

## **Reply from Authors on:**

**Interactive comment on “Technical Note: Minerals in dust productive soils – impacts and global distribution” by S. Nickovic et al.**

### **From “Anonymous Referee#1”**

The Referee proposed useful comments on the paper and pointed out important issues to be considered in order to improve understandability of the paper.

**Reviewer:** ... the title of the paper does not entirely reflect its content and I propose that the authors change it to have the fact that they propose a soil mineralogical database appear.

**Response:** Accepted. The new title is: “Technical Note: High Resolution Mineralogical Database of Dust Productive Soils for Dust Atmospheric Modelling”.

**Reviewer:** Another suggestion was that the additions to the work of Claquin et al. (1999) should be clear in the presentation of Table 1. From this table, it should be clear which fractions come from this work and which part of the Table is original to the present study. That would help the reader follow better the information summarized in paragraph 3.2.

**Response:** Amended as proposed.

**Reviewer:** Several groups are working on extended database of the mineralogical composition of soils that can be windblown. For the purpose of knowing better how these datasets compare, it would have been interesting to have a global or regional mineralogical composition by masse of the dust contained in the soils.

**Response:** To make database by mass of the dust, it would be necessary to have soil density data. This approach was out of the scope of our study. Our approach was to develop a mineral database for mineral fractions for clay and silt soils separately, as done in Claquin et al.

### **Specific corrections required:**

**Reviewer:** Page 1, line 17: change ‘determent’ to ‘determinant’

**Response:** Changed.

**Reviewer:** Page 1, line 25: what you call ‘global dataset’ is only partial in coverage since the areas mapped are present dust emitting regions. Other regions that were emitting in past climate are not necessarily covered. You should mention it here.

**Response:** We added, “present” in the article sentence: “Following such needs, in this study we developed a global dataset on mineral composition of present potentially dust productive soils.”

**Reviewer** Page 2, line 8: change ‘1990-ties’ to ‘1990s’.

**Response:** Changed.

**Reviewer** Page 2, line 10: change ‘was significant improvement’ to ‘was a significant improvement’.

**Response:** Changed.

**Reviewer** Page 2, line 17-18: change 'Results of different regional models are compared for several days dust event in Bodélé depression region' to 'Results of different regional models are compared for a dust event lasting several days over the Bodélé depression region'

**Response:** Changed.

**Reviewer** Page 2, line 18: change 'Similar study is performed over East Asia' to ' A similar study was performed over East Asia'.

**Response:** Changed.

**Reviewer** Page 2, line 19: 'The degree of model uncertainty in dust emission is of order of magnitude...' to 'The degree of model uncertainty in dust emission is of an order of magnitude.'

**Response:** Changed.

**Reviewer** Page 3, line 2: modify 'Going further on local scales complexity of sources increases.' to 'Going further to local scales, the complexity of sources increases.'

**Response:** Changed.

**Reviewer** Page 3, line 25: you need a space just before '(FAO-UNESCO, 1974)'

**Response:** Changed.

**Reviewer** Page 4, line 6-7: change 'We elaborate below several impacts of dust in which its mineral composition plays an important role.' To 'We elaborate below on several impacts of dust for which the mineral composition of dust plays an important role.'

**Response:** Changed.

**Reviewer** Page 4, line 16: you could add Balkanski et al. (2007) as a reference

**Response:** Reference added. Balkanski, Y., Schulz, M., Claquin, T., and Guibert, S.: Reevaluation of mineral aerosol radiative forcings suggests a better agreement with satellite and AERONET data, Atmos. Chem. Phys., 7, 81-95, 2007.

**Reviewer** Page 4, lines 28-29: change 'In ice nucleation process, mineralogical structure of dust an plays important role. Clay minerals in dust are particularly efficient for ice nucleation processes shown in field and modelling studies' to 'In ice nucleation process, the mineralogical structure of dust plays an important role. Clay minerals in dust are particularly efficient for ice nucleation processes as shown in field and modelling studies'

**Response:** Changed.

**Reviewer** Page 5, lines 18-19: change 'Mahowald et al. 2010 show that iron in to the ocean not only increase ocean productivity but that this increase represents carbon-dioxide sink, which has a global warming offsetting effect.' To 'Mahowald et al. (2010) show that iron into the ocean not only

increase ocean productivity but that this increase represents a carbon-dioxide sink, which has a global warming offsetting effect.'

**Response:** Changed.

**Reviewer** Page 5, line 21: change 'cruse' with 'cruise'.

**Response:** Changed.

**Reviewer** End of page 8/ beginning of page 9: It would be nice for the reader to have more information on how the following authors that you quote separated the clay and silt fraction: 'Clay and silt percentages in soil texture classes are specified following Tegen et al. (2002) and Shirazi et al. (2001).'

**Response:** We modified the sentence to: Clay and silt percentages in soil texture classes are specified according Shirazi et al. (2001) modified for loamy sands following Tegen et al. (2002).

**Reviewer** Page 11, line 15: replace 'Choice of dust mask is not considered here since it is out of the scope of our study.' with 'The choice of dust mask is not considered here since it is out of the scope of our study.'

**Response:** Changed.