

Interactive comment on “Aerobiology and passive restoration of biological soil crusts” by Steven D. Warren et al.

Anonymous Referee #1

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I have reviewed this paper for other outlets, and the author has not addressed any of my concerns. The conclusions of this paper are based mostly on the erroneous idea that restoration of biological soil crusts (BSCs) has been unsuccessful at the large scale. The most likely source of this error is the focus on efforts in the U.S. (and the authors spearheaded some of the original efforts) and lack of attention paid to efforts in China. In China, successful restoration of BSCs has been occurring for many years. The Chinese have employed both passive (stabilizing the soils) and active (culturing and inoculating) methods. In the latter case, cyanobacterial mixtures have been grown in large ponds and then sprayed out onto the landscape using large water trucks and hoses. This could easily be adapted to airplanes, if an even larger area needed coverage. Alternative technologies are also coming on-line that could benefit BSC culturing,

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such as growing cyanobacteria as an energy source (thus providing information on optimal growth conditions), developing ways to capture CO₂ from coal plants to enhance growth, etc. The authors are correct that reducing disturbance is the best of all options. However, that is not always feasible, especially given the ever-increasing demands being placed on dryland ecosystems for energy, recreation, minerals, and water resources. Passive BSC restoration is often not possible where surface disturbance has resulted in large amounts of soil movement and at the very least, soils often need some stabilization for any type of BSC recovery. In addition, there are many places where, as the authors note in the text, natural recovery is extremely slow. Dust and eroding soils reducing water quality are becoming major issues for land managers. For these reason, we need not to give up, but to pursue ideas on better ways to accomplish to hasten recovery of disturbed BSCs. In order to be published, the authors need to include the extensive Chinese literature available on this topic. This will require reframing their argument that restoration does not work. I also think it is unrealistic to wait for sites to recover for up to hundreds of years when land managers need tools to make it happen much more quickly.

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