

## ***Interactive comment on “An analysis of the September 2015 severe dust event in the Eastern Mediterranean” by Philipp Gasch et al.***

### **Anonymous Referee #2**

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We recommend the paper publication with some revision outlined below.

Nice research in this article includes: 1. It identifies & describes clearly the role of a MCS and detailed developments of 3 cold pools (CPO1,2,3) as sources for this unique dust evolution in time & space. 2. It describes an advanced attempt to provide a better model to simulate this dust event that had no precedence 3. It applies measured data close to the source and in Israel which is far from the main plume origin 4. Though the model describes fairly well the main features of the event the authors are not afraid to mention some discrepancies that were found in the details of dust spreading and attempt to provide an explanation. 5. An important physical contribution here: The mineral dust radiation interaction has been implemented in ICON-ART which seems necessary in this event.

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However, it is suggested to add some remarks to the paper. In the period of 6-8.9.2015 at least 3 events of dust raising and spreading were evident. The first resulted from a rotating thermal low and the rest from a long red sea through. In Israel, the dust entered as an elevated plume. Then it was mixed downward affected both by the topography and local diurnal cycle of the land sea interaction. This fact is marked in section 3 and 3. 4 and 3.4.1 but we feel that there is a tendency to describe a black and white picture according to the model findings and the features of ground measurements alone. We suggest some modifications:

1. The authors seem to describe the dust penetration to Israel from east to west + a portion coming from the north through the Golan heights (in Sec. 3.4 lines 10 etc. and especially line 15 on). However, in Sede Boker (inland station) the AOT started rising from the 7th afternoon (Sede Boker Aronet). Therefore, we suggest that prior to line 28 (Sec. 3.4) the author will add a comment on the turbulent and complicated nature of the event and will explain that the following study described in 3.4.1 is an attempt to explain the discrepancies they found. They can quote the hour to hour SEVERI satellite showing the complicated patterns of the dust.

2. It is suggested to add the Sede boker Aeronet AOT finding and relate it to the Model AOD and add these results to Fig 8 in 3.4.1

3. It is suggested that the PM10 graph will be given in a logarithmic scale. This will show that part of the dust will be found on the 7th too.

4. The authors tend to explain Ashdod low measurements (fig 8) as a result of sea breeze penetration that brings in clean air. As can be seen from the measurements of the Tera and Aqua and the PM10 measurements of other sea stations the sea was full of dust. There were numerous differences between station to station in Israel even in short ranges a few km apart. So taking only 3 stations for verification cannot reveal the whole picture in such a complicated event though they seem to fit with the model logic. Therefore, we suggest that fig 8 will be given as a description to the event complexity

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without a “black and white description”.

5. Fig. 1, caption, add time of satellite pictures.

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