

## ***Interactive comment on “Mineral dust aerosol from Saharan desert by means of atmospheric, emission, dispersion modelling” by F. Guarnieri et al.***

### **Anonymous Referee #1**

Received and published: 10 April 2012

### **General comments**

The manuscript describes the results of a developed dust transportation model with those of another model. Although the development of the model has undoubtedly been a considerable effort, a description of the results with mere comparisons of images is insufficient. A proper validation study should be performed. The most interesting section is 4.2.2. More quantitative results from the approach described in this section would increase the scientific impact considerably, beyond the meager qualitative description and comparisons of model results.

The overall quality of the paper is poor. The scientific significance is poor and the structure and language of the paper is fair at best.

The use of the English language should be improved considerably before being considered for publication. This should have been done before acceptance of the discussion paper, and could have been easily done by one of the many co-authors of the paper. One can not escape the impression that the first author has made a considerable effort to write a decent paper, without the help of more experienced (co-)authors to come to a sufficient scientific standard.

Below, essential improvements to the text of the manuscript are listed, which should be incorporated before this can be considered for publication as a scientific paper.

### Specific comments

Abstract. The abstract is too short and vague, although this reflects the contents of the rest of the paper rather well. Lines 11 and 12 should be extended with more specific and quantitative results.

line 10. acronym "COGART" should be specified

line 11. Add a comma after "Moreover"

line 11. "a good correspondence" should be quantified.

line 12 "some specific crustal markers" is too vague. Be specific about what was done and what the results were.

Introduction.

The introduction is too short and should embed the current study into the field of mineral dust transport and transport modelling. No reference is given. One would like to see how the introduced model compares to model efforts of other groups, what is

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known of mineral dust transport from other studies (e.g. only for the region that is targeted in this study, which is already considerable), and what the relevant advances are from the current scientific effort described in the paper.

7314, lines 17,18: Change "..the marine biochemistry, the air quality, with consequence on .." to ".. marine biochemistry, and air quality with consequences for .."

7314, lines 18: Add a comma after "Furthermore"

7314, line 24: Change "raise up" to "lift" and "type" to "types"

7314, line 25-27. This sentence should not be part of the paragraph 20-27. It should be a paragraph of its on, and it can be a good start point for a real introductory section.

7315, lines 1-5. This paragraph can be included in the Methodology section, together with the description of COGART, which is introduced only in section 4.2.1.

7322, lines 5-10 can be combined with the lines indicated above in the Methodology section, introducing the methods used in the paper.

7315, line 4. "some available in-situ measurements" should be specified.

7315, lines 6-8 Can be moved to the discussion section.

7315, line 11: Change "showed" to "shown"

7315, line 12: Change "intrusion" to "intrusions"

7315, line 12: Change "basin" to "Basin"

7315, line 13: Change "Models is" to "Models are" or "Model is"

7315, line 15,16 A new paragraph should not be started here.

7315, line 17: a reference is needed for the Reanalysis atmospheric dataset.

7315, line 18: DUSTEM acronym should be specified.

7316, line 2: Change "Regional Atmospheric Modelling System (RAMS)" to RAMS

7316, line 5: Change "The used RAMS version is the 6.02" to "RAMS version 6.02 was used"

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7316, line 6: Change "Fig. 2" to "Fig. 1"

7316, line 20: Specify the sigma levels and/or stretching factor, if possible. In a table if necessary.

7316, line 24: Kain-Fritsch scheme needs a reference.

7317, line 1-6: Should be moved to introductory section and extended to tell what is necessary to know about dust erosion, relevant for this study.

7317, line 3: Remove "inherent risk of"

7317, lines 7,8. Change "DUST Emission Model (DUSTEM)" to "DUSTEM"

7317, line 8: Specify DREAM acronym.

7317, lines 17-22. Remove all suggestions (seems to reproduce, takes into account 'most' important factor) and quantify the dust emission.

7317, line 27: Change "downscaled" to "interpolated", in line with 7318, line 17.

7318, line 3: the "'one-atmosphere" assessment ' needs explanation or a reference.

7318, line 2-10 should be combined into one paragraph.

7318, line 12: Remove "been"

7318, line 12: Change "of" to "than"

7319 section 3.1 should be part of the introductory section.

7319, line 2: Change "raising up" to "lifting"

7319, line 10: Remove "Despite that," and rephrase. There is no antithesis here.

7319, line 11: Rephrase, dust doesn't wait for mechanisms to move it.

7319, line 13: Change "causing" to "the"

7319, line 16: Change "rise up" to "lift"

7319, line 18: Change "rising up" to "lifting"

7319, line 19: Change "raised up" to "lifted"

7319, line 19,20: Change "it is necessary a deep and compact circulation (..)" to "a

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deep and compact circulation (..) is needed"

7319, line 22: Change "through" to "over"

7319, line 23-25: Change "on" to "over" (4x)

7319, line 25,26: Change "for some thousand" to "over thousands"

7319, line 26,27: Change "There is the formation of dust jet, or 'dust plumes'." to "These are called dust jets or dust plumes."

7319, line 28: Change "as" to "like"

7319, line 29: Remove "some"

section 3.2 All description of acts and passed events should be described in the past tense.

section 4.1 All description of acts and passed events should be described in the past tense.

7320, line 2: "The studied event" is not yet described. Introduce this paragraph by something like: "A 30-day period (1-30 June 2006) was analysed, during which a 20-day dust event took place."

7320, line 7: Change "Fig. 4" to "the left panel of Fig. 4."

7320, line 10: Change "Fig. 4" to "the right panel of Fig. 4."

7320, line 14: Change "mechanism" to "mechanisms"

7320, lines 12-20 should be combined into one paragraph.

7320, lines 21-28 should be combined into one paragraph.

7321, line 6: Insert "June" after "18"

7321, line 7: Change "Balcanic" to "Balkan"

7321, line 7 and 9: "interested" should be replaced by something else, but it's unclear to me what could have been meant here. Probably it's best to just say large amounts of dust were found. Or large concentrations (not strong concentrations).

7321, line 16: Change "basin" to "Basin"

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7321, line 21: Change "is incoming on" to "moves over" (and change to past tense).

7321, line 23: Change "achieved" to "reached"

7322, line 20: PATOS acronym should be specified.

Section 4.2.2 contains the first interesting information of this paper. Results from the approach introduced here are worth elaborating on.

7322, line 19 - 7323, line 17 should be placed in the introductory and methodology section.

7323, line 7: Specify the "specific equations". Surely these equations have a meaning.

7323, line 10: Change "some" to "a" (better: specify what you are thinking of, and describe it in the discussion section).

7323, line 22: Change "turned out in" to "were simulated for"

7323, line 23: "Probably, the reason could be traced to " If you can do this, then do so. And report the reason here.

7324, line 14: Rephrase "Probably, the reason could be traced to "

Articles (the, a) should be placed before:

7313, line 10: GOCART model

7315, line 1 : Mediterranean Basin

7315, line 12: Mediterranean Basin

7318, line 12: CAMx model

7319, line 12: emission area

7319, line 13: emission mechanism

7319, line 24: Iberian Peninsula

7319, line 28: dry removal mechanism

7321, line 8: West Mediterranean

7321, line 8: Scandinavian Peninsula

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7321, line 15: Atlantic Ocean  
7321, line 16: Mediterranean Basin  
7322, line 6: COGART model  
7322, line 11: COGART model  
7324, line 5: numerical modelling system  
7324, line 8: Mediterranean Basin

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