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中国年轻火山岩铀钍(U-Th)非平衡研究进展

作者	单位
邹海波	美国奥本大学地质地理系,Auburn, AL 36849,USA
樊祺诚	中国地震局地质研究所,北京100029

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摘要：

本文简述近些年中国年轻火山岩的铀钍非平衡研究进展。中国东部(五大连池,天池,镜泊湖,龙岗,大兴安岭, 海南岛)的年轻火山岩都显示著的^{230}Th过剩,表明岩浆来源于含石榴子石的深部地幔,并且部分熔融速率低。其中五大连池主要来自深部(≥75km)的岩石圈地幔,天池、镜泊湖、龙岗和大兴安岭岩浆主要来自软流圈地幔,而海南岛火山岩则显示下地幔特征。中国东部年轻火山岩中U-Th非平衡并没有显示俯冲的太平洋板块对年轻火山岩的物质贡献。我们近来发现年轻火山岩中含有锆石。长白山天池火山岩千年喷发的碱流岩中的锆石U-Th等时线年龄为7~10ka。腾冲马鞍山的锆石表面U-Th等时线年龄为55ka,而锆石内部年龄是90ka。锆石年龄可能表明,相对于腾冲马鞍山的小喷发,大喷发的长白山天池火山岩浆滞留年龄短。长白山天池火山的很短的滞留时间表明其存在危险性。

英文摘要：

We review the recent development of uranium-thorium disequilibrium technique and its application to young volcanic rocks from eastern China. All basalts from eastern China show significant ^{230}Th excesses, indicating deep and slow mantle melting in the garnet stability field. Recent addition of subduction-related fluids from the Pacific plate is not supported by U-Th disequilibrium in young volcanic rocks. Measurement of U-Th disequilibrium in zircons in young evolved volcanic rocks provides insights into magma residence times before eruptions. The zircons from Tianchi of Changbaishan are only 9000 years (9ka) old, predating the millennium eruption by only 8000 years. In comparison, the Maanshan zircons show two age populations in 55ka and 91ka. The short residence time of the Tianchi volcano suggests that Tianchi volcano is highly dangerous. The rapid development of the great Millennium eruption is consistent with the trigger mechanism of the great Millennium eruption by injection of basaltic magma into the comenditic magma.

关键词：铀钍非平衡 岩浆滞留时间 年轻火山岩 年轻锆石 中国

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