The authors would like to thank Dr. Marsham for the useful comments. We have responded below to each one of the two points:

Dr. Marsham comment: (1) Note the caveats in Ryder et al. (2013), Atmos. Chem. Phys., 13, 303–325 regarding AERONET retrievals of aspects of aerosol properties such as the size distribution, made in light of recent aircraft measurements of size distributions. It would be worth contrasting your size distributions and those in Ryder et al.

Authors' response: Thank you for this reference. We will analyze in detail the results and caveats of Ryder et al. (2013) and compare with our results. The manuscript will be accordingly modified introducing this reference and the conclusions of the comparison.

Dr. Marsham comment: (2) Much of the summertime dust at Tamanrasset is likely a result of cold pool outflows ("haboobs") from moist convection (Marsham et al., 2008, J Geophys res; Marsham et al., 2013, J. Geophys. Res.) which together with the breakdown of low-level jets around the heat low (Knippertz 2008) likely generates the summertime dust maximum. These haboobs are missing in models with parametrised convection (Marsham et al., 2011 Geophys. Res. Lett; Heinold et al., 2013, J. Geophys. Res) and hence from the analyses used in HYSPLIT trajectories. This is likely a source of significant error in the use of such trajectories in the monsoon season.

Authors' response: Thank you for this important remark. We fully agree with Dr. Marsham. In fact, we are aware about the influence of mesoscale weather systems (dry boundary layer convection, "haboob" dust storms, nocturnal low-level jets, and southerly monsoon flow) on dust generation over Central Western Sahara because, in a previous version of our manuscript, we provided a comparison between AERONET measurements and the NMMB/BSC-Dust model (Fig. SC-1). Mesoscale Convective Systems (MCSs) can not be capture by global meteorological models or regional dust models. As a consequence, we performed an analysis of several convective events during summertime (Table SC-1). Unfortunately, we decided to discard this section because the paper was too long.

We will introduce in the text a clarification about the influence of these processes in summertime. Furthermore, as MCSs are usually strong but short events, the characterization of summertime background dust conditions through Concentration Weighted Trajectory (CWT) method will be supplemented with information about the origin of MCSs affecting Tamanrasset.

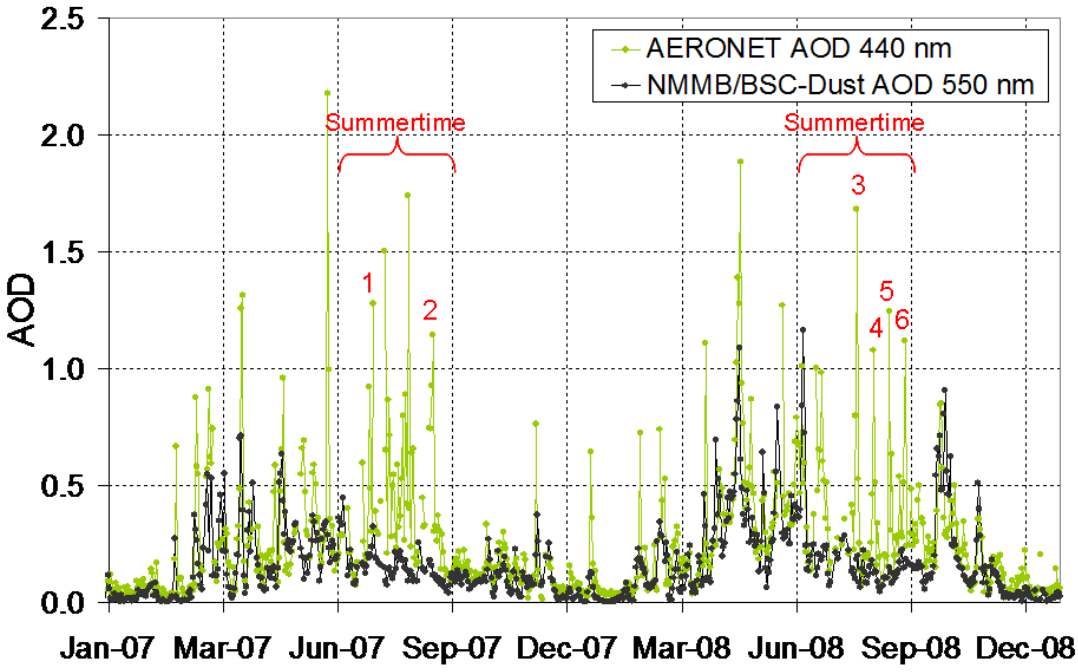

Fig. SC-1. AERONET and NMMB/BSC-Dust AOD daily mean values for the period 2007-2008. Several high dust events with significant model-observations AOD differences have been identified and numbered.

Table SC-1. Dust outbreaks at Tamanrasset driven by mesoscale convective processes[a]

Tag	Dust outbreak date	AOD range
1	22-25 Jul 2007	0.31-1.28
2	4-8 Sep 2007	0.30-1.15
3	26-30 Jul 2008	0.53-1.68
4	8-12 Aug 2008	0.16-1.08
5	21-23 August 2008	0.15-1.25
6	1-4 Sep 2008	0.24-1.12

[a]Each event is identified with its corresponding tag in Fig. SC-1.