

Final decision and comments on ms. acp-2015-558 entitled “Mediterranean intense desert dust outbreaks and their vertical structure based on remote sensing data”, by A. Gkikas et al.

By François Dulac, 26 April 2016

Thank you again for your efforts in improving your manuscript. I have decided to accept it for publication. Please consider the small corrections listed hereafter:

- Symbols should be in italic style but not all abbreviations: e.g. DD, ITCZ, SAL, SW and LW, NAO, DT, UV, VFM, etc. need normal style.
- The abstract is missing information on results from PM studies: please add a couple of sentences with quantitative results (e.g. about comparison scores) and qualitative conclusion (e.g. “the comparison against surface PM_{10} concentrations revealed a poor agreement between satellite AOD and ground observations in the western parts of the Mediterranean, attributed to the desert dust outbreaks’ vertical distribution.”).
- Line 28: replace “value” by “, but”.
- Line 30: comma missing between “episodes” and “additional”.
- Line 38: correct “consistency”.
- Line 47-48: make 2 sentences (“in warm seasons. An increase”).
- Lines 52, 127, 670, 671, 695, 867, 868, and 915: capitalize “South” and “North”.
- Line 57: “bases” (plural).
- Line 79: please additionally cite and add in the reference section those papers from the ChArMEx special issue by Sicard et al. (2014) and Nabat et al. (2015):
Sicard, M., S. Bertolín, M. Mallet, P. Dubuisson, and A. Comerón: Estimation of mineral dust long-wave radiative forcing: sensitivity study to particle properties and application to real cases in the region of Barcelona, Atmos. Chem. Phys., 14, 9213-9231, doi:10.5194/acp-14-9213-2014, 2014.
Nabat, P., S. Somot, M. Mallet, M. Michou, F. Sevault, F. Driouech, D. Meloni, A. di Sarra, C. Di Biagio, P. Formenti, M. Sicard, J.-F. Léon, and M.-N. Bouin: Dust aerosol radiative effects during summer 2012 simulated with a coupled regional aerosol–atmosphere–ocean model over the Mediterranean, Atmos. Chem. Phys., 15, 3303-3326, doi:10.5194/acp-15-3303-2015, 2015.
- Line 97: “has also been”.
- Line 106: references by chronological order.
- Line 119: “measurements and model”.
- Line 127: “capitalize “South”.
- Line 136: replace “being” by a comma.
- Line 139-140: remove commas before and after over Rome.
- Line 150: specify “The geographical limitation”.
- Line 198: “500 or 1000 m”.
- Lines 205-210: “;” rather than comma before each cited reference.
- Line 215: “(2013). However,”.
- Line 250: “match the two other”.
- Line 269: remove the verb “are”.
- Line 272: remove “VFM” (not yet defined).
- Line 274: add a comma before “namely”.
- Line 290: remove “installed”.
- Line 292: “inverted into”.

- Line 305: replace “higher” by “better”.
- Line 368: “Differences in”.
- Line 375: add a comma before “we have repeated”; do you mean “the calculation of mean AOD values”? “(calculated from)”.
- Line 376: unclear to me; do you mean “thus attenuating the possible effects on the mean AOD of an unequal temporal distribution of the number of observations”?
- Line 400: “dust-affected”.
- Line 404: replace “for” by “from”.
- Line 420: replace “operates also” by “is also tested”.
- Line 429: remove “quality”.
- Line 430: “clarified that” without comma.
- In order to remove one level of sub-titling: remove “and PM₁₀ “ in line 436, and “AERONET” subtitle in line 463; rename “4.1. Aerosol optical depth” and change 4.1.1.2 to 4.1.1.4 to 4.2 to 4.4.; correct in the text all references to those renumbered sections (e.g. in lines 460, 731, 982, 1029...).
- Line 441: use “;” before the reference.
- Line 465: “pixel-level”.
- Line 480: “overestimated on average (mean bias=0143). The scatterplots show”.
- Line 492: remove “spatial”.
- Line 498: “40-50 less events of more”.
- Line 499: “operated”.
- Line 531: specify “AOD retrievals”.
- Line 552: remove “the”.
- Line 589: “they represent”.
- Line 592: do you mean “Compared to Figure 2, it is apparent”?
- Line 601: remove “it “ and shift “has been calculated” after “thresholds” in the following line.
- Line 622: “can also be”.
- Line 625: this becomes section 4.5; add “Comparison with surface “ to this section sub-title.
- Line 657: replace “derived by” by “measured at”.
- Line 664: “that affected”.
- Line 665: this section becomes 4.6.
- Line 670: “West-to-East”.
- Line 681: “Although intense dust episodes”.
- Line 682: insert “, respectively” before closing parenthesis.
- Line 716: insert “, they” after “Sea”.
- Line 732: “has also been”.
- Line 737: specify “maximum occurrence values”.
- Line 750: this section becomes 4.7.
- Line 756: “for the dust episodes identified by”.
- Line 796: comma before “which”.
- Line 804: “4.7.1”.
- Line 806: “associated average total”.
- Line 847: “the absence”.
- Line 876: “agreement regarding the”.
- Line 881: “resulting”.
- Line 924: “are common to all plots but depend on”.
- Line 930-931: remove “it “ and shift “is evident” to end of sentence.
- Line 932: “in winter they are”.

- Line 933: "insert a comma after "3 km".
- Line 939: " they are shifted".
- Line 981: section 4.4 becomes section 4.8; change accordingly the following sub-sections 4.4.1 to 4.4.3 into 4.8.1 to 4.8.3.
- Lines 1015-1016: remove "it" and shift "is evident " before "(Figure S10-i)".
- Line 1030: "Cases".
- Line 1051: remove "it is ".
- Lines 1065-1066: AOD value found for the grid cell to which the station belongs to is high".
- Line 1068: "it extends".
- Line 1083: replace "parts" by "steps".
- Line 1086: "into strong".
- Line 1086-1087: "at the third step desert dust episodes are identified among these, separately".
- Line 1089: "higher/equal than/to".
- Line 1089: insert additional information "Up to $AOD < Mean + 4 * Std$ the episodes are classified as strong. For higher values, episodes are classified as extreme."
- Line 1090: insert a comma before "which".
- Line 1090-1091: the end of the sentence after "which" is unclear, please rephrase to clarify in what the method-B be differs from the nominal one.
- Lines 1098-1099: remove "it" and shift " is evident" after "mode".
- Line 1115: use a non-breaking hyphen in "m-3".
- Line 1171: "in the vertical, then".
- Lines 1269-1270: shift ", 2003" at the end.
- Line 1696: remove "which have been ".
- Lines 1699-1700: legend unclear; at the end of sentence, do you mean "for the intense DD episodes identified with AERONET (the reported number of DD episodes is the number of intense dust events detected by AERONET and for which satellite data are available"?
- Lines 1711-1712: add a comma after "triangles", "circles", and "thresholds".
- Line 1712: replace "which" by "that".
- Line 1724-1727: "level-3" or "level-2" "retrievals" (4 instances).
- Line 1739: replace "for" by "over" (2 instances); "episodes that occurred".
- Lines 1785 and 1797: replace "averaged for" by "averaged over".
- Legends of Figures 8 and 9: "vertically resolved".
- Legend of Figure S1: insert a space in "550 nm"; remove the first occurrence of "thresholds".
- Legend of Figure S2: specify "overall intense"; insert a comma before "which".
- Legend of Figures S2 and S3: specify "for all intense".
- Legend of Figure S9: "vertically resolved".