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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Vertical profiles of optical and microphysical particle properties above the northern Indian Ocean during CARDEX 2012" *by* F. Höpner et al.

Anonymous Referee #2

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The paper entitled 'Vertical profiles of optical and microphysical particle properties above the northern Indian Ocean during CARDEX 2012' by F. Höpner et al. describes the optical and microphysical properties of aerosols during the dry winter monsoon season above the northern Indian Ocean. Then a method for determination of particle absorption and equivalent black carbon concentration using lidar measurements with the synergy of characteristics SSA and mass absorption efficiency is presented and evaluated.

This paper is of scientific significance because the vertical information of absorbing aerosol is relevant to the radiative forcing in the region. The scientific approaches are

valid. The results in general are presented in a well structured and organized way. However, a number of assumptions is used that should be presented and emphasized in a better way in the methodology section.

There are some comments and suggestions for improvement.

Page 3909, line 5: Please specify the start and end of the campaign period. For example '..conducted from . . . to . . .'

Page 3909, line 20: 'more frequently' : Please quantify the number of elevated layers observed using the backscatter signal

Page 3909, line 23-26: Please rephrase the sentence

Page 3910, line 9-11: Lower MAE for 880 nm. . .What about 520 nm?

Page 3910, line 26: Delete the word very

Page 3912, line 17: Please provide a reference if possible.

Page 3914, section 2.2 Please state if the klett (1981) method is used

Page 3916, line 12: typo error

Page 3916, line 28-29: The authors assume that arrival heights of 400 and 2000m give a good indication for the air mass origin within the MBL and FT. Could you explain how you have selected the specific heights? Isn't it possible to perform trajectory analysis for the center of each elevated layer observed?

Page 3917, section 2.5: In addition to Figure 1, please provide a flow chart for the methodology used to estimate the vertical distribution of SSA.

Page 3918, line 12-16: The authors should also present the SSA from AERONET even if AERONET provide only total columnar values.

Page 3918, line 26,27: please add sr after the lidar ratio values given

Page 3920, line 14-18: please rephrase. It is not clear to me what you want to state.

Page 3921, line 5-8: The authors assume that arrival heights of 400 and 2000m give a good indication for the air mass origin within the MBL and FT. Could you explain how you have selected the specific heights? Isn't it possible to perform trajectory analysis for the center of each elevated layer observed? Also, the information on the vertical scale is important for the three groups of clusters. Did the authors check the height information during the air mass transportation?

Page 3922, line 5: Are you sure that on 10 of February you have the lower values?

Figure 3: Could you explain the relatively large values of PM10 before 11 February with air masses coming from Arabian sea comparing with lower values after 2 of March (red symbols)? Could it maybe that trajectory height information would give a clear indication if and when the air masses are really affected from local pollution or marine aerosols?

Page 3923, line 10 (Figure 4): Please provide the mean AOD also for the period 1-15 February since no information on AOD is given from AERONET sunphotometer (Figure 3(a)) for this time period

Page 3923, line 17-21: Is this confirmed by lidar measurements? A plot with the number of layers for 5 days period, or a plot showing the vertical distribution of the layers would be helpful for the reader.

Page 3926, line 22-26: Please compare the common SSA dataset (16 days period)

Page 3931, line 16-18 For the two last flight days, where does the air masses coming from? Do you have anyidea of the aerosol type and therefore the ssa values for these cases?

Interactive comment on Atmos. Chem. Phys. Discuss., 15, 3907, 2015.