

## 世界遗产——四川黄龙钙华景观退化现象、原因及保护对策分析

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引用本文: 张金流,王海静,董立,赵德猛.2012.世界遗产——四川黄龙钙华景观退化现象、原因及保护对策分析[J].地球学报,33(1):111-120.

DOI: 10.3975/cagsb.2012.01.13

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基金项目:中国科学院“百人计划”项目(编号: 2006-067);国家自然科学基金项目(编号: 40872168)

中文摘要:近年来,随着游客人数的逐年增长,黄龙国家级风景名胜区钙华景观出现了明显的退化现象,主要表现为地表水量减少,钙华彩池干枯、钙华沉积速率变慢以及水生藻类加速生长3个方面。为了阐明上述退化现象是源于旅游等人为活动因素影响还是自然因素变化所致,我们首先对比分析了近年来景区上、下游泉水流量变化,结果发现,地表水量的减少是源于地表水向地下渗漏量的增加;考虑到近年来景区内外工程活动的增强以及钙华沉积速率的减缓,这种渗透性的增强很可能来自工程的爆破震动以及钙华沉积速率减缓所导致的钙华致密性下降。同时,在对黄龙溪流水化学测试分析后发现,旅游活动在很大程度上影响了黄龙风景区水质进而影响了水生藻类生长以及钙华沉积速率。因此,我们推测,黄龙钙华景观的退化,在一定程度上可能应归结为人类活动的影响。

中文关键词:[景观退化](#) [原因](#) [保护对策](#) [四川黄龙](#)

## An Analysis of Travertine Landscape Degradation in Huanglong Ravine of Sichuan, A World's Heritage Site, and Its Causes and Protection Countermeasures

**Abstract:** Travertine landscape at Huanglong Scenic Area shows obvious degradation with the increasing number of tourists in recent years, which finds expression in such aspects as the drying up of the travertine pool, the declined travertine deposition rate and the accelerated algae propagation and travertine darkness. To understand whether these degradations have relation with tourists' activities, the authors investigated water quality and carbonate precipitation rate of Huanglong Ravine in the wet period of 2010 from late May to early November. Automatic logging in field combined with laboratory analysis was carried out to study temporal variations in algae chlorophyll concentration and travertine deposition rate. The results show that tourists' activities have an impact on water quality in some degree and thereby affect the carbonate precipitation rate and algae growth. The authors also found that the reduction of surface stream water is caused by increased surface water leakage, as evidenced by analyzing such factors as the spring flow change in recent years, the enhancement of engineering activities inside and outside the scenic area and the slowing carbonate precipitation in recent years. It is held that the enhanced permeability is caused probably by project blasting vibration and the declining of travertine density due to slowing precipitation rate. The conclusion can thus be reached that Huanglong Ravine travertine degradation, to some degree, should be attributed to the effect of human activities.


**keywords:** [landscape degradation](#) [causess](#) [countermeasures](#) [Huanglong Sichuan](#)

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