Review report on the paper “Occurrence frequency of subcritical Richardson number assessed by global high-resolution radiosonde and ERA5 reanalysis” by Shao et al., ACPD.

The authors responded to the questions raised by the reviewers, and improved the manuscript which is now more conclusive compared to the initial submission, both in the handling of the data as well as in the interpretation and description of the results. Still, I think a few clarifications are necessary, mainly of technical or linguistic character.

p.5 L. 121 What does “the last version of the ECMWF model” refer to? The latest reanalysis product? The IFS version?

p.11 L.289 According to Fig. S3 the static stability is not averaged from the surface to 30 km.

Figure 8: Out of curiosity, is the ERA5 distribution above 17 km altitude so irregular because the data density is so low for both $Ri<0$ and $Ri<Ri_t$? How meaningful is the top part of the plot then?

p.15 L.425ff I would expect the vertical resolution to be enhanced over mountainous areas, due to the surface-following hybrid sigma-pressure coordinates.

p.16 L.450 “Generally weak” compared to where? I am not sure that I would agree with this statement.

p.17 L.471 Just to be sure, do the unresolved orographic gravity waves (their dissipation) cause the low Richardson numbers, or do the unresolved orographic waves occur along with resolved orographic gravity waves which impact the occurrence of low Richardson numbers? Or both effects? Maybe rephrase the sentence to make it more clear how you interpret the results.

p.17 L.477 I find it a bit hard to follow the interpretation of Fig. 15.
$OF(Ri<Ri_t) > 10\%$ would be yellow and above in the colorscale, I see no direct connection to the wind speed threshold of 25 m/s.
The occurrence frequency $OF(Ri<Ri_t)$ depends mainly (directly) on wind shear, and the average wind shear (along with $OF(Ri<Ri_t)$) increases somewhat with the average wind speed. However, this is mainly evident in Fig. S9b and not in Fig. 15.
Maybe rephrase this paragraph.
p.19 L.523 would have to be adjusted accordingly.

Figure 12: I believe SDOR should have meter as unit.