TNP)

2 劇烈板塊運動造成落石的  
自然現象, 遊客在賞景之餘也  
要特別小心落石, 並盡量避  
免於颱風、地震後進入太魯  
閣峽谷地區 (太管處提供, 林茂  
耀攝)

Rock-fall is a natural  
phenomenon caused by  
violent plate movement.  
Visitors must take care and  
avoid entering the Taroko  
Gorge area after a typhoon  
or earthquake (by Mao-yao  
Lin, provided by TNP)









## 漫遊步道賞峽谷風光

依據張石角的觀察，從閣口到天祥這一段的峽谷風光最為美麗，他特別推薦砂卡礑步道、九曲洞步道。

舊名為神秘谷的砂卡礑，為德魯固族語 Skadang 的音譯。這條沿著砂卡礑溪谷而開鑿的步道，原是日本人的發電施工道、探勘砂金的淘金道。全長4.4公里，來回步行約需2至3小時，步道沿著山壁與溪谷平行，山壁地質較為穩定，而且遊客穿梭在林蔭濃密的平緩步道上，步行起來非常安全、輕鬆。

鬼斧神工的九曲洞步道，全長約2公里，是太魯閣峽谷景觀最經典壯麗的路段。原屬舊中橫公路路段的步道，橫切峽谷，一下隱入隧道，一下又鑲嵌山壁，步道在半隧道山壁的保護下，安全性提高不少。遊客前來時，可將車子停放在東口，便可自在漫步，觀賞峽谷景觀。尤其是當峽谷上升氣流所形成的山風，陣陣吹來，更是涼爽無比。

張石角說，雖然與美國大峽谷、中國黃山相比，太魯閣峽谷的景觀規模較小，但就台灣至整個東南亞地區而言，太魯閣峽谷的美是絕無僅有，山容之美重重無止境。遊客沿著中橫公路所看到的景觀，仍舊無法全觀峽谷之美，充滿神秘感就是太魯閣峽谷的魔力。

儘管美景當前，遊客仍不可輕忽自身安全。面對落石這種自然現象，太管處特別提醒遊客，應避免在颱風豪雨、地震之後進入太魯閣峽谷；即使在無雨、無地震的情況下，也應避免在地層不穩定的區域停留，同時緊靠山壁步行，也是相對較安全的方式。

## Along the Trail Feasted on Scenic Gorge

In Chang's observation, the most beautiful part of Taroko begins from the Gorge entrance to Tiansiang, and commendable trails are Shakadang and Chiucyudong Trails.

The name "Shakadang" comes from the indigenous Truku. It is built along Shakadang River Valley by Japanese for the power plant construction and sand gold exploration. The total length of 4.4km takes 2 to 3 hours for a round trip. The smooth trail goes parallel with the valley and the geologically stable cliff wall, and offers an easy and safe walk through the shady woods.

The 2-km-long Chiucyudong Trail has the most classic beauty of the Gorge. Once part of the Cross-Island Highway, it transverses the gorge, enters the tunnel and then wedges in the wall. Protected by the tunnel wall, it is much safer to walk on. Tourists can park the cars at the eastern entrance, and enjoy the view along the trail and the cool breeze caused by the ascending air current.

According to Chang, though smaller in scale than Grand Canyon in USA and Yellow Mountain in China, the beauty of Taroko Gorge is absolute unique in Southeast Asia. Even a walk along the Highway cannot cover the entire beauty of the valley and the mountains. The charm of Taroko lies in its mystic ambience.

Visitors must remember that safety comes first when enjoying the scenery. As rock-falls happen, the TNP advises people against coming to the gorge after a typhoon, storm or earthquake. Even when there is neither rain nor earthquake, it is safer to avoid lingering in the area of unstable tectonic structure and always keep close to the cliff wall when walking.

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1 九曲洞步道（太管處提供，林炳煌攝）  
Chiucyudong Trail (by Ping-huang Lin, provided by TNP)

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