

研究报告

# 利用<sup>137</sup>Cs技术研究黑土坡耕地土壤再分布特征

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## 摘要

利用<sup>137</sup>Cs示踪技术和不同的理论模型研究典型的东北漫岗地形的黑土土壤再分布状况. 通过野外采样和模型分析, 得出研究区<sup>137</sup>Cs背景值为2 232.75 Bq·m<sup>-2</sup>, 介于长江三角洲和黄土高原背景值之间, 表明<sup>137</sup>Cs沉降与纬度和降水相关. 研究区各地貌部位<sup>137</sup>Cs含量在水平方向和深度分布上有很大的分异. 坡肩部位<sup>137</sup>Cs含量最低, 土壤侵蚀最为强烈; 坡顶和坡背侵蚀较为微弱; 坡脚和坡足基本上表现土壤沉积. <sup>137</sup>Cs分布深度从坡肩20 cm到坡足80 cm土层, 表现出该区经历了强烈的侵蚀和沉积过程. 文中采用4种常用的<sup>137</sup>Cs土壤侵蚀模型估计研究区的土壤侵蚀速率, 结果表明, PM模型明显低估了土壤侵蚀速率, MBM-1明显高估了土壤侵蚀速率, MBM-2和MBM-3估计的结果较为相近的合理结果.

关键词 [土壤再分布](#); [<sup>137</sup>Cs](#); [校正模型](#); [黑土](#); [中国东北](#)

分类号

## Redistribution patterns of black soil in hillslope landform of Northeast China: A <sup>137</sup>Cs study

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### Abstract

In the black soil region of Northeast China, soil and water loss is quite serious, but not fully investigated due to the lack of reliable methods. <sup>137</sup>Cs technology is a good one to study the medium-and long term erosion and sedimentation rates and the spatial redistribution of soil. With this technology and the existing calibration models, this paper studied the redistribution patterns of black soil in a typical hillslope landform of Northeast China. The results showed that in the study area, the reference <sup>137</sup>Cs value was 2232.75 Bq·m<sup>-2</sup>, intervenient the background values in the Yangtse River Delta and Loess Plateau; and the <sup>137</sup>Cs areal activity had a great differentiation in horizontal and vertical directions, being the lowest in the shoulder-slope positions, which suggested that the summits and back-slope positions suffered weak erosion, and some of the eroded soils were re deposited in foot-slope and toe-slope positions. The vertical distribution of <sup>137</sup>Cs in soil profile ranged from 20 cm on a shoulder-slope to 80 cm on a toe-slope position, indicating a significant erosion and deposition. Estimations with four existing calibration models showed that PM model underestimated while MBM-1 model overestimated the soil erosion rates very obviously, and both MBM-2 and MBM-3 gave similar and reasonable estimations.

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## Key words

[Soil redistribution](#) [Cesium-137 \( \$^{137}\text{Cs}\$ \)](#) [Calibration models](#) [Black soils](#)  
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