

Thallium and other metals in airborne particulate around an abandoned Tl-mine in Southwestern Guizhou, China

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Thallium (Tl) is a typical non-essential and toxic element for human, with higher toxicity to organism than mercury, cadmium, lead, zinc and copper. It as a dispersed element, usually occurs in trace concentration, and its minerals and mineralization are also rare in nature. However, it was found that Tl enriched in specific sulfide minerals formed by epithermal metallogenesis, as well as rarely formed independent Tl-rich deposits, such as Lanmuchang Tl deposit located in Southwestern Guizhou, China. This area suffered from serious Tl pollution since early 1960s, and thallosis bursted in 1960s, 1970s and 1990s. In past two decades, lots of excellent reseaches on Tl had ascertained its exposure pathway for local residents and human health impact, which usually focused on accumulation, transport and transformation of Tl among different environmental compartments (eg. soil, water and plant), but there was few research on airborne particulates. Thus, this study attempted to verify the hypothesis that local airborne particulates might accumulate elevated Tl, and it also might be another potential Tl exposure pathway for local inhabitants. Fifteen airborne particulates were collected around houses within Lanmuchang area, Southwestern Guizhou. Tl, As and Sb concentrations were analysed by ICP-MS. The results showed that, airborne particulates in study area very highly accumulated Tl, with the value of 12.3 ± 3.35 mg/kg, coupled with elevated As (93.3 ± 13.6 mg/kg) and Sb (25.2 ± 3.28 mg/kg) concentrations. It is confirmed that airborne particulates is a very important exposure pathway of Tl and other metals for local residents in Lanmuchang area, Southwestern Guizhou.