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Peakless distribution and migration model of 239+240Pu in typical Chinese core samples

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Based on data from 45 soil cores, 35 lake sediment cores, and 29 sea sediment cores in China, this study found a type of 239+240Pu peakless distribution cores in soil, lakes, and marine environments, and discussed the phenomenon of 239+240Pu peakless distribution. The results show that there were two main types of peakless distribution of 239+240Pu in soil core samples: one that the 239+240Pu specific activity increased with depth, and the other that the 239+240Pu specific activity decreased with depth; when using a Convection Dispersion Equation(CDE) model to simulate the migration behavior of 239+240Pu in soil cores, the apparent convection rate showed a positive correlation with the 239+240Pu maximum depth (n=45, R2=0.847). There was only one type of peakless distribution of 239+240Pu in lake and ocean core samples: the 239+240Pu specific activity decreased with depth. Meanwhile, the sedimentation rate of lake core samples (n=35,R2=0.921) or the maximum apparent convection rate of marine core samples (n=29, R2=0.949) also showed a positive correlation with the 239+240Pu maximum depth. The maximum apparent convection rate of the exchangeable 239+240Pu in the peakless distribution core sample was close to the sedimentation rate, and the maximum apparent convection rate didn't affect the vertical distribution of 239+240Pu in the core sample.

Student Submission

No

Primary authors: HUANG, Yanan (南宁师范大学); GUAN, Yongjing (广西大学); LIU, Zhiyong (苏州大学)

Presenter: HUANG, Yanan (南宁师范大学)

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