

张丹, 陈安强, 苏友波, 段红平, 王蓉, 刘刚才. 水热环境对不同紫色母岩崩解特性的影响[J]. 土壤学报, 2013, 50(4): 643-651. Zhang Dan, Chen Anqiang, Su Youbo, Duan Hongping, Wang Rong and Liu Gangcai. Effect of hydrothermal environment on disintegration of different purple parent rocks[J]. Acta Pedologica Sinica, 2013, 50(4): 643-651



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水热环境对不同紫色母岩崩解特性的影响

Effect of hydrothermal environment on disintegration of different purple parent rocks

投稿时间: 2012-03-22 最后修改时间: 2013-03-15

DOI: 10.11766/trxb201203220085

中文关键词: [紫色母岩](#) [水热环境](#) [崩解特性](#)

Key Words: [Purple parent rock](#) [Hydrothermal environment](#) [Disintegration characteristics](#)

基金项目: 国家自然科学基金项目(40971168)资助

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摘要点击次数: 224

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中文摘要:

为研究马头山组(K_2m)、禄丰组(J_1l)和妥甸组(J_3t)紫色母岩在不同水热环境下的崩解特性,综合考虑了水作用(饱和泡水和表面浸水)、热作用(自然昼夜温差和极端温差)和水热相互作用,设计了紫色母岩崩解的5种试验处理:浸水极端温差、饱和和极端温差、饱和和自然温差、浸水自然温差和极端温差。结果表明母岩崩解速率的大小顺序为:浸水极端温差>饱和和极端温差>饱和和自然温差>浸水自然温差>极端温差,说明在温差较大时,干湿交替处理比饱和和泡水处理更利用崩解,在温差不大时,饱和和泡水处理比干湿交替处理更利于母岩崩解,纯粹的温度变化对母岩崩解的影响很小。三种紫色母岩的平均崩解速率大小依次为:妥甸组>禄丰组>马头山组,这与母岩的化学成分、矿物组成和微结构特征密切相关。不同试验处理下的崩解速率与干湿变化、冷热变化和循环次数呈较好的线性关系。妥甸组崩解速率与循环次数呈负相关,其他两种母岩的崩解速率与循环次数、冷热变化和干湿变化均呈正相关。

Abstract:

To study characteristics of the disintegration of purple parent rocks of the Matoushan group (K_2m), the Lufeng group (J_1l) and the Tuodian group (J_3t) as affected by water environment (soaking in water or wetting the surface), heat environment (natural diurnal temperature difference or extreme temperature difference), and their interaction, an experiment, designed to have five treatments, i.e. wetting and extreme temperature difference (WETD), soaking and extreme temperature difference (SETD), soaking and natural diurnal temperature difference (SNTD), wetting and natural temperature difference (WNTD) and extreme temperature difference (ETD), were carried out. Results show that the five treatments followed the order of WETD > SETD > SNTD > WNTD and ETD in terms of rock integration rate, which suggests that in the case of big temperature difference, the parent rocks are more likely to disintegrate when getting wet and dry alternately than when being soaked all the time, while in the case of small temperature difference, it is the other way round. The factor of temperature alone does not have much effect on disintegration of the parent rocks. In terms of mean disintegration rate, the 3 parent rocks follow the order of $J_3t > J_1l > K_2m$, which is closely related to their chemical constitution, mineral compositions and microstructures. The experiment shows that disintegration rate has a good positive linear relationship with temperature variation, moisture alteration and/or number of treatment cycles in all the rocks except for J3t, of which the integration rate is negatively correlated with the number of treatment cycles.

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