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Atmospheric Measurement Techniques Discussions

Interactive comment on "A Tale of Two Dust Storms: Analysis of a Complex Dust Event in the Middle East" *by* Steven D. Miller et al.

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A Review and Recommendation for "A Tale of Two Dust Storms: Analysis of a Complex Dust Event in the Middle East" by Steven D. Miller and Co-Authors.

It was a pleasure reading this manuscript as the content, organization, and general flow were excellent. It is more meaningful when a manuscript can explain complex topics in a simple, effective manner, guiding the reader on a journey of how the authors' scientific approach was used to enhance or improve observational or other techniques. This manuscript easily achieves this goal and allows the reader to follow along without getting lost in the "weeds".

The goal of this manuscript is to show how differing moisture profiles can have signif-

icant impacts on the detection of dust plumes both over land and water. Forecasters experience these impacts in operations fairly often, and they can attest to how difficult it can be to follow a dust plume, and thus the impacts of said plume on convection or lack thereof. The DEBRA technique and the EUMETSAT Dust RGB both have their strengths and weaknesses, but it's nice to see the challenges of atmospheric moisture above dust getting much deserved attention. The dust event used in this case study was very appropriate as it illustrates the observational sensitivities to local geography coupled with complex atmospheric phenomena. A future paper might explore the challenges of following a dust plume from Africa into the Atlantic Ocean, coupled with a tropical wave as this new technique would be very appealing. The use of the integrated water vapor and NUCAPS soundings is a smart approach along with an explanation of how different aerosols are detected due to scattering. This improvement to the DEBRA algorithm would have a very positive impacts to operations, but it's understandable that further improvements are hindered by the lack of vertical observations (i.e. broader swaths from CATS or CALIPSO), yet modeling is a viable option.

After a few minor revisions, I recommend this manuscript to be accepted.

Minor edit suggestions: Page 2, line 21: Change "importance" to "important" so the sentence flows better into line 22. Page 12, lines 11-12: Re-word "Of note in Fig. 5d is that, whereas Location 3. . ." This feels like a stumble on the way to trying to understand the SWBTD signal. Page 13, line 4: Insert commas after "observations" and "study" Page 13, line 10: Delete "perhaps" as this seems wordy. Page 17, lines 8-9: Change "By inspection with Figs. 1, 4 and 5, this dry. . ." to "Close inspection of Figs. 1, 4, and 5, shows dry. . ." Page 18, line 2: Either change "JPSS-1" to "NOAA-20" or include in the parenthesis (JPSS-1/NOAA-20) as the name changed once it became operational. Page 19, line 8: Add "to" between "due" and "a". Page 28, line 6: Re-word "it could be used provide extrapolate a first-guess. . ." as this is very confusing. I can't make a suggested correction because I'm not sure what you are trying to say (it could be used to provide or it could be used to extrapolate). Page 29, line 1: Re-word "Results show

promising results. . .” as this is redundant (i.e. Results are promising. . .)

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