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Interactive comment on "Lithology and climate controlled soil aggregate size distribution and organic carbon stability in the Peruvian Andes" *by* Songyu Yang et al.

Anonymous Referee #2

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The paper discusses the role of lithology and climate on the stabilization of organic matter. I like the choice of the sites on a clear precipitation transect. The approach is also straightforward, but I am not sure why the authors in contrast to the prevailing literature on the topic did not use wet sieving. After all, dry sieving does not result in water stable aggregates that occlude (to a certain extent) the organic matter. This choice for dry sieving needs to be justified and its implications discussed. Furthermore, details on the dry sieving method are lacking (line 159): agitation intensity and duration. Were the samples air-dried or field moist? The discussion section is speculative as many characteristics are mentioned in the discussion but neither the analytical methods nor the results are presented.

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Discussion paper

line 103 Could you please explain the land use of the sites in somewhat more detail. As it stands, the land use is grassland, but you also mention cultivation and tree plantations. These activities would belong to cropland or forest land use classes. Line 142 The stoniness is not expressed in % but in fraction. Please also state that you use the gravimetric fraction. See the discussion on the role of coarse fragments for SOC stocks in SOIL by Poeplau et al and Hobley et al (2017 if I am not mistaken). The Bulk density should include the coarse fragments. Was this the case? You mention in line 132 that the gravels were removed. Please revise carefully. Line 144 In general wet sieving is used to determine aggregate stability. Why did you choose dry sieving? Line 147 Please specify that these are gravimetric gravel contents. Lines 307-326 I miss a discussion on the difference between wet and dry sieving. After all, the authors you cite all used wet sieving. It is possible that occlusion does not play an important role, because your aggregates are not water stable and therefore, there is no real occlusion of OM in stable aggregates. This possibility should at least be mentioned in a note of caution (see also general remark). Section 4.3 It is not clear to what extent characteristics have been measured. For instance, lines 328-330 I have not seen any analytical data on Fe and Al hydroxide or Ca bridges. Lines 368-369 How were these fatty acids analysed?

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