

滨海湿地生态学与生物地球化学

## $\alpha$ 法与 $\gamma$ 法测定 $^{210}\text{Pb}$ 活度的对比

刘旭英, 潘少明

南京大学 海岸与海岛开发教育部重点实验室, 南京210093

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**摘要** 选取1987~2005年国际原子能机构11个国际比对样品的 $^{210}\text{Pb}$ 测量结果, 根据测试方法分为 $\alpha$ 法与 $\gamma$ 法两组进行对比研究, 运用线性回归法分析两种方法测试结果的一致性, 对同一种方法不同实验室间的一致性程度进行比较, 并对两种方法的有效率及使用率进行对比分析, 同时, 探讨了影响其结果的因素. 结果显示: 运用 $\alpha$ 法与 $\gamma$ 法分析 $^{210}\text{Pb}$ 的平均值较一致, 两者呈较强的线性相关性, 但同一种方法不同实验室间的一致性程度较低;  $\alpha$ 法在测试有效率与稳定性方面比 $\gamma$ 法要好, 但使用 $\gamma$ 法的实验室却逐年增多; 样品 $^{210}\text{Pb}$ 活度越低, 实验室间的一致性程度越差, 且 $\gamma$ 法尤为明显. 基于此, 建议实验室应加强质量控制, 并积极参与国际和国内外实验室间比对, 以提高样品 $^{210}\text{Pb}$ 的分析质量及不同实验室间的可比性.

**关键词**  [\$\alpha\$ 法](#);  [\$\gamma\$ 法](#);  [\$^{210}\text{Pb}\$ 活度](#)

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## Comparison on analysis of $^{210}\text{Pb}$ using alpha and gamma techniques

LIU Xuying, PAN Shaoming

Ministry of Education Key Laboratory of Coastal and Island Development, Nanjing University, Nanjing 210093, China

### Abstract

Eleven groups of results on activities of  $^{210}\text{Pb}$  from IAEA (International Atomic Energy Agency) for international comparison were analyzed to discuss the difference between two methods for  $^{210}\text{Pb}$  analysis: alpha and gamma spectrometry techniques. Consistence of the results by two techniques was discussed through linear regression analysis; consistence of the results by the same technique among different laboratories was also discussed; their availabilities and utilization ratios were compared, and then factors that influenced consistence and availabilities were discussed. Results showed that, there was a good agreement and strong linear correlation in the average results using two different techniques; however, there was significant difference among laboratories even using the same technique. Relatively, availability of results using alpha technique was higher than that of gamma spectrometry technique, but laboratories using gamma techniques were increasing annually. Low activity of  $^{210}\text{Pb}$  would affect consistence among laboratories negatively, especially for gamma techniques. Therefore, it was suggested that laboratory quality controls should be enhanced and comparisons among international and national laboratories should be put in an important place in order to improve the analysis quality of  $^{210}\text{Pb}$  and comparability among laboratories.

**Key words** [alpha spectrometry technique](#) [gamma spectrometry technique](#) [activity of  \$^{210}\text{Pb}\$](#)

DOI:

通讯作者 刘旭英 [xuying851160@sina.com](mailto:xuying851160@sina.com)

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