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***Interactive comment on* “Sulfur-containing particles emitted by concealed sulfide ore deposits: an unknown source of sulfur-containing particles in the atmosphere” by J. Cao et al.**

Anonymous Referee #1

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The content of the manuscript "Sulfur-containing particles emitted by concealed sulfide ore deposits: an unknown source of the sulfur-containing particles of the atmosphere" is completely given in the title.

Particles were collected from an ascending geogas flow above the soil, in the soil, and in deep-seated faults. These particles were analyzed in the TEM.

The main results of the TEM measurements is that the particles are Sulfur containing particles and from this finding it is concluded that the climatic and ecological influences of these particles from sulfide ore deposits has to be assessed.

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This is not convincing enough for me, because of many reasons.

1- Some details are given about the sampling procedure, but I cannot reproduce if the very limited number of sampled particles (after 60 days of sampling mostly 1 or 2 particles per sample) are really representative for the ascending geogas flow. In the methods chapter a protective device is mentioned, but no details are given. From an analytical point of view there must be some information about blind samples. Is there really no single particle after 60 days of sampling under the applied conditions in a blind sample? Only if this is tested it is useful to discuss the composition of the detected particles.

2- Even under the assumption that the 16 analyzed particles are from the geogas flow, the number is too low for a representative result. Further, there is no data about concentration. I cannot support the thesis that sulfide ore deposits are an important global sulfate source (climatic relevant) only based on sixteen nanometer sized sulfate particles after 60 days of sampling.

3- In the text mainly the elemental composition from EDX measurements for 16 particles are presented. A critical discussion or further interpretation is missing. Even the amazing Co, As or Pb concentrations are only mentioned, not further discussed. The long discussion about other sulfate sources and their importance should not be scope of this manuscript.

4- The HRTEM images and SAED measurements are impressive and absolutely state of the art. But unfortunately no mineralogical phase information was won for the crystalline particles. Most images (Fig 1,3,5,9) show decomposing particles. It is also not mentioned in the text, which particles are stable during the TEM measurements. The behaviour of the particles in (Fig 1,3,5,9) looks similar to ammonium sulfate or sulfuric acid. TEM images of all particles (16 Figures) are not necessary in the manuscript, there is only very limited new information.

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