

Interactive comment on “Natural or anthropogenic? On the origin of atmospheric sulfate deposition in the Andes of southeastern Ecuador” by S. Makowski Giannoni et al.

Anonymous Referee #3

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This study conducts source-receptor relationships between collected wet deposition at two mountain sites and known SO₂ emission sources. A large amount of work is presented and is worth to be published. The relative importance of precipitation and occult deposition need to be explained carefully due to the factors explained below.

According to descriptions in Section 3.1.1, sulfate deposition collected in this study seems to include a portion of dry deposition (i.e., it is not a wet only collector). Apparently, dry deposition contributes a larger fraction of the total collected deposition in occult precipitation than in rain. It should also be noted that the actual dry deposition to forest canopies may be much higher than the portion collected by the instruments

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due to the larger surface areas of forest leaves. A brief discussion on this point and uncertainties caused in the experimental design should be added in this section and in places where total deposition amount is discussed.

Most receptor-based source-receptor relationship studies use measured concentrations at the receptor site. This study uses deposition data directly, and thus involves more parameters. Sulfate wet deposition in rain includes two parts: in-cloud scavenging which likely related more to back trajectories and below-cloud scavenging which likely related more to local ambient SO₂ and sulfate concentrations. On the contrary, sulfate deposition in occult precipitation should mostly be related to local ambient concentration. These factors may help to explain the differences identified between rain and occult precipitation.

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