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干旱区高山泥炭磁学特性研究

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Magnetic investigation of peat sediments from the mountain in Arid Regions

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摘要

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摘要

对于干旱区高山—新疆阿尔泰山中段连续的泥炭沉积序列进行详细系统的磁学分析, 获得泥炭沉积物中磁性矿物的类型、含量以及粒径大小等磁学特性, 探讨了在富含大量有机质的氧化还原条件下磁性矿物的保存与变化机理. 岩石磁学结果表明沉积物中亚铁磁性矿物的富集程度低, 磁性较弱. 主要含有磁铁矿、赤铁矿、顺磁性矿物以及大量的抗磁性矿物组分, 并且证实泥炭沉积物中不可能含有生物成因的趋磁细菌. 沉积物的磁性颗粒主要以细颗粒为主, 但同时还存在粗颗粒成分. 研究结果指示在泥炭表层酸性的亚氧环境中, 亚铁磁性矿物在较短的时间内伴随着部分溶解和改造, 导致沉积物磁性浓度的降低和粒径的减小, 快速的沉积和埋藏之后, 长期处于缺氧的碱性还原环境下, 磁铁矿发生的变化很小或基本不会再次被改造.

关键词 泥炭沉积, 磁学, 磁铁矿, 氧化还原环境

Abstract:

Detailed and systematic magnetic analysis was conducted on continuous peat depositional sequences from the Altay Mountains in arid regions, Northwest China. Based on magnetic properties, such as composition, concentration and grain-size, the magnetic-variation mechanism of these minerals can be discussed in peat sediments that are rich in organic matter under redox conditions. The results are showed as follows: The concentration of ferrimagnetic minerals has a low enrichment degree. Magnetite, hematite, a great deal of diamagnetic organic matter and some paramagnetic components have been identified in peat sediments, and there is no magnetotactic bacteria (MTB). The grain sizes are mainly fine particles, but meanwhile there are also coarse particles-multidomain (MD). The results further reveal that the major variations of ferrimagnetic minerals in the peat sediments occur during the short period of post-depositional processes. As for the possible mechanism, we argue that the pseudo single domain (PSD) and MD magnetite on the peatland surface are dissolved and refined in the acid waterlogged sub-oxic conditions, which results in low concentration and smaller grain sizes. Furthermore, we also speculate that no long-term burial-diagenetic dissolution processes take place in the peat sediments and little magnetite dissolution happens under the condition of alkaline and reductive environments in which the peat is buried deeply.

Keywords [Peat sediment](#), [Magnetism](#), [Magnetite](#), [Redoxic conditions](#)

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