We are grateful to the editors and anonymous referees for the insightful comments which highly helped us to improve the quality of our paper. We now turn to addressing concerns specific to reviewer one by one as below.

[1.The authors mentioned the structure of dust devil (DD)'s zone of weak winds is similar to the eye of tropical cyclone. However, according to figure 1b in the paper, the center of dust devil has strong upward motion, which is different from the hurricane eye (Figure 1R) or tornado center (Figure 2R) described in textbook, which has weak subsidence in their center. How to justify this inconsistency?]

Reply 1: Thanks for the comments. According to the previous observations, some researchers have found the central downdrafts within dust devils while others have not found such a structure (Sinclair, 1973; Metzger, 1999). There could be a stagnation point above the ground level where downward flow only occurs at height above the stagnation (Fig 1). Therefore downward flow might occur at considerable height above the surface or just at ground level (downward flow throughout the dust devil) or might not be present at all (upward flow throughout dust devil). Our observation results indicate the possible existence of DD's eye and that will be further confirmed in the future research. The conclusion has been revised according to your suggestion in the paper. New text added in the Summary and conclusions section:

"The distinct horizontal distribution of opacity values indicates the possible existence of the DD's eye which is difficult to be observed directly."

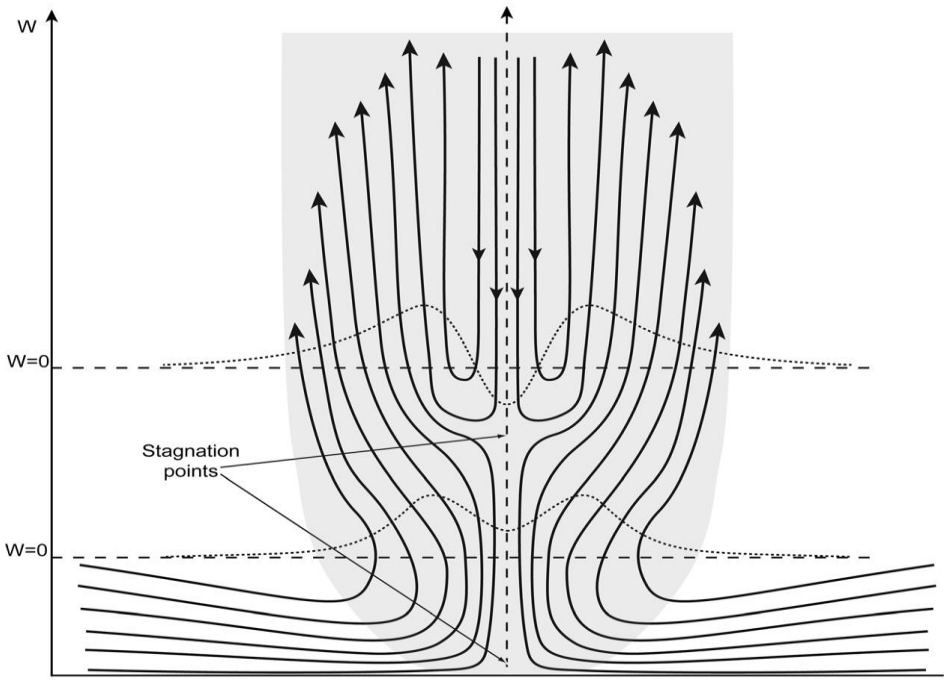

Figure1. Sketch showing possible vertical flow in a dust devil (Balme, 2006)

References:

Sinclair, P. C. (1973), The lower structure of dust devils, J. Atmos.Sci., 30, 1599–1619.

Metzger, S. M., J. R. Carr, J. R. Johnson, T. J. Parker, and M. T.Lemmon (1999), Dust devil vortices seen by the Mars Pathfindercamera, Geophys. Res. Lett., 26, 2781–2784.

Balme, M., and R. Greeley (2006), Dust devils on Earth and Mars, Rev. Geophys., 44, RG3003, doi:10.1029/2005RG000188

[2.It is true that the center of dust devil can has weak horizontal wind (e.g. the schematic drawing of dust devil from NASA website http://science.ksc.nasa.gov/ mars/ops /dustdevil.gif); and similar study (e.g., Zhang et. al. 2015) also confirmed that. However, no eye (or subsidence) was claimed in all these previous studies. The reader of the paper may wonder whether the authors' current results are consistent with the results of previous studies.]

Reply 2: Thanks for the valuable suggestion. Downdrafts within dust devils have been found currently by Kaimal and Bussinger (1970), Sinclair (1973), Metgzer (1999), et al. And dust devil eye also has been proposed by Gu (2008).But the structure and mechanism of dust devil eye are still unclear and the existence of dust devil eye has not been confirmed yet. So in the following study, we will focus on these aspects of research.

References:

Kaimal, J. C., and J. A. Bussinger (1970), Case studies of a convective plume and a dust devil, J. Appl. Meteorol., 9,612–620.

Sinclair, P. C. (1973), The lower structure of dust devils, J. Atmos.Sci., 30, 1599–1619.

Metzger, S. M., J. R. Carr, J. R. Johnson, T. J. Parker, and M. T. Lemmon (1999), Dust devil vortices seen by the Mars Pathfinder camera, Geophys. Res. Lett., 26, 2781–2784.

Gu, Z.L., J. Qiu, Y.Z. Zhao, and X.P. Hou(2008), Aerosol and Air Quality Research, Vol. 8, No. 1, pp. 65-77.