Comments on the revised version of the ms. acp-2018-700 by M. J. Granados-Muñoz et al., entitled "Impact of mineral dust on shortwave and longwave radiation: evaluation of different vertically-resolved parametrizations in 1-D radiative transfer computations"

François Dulac, 16 December 2018

First, let me thank you for your revision. I consider that it greatly improved the manuscript. I am suggesting a further small revision because I am not totally satisfied with the way you addressed replies to comments 4 and 5 from reviewer #1 in the revised version itself. My minor comment and a few technical corrections are detailed hereafter.

Minor comment:

-I am not fully satisfied with your reply to reviewer #1 comment 5 on large particles observed in the dust plume further North over the western Mediterranean: I do not think this is the case at the moment but I believe that at least part of your text replies to reviewer #1 comment 4 on the sensitivity to absorbing gases and comment 9 on large particles should be included in the article. I insist that although dust size distribution measurements under balloons drifting from Menorca are somewhat distant from yours, as highlighted in your reply to reviewer #1 comment 5, they were performed during the same dust event (see below my suggestion referring to satellite AODs), and the Lagrangian balloon measurements reported in Renard et al. (2018) shows that the dust particle size distribution seems fairly stable during the long-range transport from Africa to Europe, including the largest mode around 30 µm in diameter that they report. Acknowledging this, and reporting the conclusion of your test that this mode has a weak radiative influence in the LW looks important to me. Regarding this sensitivity test reported in your reply to comment 9, note, however, that the indicated 15% proportion for the third, (coarse) mode should apply to the total mass or volume, but not to the number concentration as stated in your reply (the 3rd mode number contribution is negligible, likely <10^{-4}%).

Technical corrections:

-P.9, line 7: "not shown" is no longer correct about back-trajectories; please refer to figure S1.

-P.9, l.10: I suggest making a new sentence after the ref. to Renard et al., replacing ", which […]": "Daily maps of MSG-derived AOD over the Mediterranean from June 15 to 18 during the dust event shown in Figure 4 of Renard et al. (2018) shows the regional extension of the plume over the western Mediterranean region".

-P.14, lines 1-2: "GRASP-derived spectral profiles".

-P.14, l.5: "single-wavelength".

-P.14, l.23: use unbreakable hyphen in units (CTRL+8 in Word).

-P.17, l.16: I suggest "comparable" rather than "similar".

-P.18, l.1: Here again, I think "very similar" is not appropriate; I suggest "close to".

-P.18, l.3: "very similar" would apply here.

-P.19, l.9: remove the article “a” before the 2 numbers in %.

-P.19, line 28: “increasing […] by 5K”.
