Mobility and geochemical behavior of antimony in mining-impacted water environments, Guizhou, China

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Antimony (Sb) is a toxic element and a global environmental contaminant that is found throughout the environment as a result of natural processes and human activities [1, 2]. China is a country with the most abundant Sb resources with huge reservation and productivity on top of the world. Antimony pollution has become one of the typical environmental issues in China [3]. Research on the geochemical fate of antimony in environment is significant to assess environmental risk of Sb, understand environmental behaviors of Sb and establish its global biogeochemical cycle.

In the Duliujiang river basin, there are abundant Sb mineral resources (eg., Banpo Sb deposit in Guizhou) with the long-term exploitation and smelting of Sb deposits. Most of Sb deposits were closed and abandoned so far, but mining activities have produced amounts of waste drainages and tailings which contribute to the antimony pollution in the this basin. The study is focused on the geochemical behaviors of Sb in water environments in this area. Samples of different types of waters and stream sediments were collected and analyzed for Sb to investigate their spatial distribution and dispersion in the basin. Waters of various types showed a range of pH values from circum-neutral to alkaline waters because of the buffering capacity of abundant carbonates. Migration of Sb in waters was attributed to its dispersion as dissolved forms. Adit waters from the abandoned Sb mines showed the highest levels of Sb compared to the other types of waters, and stream sediments also have been contaminated by Sb with high concentrations, which indicated that adit waters and residues from the abandoned Sb mines are main sources of Sb pollution in the Duliujiang river basin in this moment.

[1] Filella et al. (2002) *EARTH-SCI REV*, **59**, 265–285. [2] Herath et al. (2017) *Environ. Pollut.*, **223**, 545-559. [3] He et al. (2012) *Sci. Total Environ.* **(421-422)**, 41-50.