

SU Weigang, SHA Zhanjiang, KONG Fancui and YU Chenguang. 2014. Sedimentary Environment Change in Northwestern of Lake Qinghai Based on the ^{137}Cs and ^{210}Pb . *Acta Geologica Sinica* (English Edition), 88(supp. 1): 27-28.

Sedimentary Environment Change in Northwestern of Lake Qinghai Based on the ^{137}Cs and ^{210}Pb

SU Weigang, SHA Zhanjiang, KONG Fancui and YU Chenguang

Qinghai Institute of Salt Lakes, Chinese Academy of Sciences, Qinghai 810000, China

Lake Qinghai is located in the northeastern margin of qinghai-tibet plateau. It's very sensitive to climate change. Through the research of modern sedimentary environmental change in Lake Qinghai, We expect to gain the information about its response to global environmental change. Our study collected three sedimentary columns of Lake Qinghai in the northwestern. Column samples' length are 12, 13, 14 cm respectively. We have calculated the deposition rate of Lake Qinghai in the northwestern based on the ^{137}Cs and ^{210}Pb geochronology which could be tested with each other. The result shows that the deposition rates which are calculated through ^{137}Cs and $^{210}\text{Pb}_{\text{ex}}$ are relatively consistent with the ^{137}Cs peak of three sediment column samples we have figured out the average mass accumulation rate. They are $0.0329 \text{ g}\cdot\text{cm}^{-2}\cdot\text{a}^{-1}$, $0.032 \text{ g}\cdot\text{cm}^{-2}\cdot\text{a}^{-1}$, $0.0371 \text{ g}\cdot\text{cm}^{-2}\cdot\text{a}^{-1}$. The deposition rate are $0.1406 \text{ cm}\cdot\text{a}^{-1}$, $0.1429 \text{ cm}\cdot\text{a}^{-1}$, $0.1535 \text{ cm}\cdot\text{a}^{-1}$. the deposition rate by $^{210}\text{Pb}_{\text{ex}}$ calculation are $0.0422 \text{ g}\cdot\text{cm}^{-1}\cdot\text{a}^{-1}$, $0.0307 \text{ g}\cdot\text{cm}^{-1}\cdot\text{a}^{-1}$, $0.0347 \text{ g}\cdot\text{cm}^{-1}\cdot\text{a}^{-1}$. In this paper, the results of deposition rate are close to the predecessors'. The deposition rate in

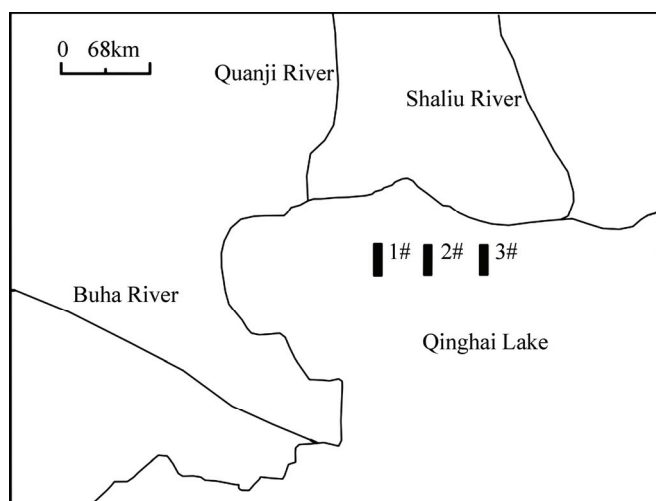
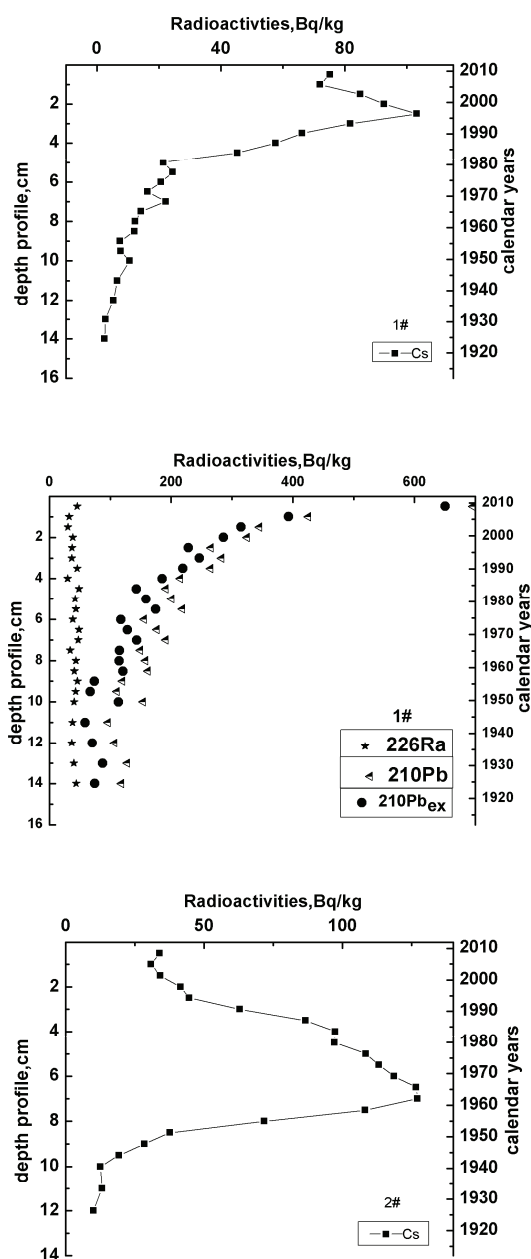


Fig. 1. Geological diagram of Sampling area



* Corresponding author. E-mail: yangyuwan_su@163.com

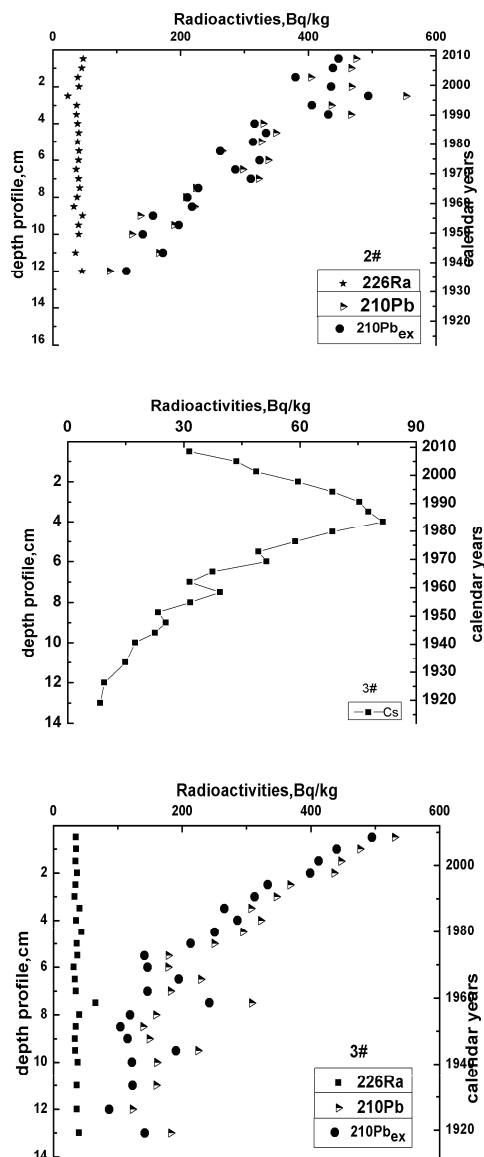


Figure 2 spatial distribution of radioactive elements activity changes with depth

northwest of the lake slightly greater than what in southeast of the lake. What's more, we find that the change of the deposition rate and the overall change of annual average rainfall stay consistent.

Key words: Lake Qinghai, ^{137}Cs , ^{210}Pb , Modern deposition rate, Environmental evolution

Acknowledgements

Thanks to the guidance of my advisor, Professor Sha Zhanjiang. At the same time thanks for my colleagues' help.

References

Song Honglie. 1996. The formation and evolution of the Tibetan Plateau. ShangHai: Shanghai Science and Technology Press.

- (in Chinese)
- Li Fengxia, Fu Yang. 2008. Climate change and its environmental effects in Qinghai Lake. *Resources Science*, 30 (3) : 348-353 (in Chinese)
- Shen Ji, Zhang Enlou, Xia Weilan. 2001. The sediment records of the last millennium climate change in Lake Qinghai. *Quaternary Sciences*, 21 (16) : 508-513 (in Chinese)
- Zhang Enlou, Shen Ji, Wang Suming et al. 2002. The sediment records of climate change nearly 900 years in Lake Qinghai. *Journal of Lake Sciences*, 14(1):32-37 (in Chinese)
- Zhang Xinbao, Zeng Yi, Long Yi. 2009. An attempt of ^{137}Cs mass balance modern to calculate deposition rate of Qinghai Lake. *Journal of Lake Sciences*, 21 (6) : 827~833 (in Chinese)
- Xu Hai, Liu Xiaoyan, An Zhisheng. 2010. preliminary study of modern sedimentation rate of Qinghai Lake and the spatial distribution of deposition fluxes. *Chinese Science Bulletin*, 55 (4-5) : 384-390 (in Chinese)
- Wan Guojiang. 1997. ^{210}Pb dating of Modern deposited. *Quaternary Sciences*, 3:230-238 (in Chinese)
- Sun Yongliang, Li Xiaoyan, Tang Jia et al. 2008. The hydrological effects and climate change of Qinghai Lake basin. *Resources Science*, 30 (30) : 354-362 (in Chinese)
- Ritchie J C, McHenry J R, Gill A C. 1973. Dating recent reservoir sediments. *Limnology and Oceanography*, 18: 254-263
- Walling D E, He Q. 1997. Use of fallout ^{137}Cs in investigations of overbank sediment deposition on river floodplains. *Catena*, 29: 263-282
- Kang Xinglun. 1986. data processing problems about ^{210}Pb dating method. *Marine Sciences*, 10(6):13-16 (in Chinese)
- Robbins J A. 1978. Geochemical and geophysical applications of radioactive lead. in: Nriagu J O ed. The geochemistry of Lead in the Environment Amsterdam: Elsevier/North-Holland Biomedical Press, :285-383
- Krishnaswamy S, Lal D, Martin J M et al. 1971. Geochronology of lake sediments. *Earth and planetary Science Letters*, 11:407-414
- Appleby P G, Oldfield F. 1992. Application of ^{210}Pb to sedimentation studies. In: Ivanovich M, Harmon R S eds, Uranium R S eds. Uranium Series Disequilibrium: Applications to Earth, Marine, and Environmental Sciences, oxford, United Kingdom: Clarendon Press, 731~778
- Zeng Yi, Zhang Xinbao, Zhou Weijian. 2007. The radioisotope ^{137}Cs source of Surface sediments in Lake Qinghai. *Journal of Lake Sciences*, 19(5):516-521 (in Chinese)
- Zhang Xinbao. 2005. Discussion about ^{137}Cs depth distribution data interpretation of the lake sediments. *Journal of Mountain Science*, 23 (3) : 294-299 (in Chinese)
- Qu Yaoguang. 1994. water balance and water level prediction in Qinghai lake. *Journal of Lake Sciences*, 6 (4) : 298-306 (in Chinese)
- Robbins J A, Edgington D N. 1975. Determination of recent sedimentation rates in Lake Michigan using ^{210}Pb and ^{137}Cs . *Geochimica et Cosmochimica Acta*, 39 (3) : 285~304
- Huang Qi. 1988. A preliminary study of lake sediments' deposition rate and paleoclimatic evolution. *Chinese Science Bulletin*, 22:1740-1744 (in Chinese)
- Xu Hai, Ai Li, Tan Liangcheng et al. 2006. Geochronology of a surface core in the northern basin of Lake Qinghai: Evidence from ^{210}Pb and ^{137}Cs radionuclides. *Chinese Journal of Geochemistry*, 25(4): 301-306