

Interactive comment on “Mineral leaching chemicals transport with runoff and sediment from severely eroded rare earth tailings in southern China” by Huizhong Lu et al.

Anonymous Referee #1

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1 General comments Rare earth mining has led to severe soil erosion in southern China. Furthermore, the presence of the mineral leaching chemical ammonium sulfate in runoff and sediment poses a serious environmental threat to downstream water bodies. The mineral leaching chemicals characteristics in rare earth tailing heaps were discussed in this study for the first time. The methods used in the paper is very suitable and the figures, tables, and equations showed clearly and therefore can verify the conclusions. The calculation and analysis can be accepted. The above results will aid in better understanding the transport characteristics of mineral leaching chemicals during the erosion process and in developing predictive equations in rare earth tailing areas. However, it needs a deep major revision in the current state.

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2 Specific comments (1) P2L6 Furthermore, different chemicals have unique transportation pathways and primary carriers in runoff. Thus, it is necessary to compare the differences between NH_4^+ and SO_4^{2-} . The authors should added the reason why the paper studied NH_4^+ and SO_4^{2-} and their research progress. (2) P2L9 Three rainfall events were recorded on June 16, 2012, May 15, 2013, and May 16, 2013. At least two samples were taken at every sampling point. There were a total of 67 rainfall runoff samples. Three rainfall events, eighteen sampling points, At least two samples were taken at every sampling point, how to get a total of 67 rainfall runoff samples? (3) P7L25 Nijl31 in Figure 2(a) and $N=24$ in Figure 2(b). why are the two N different? (4) P7L5 The precipitation intensities differed among the rainfall events, and the dissolved chemical concentrations increased with increasing precipitation intensity (Zhang et. al, 2016). Thus, the data were standardized according to the precipitation intensities, i.e., the standardized concentrations were equal to the real concentrations divided by the corresponding precipitation intensity. P8L24 Each sediment sample was divided into three sediment size groups: sand (2-0.05 mm), silt (0.05-0.002 mm) and clay (<0.002 mm). Maybe the sentences should be put in the 2.3 Analytical methods. (5) Some sentences should be put in the discussions. For example, P8L27 Smaller particles, particularly silt and clay, have relatively greater specific surface areas and can therefore adsorb and transport large quantities of chemicals (Lü et al., 2007). (6) There are some comparisons in the paper, for example, P6L13 The absorbed NH_4^+ concentrations at sites B (2.05 mg/L) and C (1.26 mg/L) were higher than the dissolved NH_4^+ contents at sites B (0.93 mg/L) and C (1.04 mg/L). Why not use one-way analysis of variance (ANOVAs) to compare differences among them? (7) P10L5 Our results demonstrate that SO_4^{2-} absorption occurred rarely in the upper soil, although it was found in deeper soil layers, How to draw the conclusion that it was found in deeper soil layers? (8) P11L14 4.3 Implications and prospects of this study Some materials should be added to 4.3 to improve it.

3 Technical corrections mg kg⁻¹ was used in Figure 3, mg L⁻¹ was used in Figure 2, while mg/kg and mg/L were used in the text.

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