



# 中国伏牛山世界地质公园西峡园区

Guide to Xixia Scenic Spot of Funiu Mountains World Geopark, China

## 导游手册



黄河水利出版社



GEO PARK

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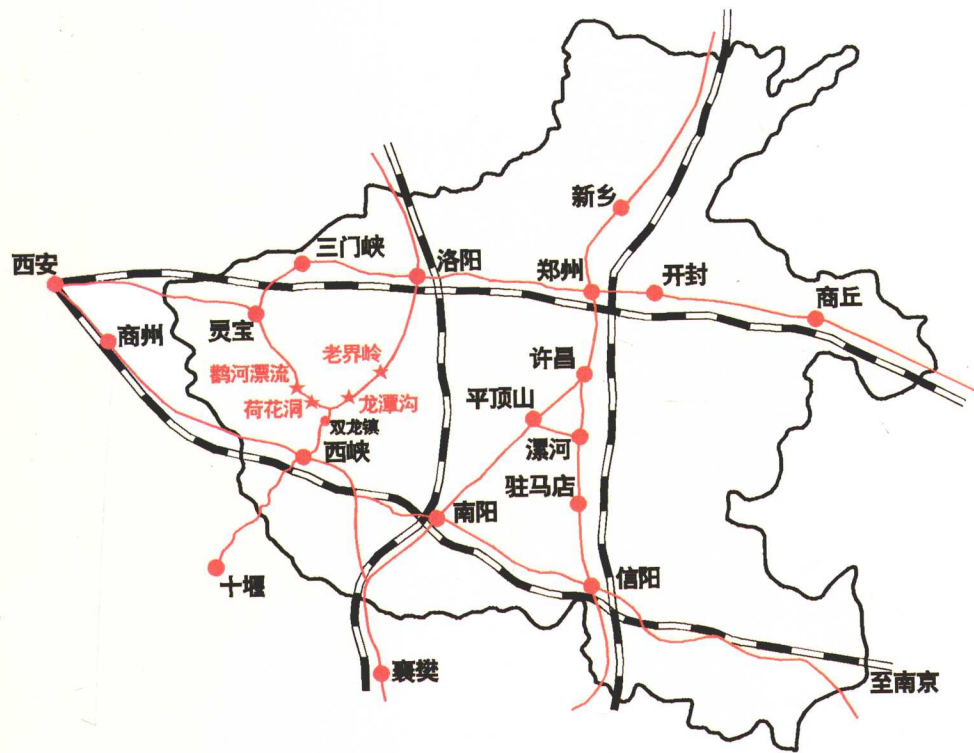
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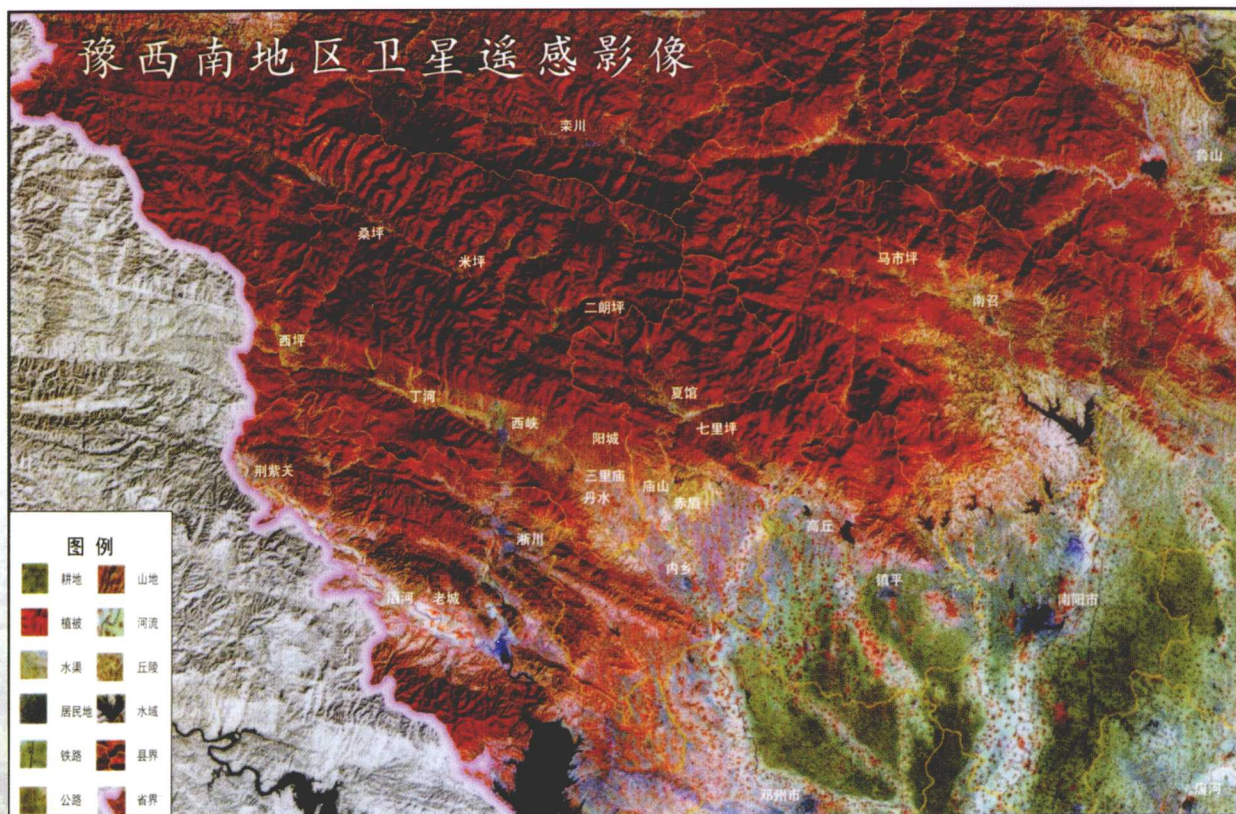
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**中国伏牛山世界地质公园西峡园区区位图**

中国伏牛山世界地质公园西峡园区，位于河南省西南部南阳市辖区内的西峡县境内，其地理坐标：东经 $110^{\circ}49'38'' \sim 111^{\circ}59'44''$ ；北纬 $33^{\circ}07'21'' \sim 33^{\circ}43'29''$ 。总面积954.35平方公里，主要地质遗迹保护面积338平方公里。

# 豫西南地区卫星遥感影像





中国伏牛山世界地质公园西峡园区导游图



## 中原大地的璀璨明珠——中国伏牛山世界地质公园西峡园区

巍巍八百里伏牛，峰岳连绵、雄伟俊秀，是中国南北地质、地理的天然分界，是气候、生物的过渡带，是长江、黄河、淮河流域的分水岭。西峡园区位于伏牛山南麓，地理坐标：东经 $110^{\circ}49'38''\sim 111^{\circ}59'44''$ ；北纬 $33^{\circ}07'21''\sim 33^{\circ}43'29''$ 。属典型地质剖面、古生物化石景观，地质地貌景观，水体景观与自然生态和谐共存的复合型地质公园。

西峡园区占据中国中央造山带的重要构造部位，园内典型稀有、系统完整、自然优美的地质遗迹，记录着25亿年造山带构造演化、恐龙衰亡灭绝及伏牛山沧桑变迁的历史。

距今25亿~10亿年间，是造山带的前造山期，造山带基底形成，华北与扬子板块间隔着浩瀚的古秦岭洋。距今10亿~2.4亿年的主造山期，扬子板块携秦岭微板块向华北板块会聚、俯冲、碰撞、拼合（园区西官庄至阳城一线为古缝合带），其间的古秦岭洋消失，华北、扬子板块合为一体。2.4亿年来，造山带进入伸展抬升的后造山期，伏牛山与造山带一起，在抬升中被风化剥蚀为今日面貌。故，西峡园区是展示古板块构造运动和复合型大陆造山带的“地质档案馆”，是地学科学研究和科普教育的基地。

距今1亿年前后，沿断裂带形成的山间盆地，成为恐龙活动的场所。园区内，著名的“西峡盆地”中已发现8科11属15种2个比较种6个未定种恐龙蛋化石，其中的西峡巨型长形蛋和戈壁棱柱形蛋为世界上独有或稀有类型。化石群分布之广、数量之大、类型之多样、保存之完美，以及蛋化石与恐龙骨骼、恐龙脚印化石共存，成对的蛋化石呈放射状排列，90枚蛋化石共居一室等珍稀产出特征，堪称世界之最。“西峡盆地”是研究恐龙生存环境、生物演化及恐龙蛋化石群合理保护的示范园。

园区内，由造山作用形成的各类花岗岩，经构造剥蚀和流水侵蚀，被雕凿成群山耸峙、峰林凌空、层峦叠嶂、峡谷纵横、涧壑深邃、潭幽溪清的地貌景观。

雨量充沛、气候湿润、山高水长的园区植被发育，水土涵养良好，至今保持原始的自然生态和如画的水体景观。鳞次栉比的崇山峻岭，林海苍莽、峰峦叠翠、古树参天、泉悬瀑垂，珍禽异兽、碧潭秀水，处处呈现出气象万千、云蒸霞蔚的旖旎风光。

山花翠竹环绕的村镇，潺潺溪水、层层梯田、莺歌燕舞、瓦屋炊烟，到处是令人陶醉的世外桃源。

西峡县山川秀美，物产丰富，人杰地灵，自然纯朴。西峡人民和世界地质公园欢迎您的光临。



## Resplendent bright pearl of the Central Plains land—Xixia Scenic Spot of Funiu Mountains World Geopark, China

The towering 400 kilometres Funiu Mountains is the natural boundary on geology and geography, the transitional belts of climate and living things between the north and the south of China, and the topographic divide among Changjiang, Huanghe and Huaihe Rivers. Xixia Scenic Spot is located at the southern foot of Funiu Mountains, its geographical coordinates:  $110^{\circ}49'38'' \sim 110^{\circ}59'44''\text{E}$ ;  $33^{\circ}07'21'' \sim 33^{\circ}43'29''\text{N}$ . It belongs to the composite-type geopark coexisting harmoniously with the typical geological sections, palaeontological fossil landscapes, geologic geomorphological landscapes, water landscape and natural ecology.

Xixia Scenic Spot has occupied the important tectonic position of the Central Orogenic Belt in China. In geopark, typical, rare, complete and beautiful geological heritages have recorded the history of the structural evolution of orogenetic belt, the decline and fall and extinction of dinosaurs and the great changes of Funiu Mountains during 2500 million years.

During the preorogenic stage of 2500 ~ 1000 million years ago, the base of the orogenic belt was formed, the North China plate and the Yangtze plate were separated by the boundless old Qinling ocean. In the climactic orogeny stage of 1000 ~ 240 million years ago, the Yangtze plate carried the Qinling microplate convergence, underthrust, collision and matching toward the North China plate (the line from Xiguanzhuang to Yangcheng is the suture zone). The old Qinling ocean died out and two plates merged into an integral whole. Since 240 million years ago, the orogenic belt entered the postorogenic period which was characterized by extension and uplifting, the Funiu Mountains suffering weathering and denudation have gradually become the present features.

Round about 100 million years ago, the intermontane basins formed along the zone of faults. In the famous Xixia basin of the geopark, 8 families, 11 genera and 15 species, 2 conformis and 6 undefined species of dinosaur eggs have been discovered, among which *Macroelongatoolithus xixiaensis* and *Prismatoolithus gebiensis* are the unique and rare types in the world. As far as their unusual occurrence features may be rated as the first in the world, such as wide-spread distribution, large quantity, various type, perfect occurrence, the symbiosis of dinosaur eggs with the skeleton and footprint fossils of dinosaurs, the radiation arrangement in pairs and 90 egg fossils discovered in one nest. Xixia basin is a demonstrating field for studying the existing environment of dinosaurs, the organic evolution and the reasonable protection of dinosaur egg fossil community.

In the geopark, the different kinds of granite formed by the orogeny have suffered the tectonic denudation and water erosion, and has carved the Funiu Mountains into the picturesque landscape with towering mountains, forest of peaks towering into the sky, range upon range of hills, valleys across valleys, deep gullies, deep and secluded pools and cool rivulets.

Because of the abundant rainfall and humid climate, the geopark is covered by dense vegetation. The water and soil conservation are well. The primitive natural ecology and picturesque water body landscape have been kept well. Row upon row of the lofty ridges and towering mountains, boundless immense forests, towering old trees, cliffside waterfalls, rare birds and animals, clear blue pools and clear water are all presented before our eyes and make you feel carefree and happy.

The villages and small townships surrounded by bright mountain flowers and green bamboos, the murmuring stream, the layer upon layer of terraced fields and the smoke curling upward from kitchen chimneys make you feel as if you were in the Land of Peach Blossoms.

Xixia County has the beautiful landscapes, rich natural resources and products. The people of Xixia and the geopark warmly welcome you!





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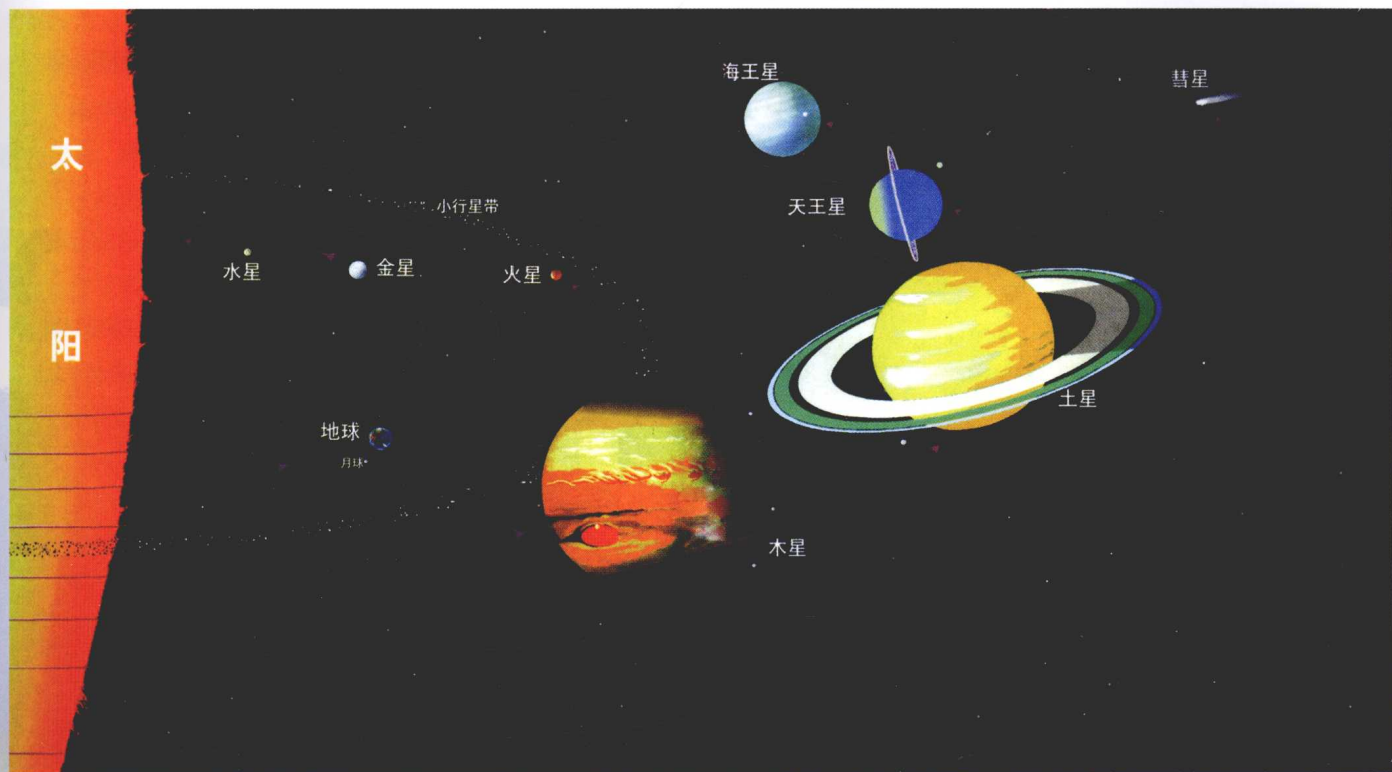
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# 第一篇 地学科普

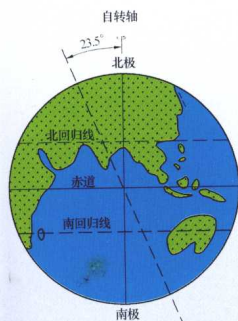




## 一、地球 Earth

### 【地球】Earth

地球是太阳系九大行星之一，是人类居住的星球。按距离太阳远近计，仅远于水星和金星，居第三位。地球绕“地轴”自转，又绕太阳公转，还随太阳系在星际空间运行。是赤道突出、两极稍扁的三轴旋转椭球体，叫做地球椭球体或简称地球体。



地球距太阳平均距离 $1.496 \times 10^8$ 公里（即一个天文单位）

轨道偏心率0.016722

自转周期23时56分4.1秒

自转速度0.465公里/秒

公转周期365.2564日

（365日6时9分10秒，1恒星年）

公转速度29.79公里/秒

地球长半径6378.160公里

地球短半径6356.755公里



扁率 $1/298.25$ （ $=0.0033529$ ）

赤道圆周40075.696公里

子午圈长40008.548公里

表面积 $5.101 \times 10^8$ 平方公里

海洋面积 $3.62 \times 10^8$ 平方公里（占总面积的70.9%）

陆地面积 $1.49 \times 10^8$ 平方公里（占总面积的29.1%）

体积 $1.083316 \times 10^{12}$ 立方公里（太阳体积的1/130万）

平均密度5.518克/立方厘米

质量 $5.976 \times 10^{21}$ 吨

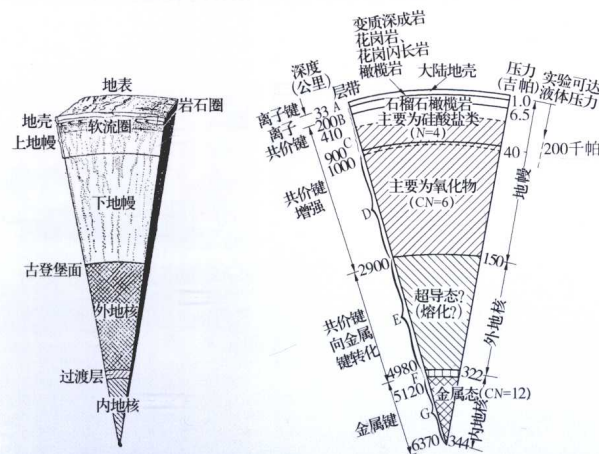


### 【地球结构】Earth structure

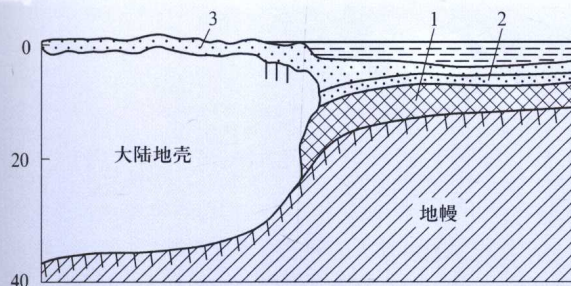
地球结构是指地球的同心状圈层构造。原始地球形成后，在地球的重力分异和化学分异等作用下，经过漫长的演化，从均匀混合的物质状态，逐渐地依次分化出地核、地幔和地壳等内圈，以及大气圈、水圈和生物圈等外圈。

## 【地壳】Earth crust

地壳是地球的表层部分。现多把莫霍洛维奇间断面（简称莫霍面 Moho）规定为地壳的下界面。地壳上部主要由沉积岩、花岗岩类岩石组成，叫硅铝层。其厚薄不等，在山区有时达40公里，平原区一般为10余公里，海洋区显著变薄，大洋洋底缺失。下部主要由玄武岩或辉长岩类岩石组成，称为硅镁层。它呈连续分布，但厚薄不等，在大陆区厚达30公里，在缺失花岗岩岩层的深海盆内玄武岩层仅厚5~8公里。硅铝层和硅镁层之间以康拉德间断面(Conrad discontinuity)隔开。地壳平均厚度，大陆地区为35公里，大洋地区为5~10公里；我国青藏高原厚达60~80公里，西部地区为50~70公里，东南沿海地区为20余公里。



地球构造示意图



大陆型地壳

1—辉长岩；2—变质的沉积岩和火山岩；3—沉积岩和沉积物

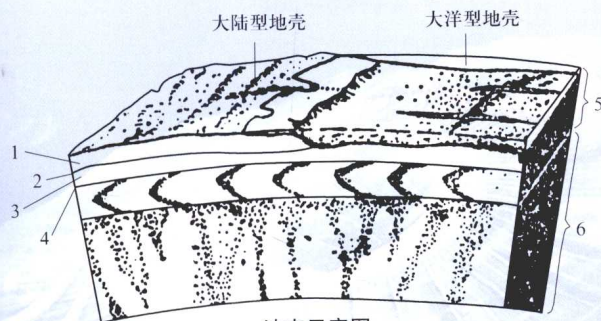
## 【大陆型地壳】Continental crust

大陆型地壳是地壳的一种类型。位于大陆及大陆架地区，相当于硅铝层及其下的硅镁层。大陆地壳的上部密度为2.7克/立方厘米，地震波P波（纵波）的传播速度为6.2公里/秒。



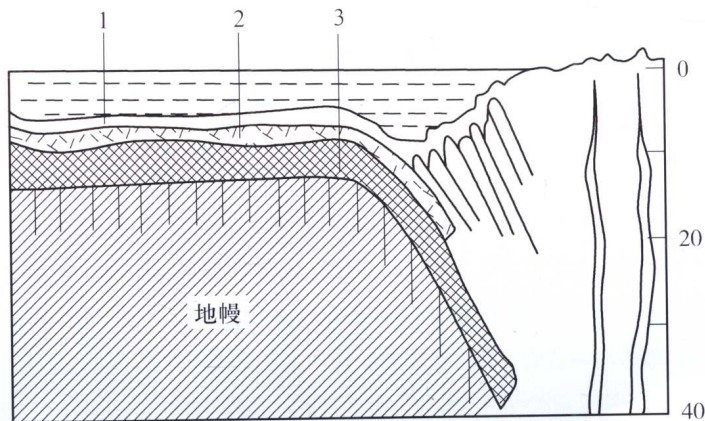
## 【大洋型地壳】Oceanic crust

大洋型地壳是地壳的一种类型。位于大洋盆地之下，相当于硅镁层。大洋型地壳缺乏硅铝层，其厚度约5公里，密度为3.0克/立方厘米，地震波的P波传播速度大于6.2公里/秒。



地壳示意图

1—大陆型地壳；2—康拉德面；3—大洋型地壳；4—莫霍面；  
5—岩石圈；6—上地幔



大洋型地壳

1—沉积岩和沉积物；2—变质的沉积岩和火山岩；3—辉长岩

## 【岩石圈】Lithosphere

岩石圈是地球上部相对于软流圈而言的坚硬的岩石圈层。厚60~120公里，为地震波高速带。包括地壳的全部和上地幔的上部，由花岗质岩、玄武质岩和超基性岩组成。其下为地震波低速带、部分熔融层和厚度100公里的软流圈。

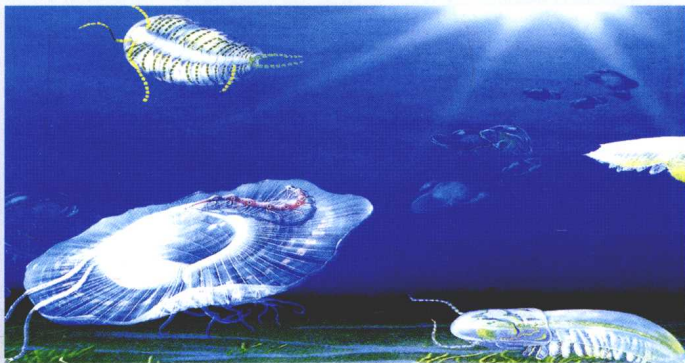
### 【水圈】Hydrosphere

水圈是连续包围地球表层的水的闭合圈。主要分布在海洋, 占水圈总体积(约3260亿立方公里)的97.2%, 其余则零星地分布在陆地上, 有的在地面成为冰、雪和冰川(占2.24%)、湖沼和河流, 有的渗透到地下土壤和岩石里成为地下水。地面(表)水、地下水及大气水三者不停地进行水的大小循环, 引起许多表生地质作用, 对地壳起着巨大的改造和建设作用。



### 【生物圈】Biosphere

生物圈是地球表层有生命活动的圈层。分布范围: 在陆地上深不过百余米, 在海洋中深达10.8公里, 上限不超出臭氧层(只在7~8公

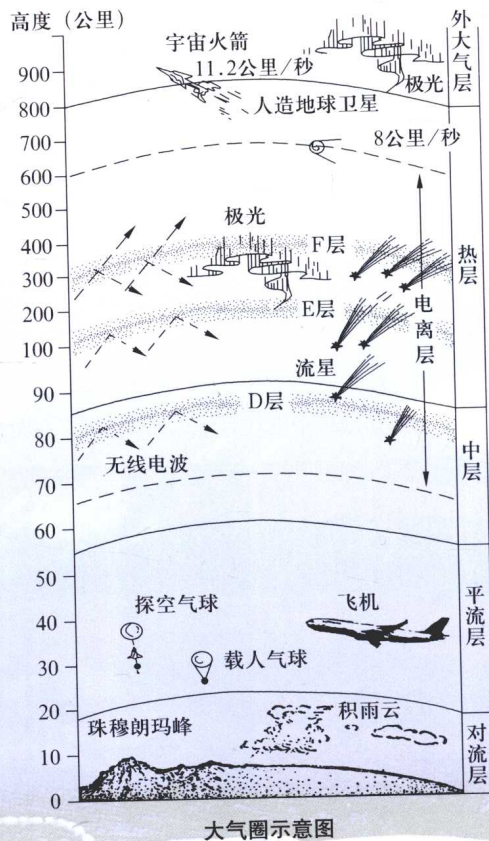


里的高空以内发现生物)。地球上的生物在10亿~25亿年前才开始出现。最近, 在非洲发现有31亿~32亿年的细菌化石和28亿~35亿年的蓝绿藻化石。生物一出现便参与了对岩石圈、大气圈和水圈的改造, 人类的出现更使改造速度加快。因而, 生物在地质历史时期的成岩、成矿和成土作用中都起着很重要的作用, 研究生物圈对探讨地球发展的历史也有重要意义。



## 【大气圈】 Atmosphere

大气圈是包围地球外面的一层大气，即空气。它位于行星际空间和地面之间，是多种气体的混合物。混合体中各种气体的体积占总体积的比重为：氮78.09%、氧20.95%、氩0.93%、二氧化碳0.03%、氖0.0018%，此外还有水气和尘埃微粒等。一般认为，由以二氧化碳、一氧化碳、甲烷和氨为主的原始大气转变成以氮、氧为主的现代大气，是经过生物圈、水圈和地壳的相互作用、互相促进、逐渐转化而来的。大气总质量为 $5.6 \times 10^{19}$ 克，其中1/4集中在地面到100公里高度范围内，而且一半集中在10公里高度范围内。其密度和压力随高度增加而趋于稀薄和降低，并逐渐向星际空间过渡，无明显上界。大气圈沿垂直方向划分为对流层、平流层、中层、热层和外大气层等，主要天气现象多发生在对流层中。所以，大气圈对地球表生地质作用，以及整个生物界的发育和电讯传播都有很大影响。



大气圈示意图