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Interactive comment on "Cloud scavenging of abundant anthropogenic refractory particles at a mountain site in North China" *by* Lei Liu et al.

Anonymous Referee #2

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In this study cloud residual and cloud interstitial particles were collected at a site and analyzed to obtain insight into the aerosol-cloud interactions. Properties such as size, morphology, composition and the mixing state were studied to highlight the salient differences in clout RES and INT particles. The researchers also propose a model to further explain the cloud-aerosol interactions.

Overall, the background, scientific rationale and the data presented in the study are sound. The presentation style is clear and easy to follow. However, there are a couple minor issues which need to be addressed.

In Results, there is a section 3.2 and 3.4 but there is no section 3.3. It seems that section 3.4 needs to be changed to 3.3

In section 3.2, the authors classify the particles as (1)S-rich, (2)OM, (3)Soot, (4)mineral and (5)fly-ash and (6)metal. Furthermore, they say (2)-(6) can be classified as refractory particles owing to their refractory behavior under electron beams. The authors then say that "Based on the mixing properties of individual particles, they can be further classified into four categories: S-mineral, S-soot, S-fly ash/metal, S-fly ash/metal-soot" together defined as S-refractory particles. While the classification seems reasonable the use of the term "mixing properties" is a bit vague here unless more information is provided. What are the mixing properties to which the authors are referring? Are S-refractory particles formed from refractory particles? If so, how? Is it a probabilistic phenomenon or is there a fundamental difference between the refractory particle in itself as opposed to a component of S-refractory particle?

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