

Interactive comment on “Comparison of soil characteristics from geophysical and geochemical techniques along a climate and ecological gradient, Chilean Coastal Cordillera (26° to 38° S)” by Mirjam Schaller et al.

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General comments This paper is a somewhat disappointing addition to work already published by the team working on the German-Chilean priority research program EarthShape (www.earthshape.net). The published work has already established that GPR could be used to map “soil” materials in the four study areas, and that interpretation can be “up scaled” from point observations to transects (Dal Bo et al. 2019). The Dal Bo et al. paper correctly identifies the importance of observations about soil moisture content and clay content to refinement of GPR data interpretation. Note, increases

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in both soil moisture and clay content often mark the transition from pedolith to saprolith. Unfortunately, Schaller et al. do not expand on the soil property dataset already available to Dal Bo et al., and so, unsurprisingly, do not come up with any new insights into the interpretation of their new - or the old (Dal Bo et al.) - GPR data acquired in the EarthShape Chilean study areas.

I would suggest that the authors, and the EarthShape team, take a closer look at some of the work that is being done on using GPR to map regolith materials and processes elsewhere in the southern hemisphere, especially in Australia. Some of this work is published in “grey” literature, but it is still relatively easy to find on the internet. There is also a lot of work being done in Australia, some in collaboration with European geophysicists, on the use of electromagnetic surveys to map regolith materials and processes. The inversion of this data has become quite sophisticated and AEM surveys, designed in part to map regolith thickness, are now taking place on a continental scale.

Further, Schaller et al. perpetuate some of the confusion in soil and regolith terminology that is apparent in earlier work by this team. In particular, the confusion relates to the use of the term “soil” variously as a descriptor for the entire regolith profile (pedolith and saprolith), and as a descriptor solely for the pedolith. This confusion is exacerbated by reference to soil materials that are mobile (pedolith) and immobile (saprolith). Note, the saprolith includes saprolite and saprock. The distinction between these units can be important for the interpretation of geophysical data, although the EarthShape Chilean study does not appear to have properly investigated beyond the pedolith. A visit to some of Chile’s open cut mines might be a salutary experience in this regard.

Note, these general comments are supplemented with detailed comments and suggested amendments as per the attached pdf. The comments and suggested amendments have been added to the pdf using Adobe Acrobat.

Please also note the supplement to this comment:

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<https://soil.copernicus.org/preprints/soil-2020-33/soil-2020-33-RC2-supplement.pdf>

Interactive comment on SOIL Discuss., <https://doi.org/10.5194/soil-2020-33>, 2020.