



EGUsphere, referee comment RC2
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Comment on egusphere-2022-714

Anonymous Referee #2

Referee comment on "Modeling the inhibition effect of straw checkerboard barriers on wind-blown sand" by Haojie Huang, EGU sphere,
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This is an interesting paper that uses numerical simulation to study the inhibition effect of straw checkerboard barriers (SCBs) on wind-blown sand, and also the influence of SCB's laying length was discussed. Based on the simulation results, the wind field, particle concentration and transport rules around the SCBs are revealed and analyzed. These works have positive significance for people to deeply understand the function of SCB and effectively improve its use effect. This article thus has the potential to be an important contribution. However, there are several major issues with the article.

First of all, it is suggested that the language and format of the full text should be carefully examined and revised. There are many obvious grammatical and formatting errors, such as in line 95-96, line 190, 195, 198, 220, 226, line 231-232, line 273, line 314-318...

Line 161, In Figure 1 we don't see any information about the inlet condition setting.

Line 254-256, is there any evidence to confirm that SCB can be approximated as vegetation when evaluate rfa in equation 16?

How to describe the dynamic behavior after the collision of saltation particles and SCB?

Line 264, what is wall-normal direction. There are several walls in the simulation region.

Line 293, what are delta t, H and M in Eq. 17? What is the meaning of 'mass in the range'? Is it similar to concentration? Why dx is divided here? From the physical concept, the scale

information in the x direction should not appear here (should be y direction). Anyway, please check and define all the variables involved in the Eq. 17 and give the dimension of q.

Line 309, what is the difference between the transport rate density and the transport rate defined in eq. 17?

Line 301-350, the author spent a great deal of space to analyze and discuss the structural characteristics of aeolian sand flow without SCBs, but it seems that this is not the focus of this paper. Appropriate reduction is recommended.

In the part of model validation, the verification of the simulation results of sand flow with SCBs is not sufficient. The qualitative comparison cannot prove that the simulation results of the adopted model are credible in the presence of SCBs. Some quantitative comparisons are necessary. I believe the author should be able to find the observation data of the sand flow in the presence of SCB.

Line 434-443, the sand accumulation pattern in a single SCB should be related to the vortex structure of the local flow. It seems to be too far-fetched to explain it only from the result of time-averaged wind speed.

Line 466, why does the laying length of SCBs affect the sand transport rate in the upwind area ($x < 5m$)?

Line 474, 478-479, it is a little strange here that the author did not consider the fluid entrainment. How does the wind-blown sand flow recover in the downwind area of the SCBs where the sand transport rate has reduced to zero?

Line 481-482, is it possible that the length of the computation domain is not enough?

The results in Figure 14 and Figure 12 do not seem to agree. Fig. 12 shows that there is almost no sand flow in the area of SCB, but Fig. 14 shows a different result.