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Interactive comment on “Desert dust deposition on Mt. Elbrus, Caucasus Mountains, Russia in 2009–2012 as recorded in snow and shallow ice core: high-resolution “provenancing”, transport patterns, physical properties and soluble ionic composition” by S. Kutuzov et al.

Anonymous Referee #1

Received and published: 22 May 2013

The authors present an interesting and novel study on desert dust deposition on Mt. Elbrus nowadays. Dust horizons found in ice-cores from Mt. Elbrus glacier are analysed with regard to isotopic ratios, particle size distribution, and water-soluble ions. In addition, satellite products indicating atmospheric dust loadings (i.e. MSG SEVIRI IR dust index and MODIS DeepBlue AOD) are analysed to identify source regions and dust plumes transported towards the Caucasus region. During the 4-year period 2009–2012, most dust horizons are related to springtime dust plumes

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originating from source regions located in the Sahara and the Middle East. Dust transport pathways are additionally identified from HYSPLIT back-trajectories.

The paper is well written and the presentation of the study and its results is sound and well structured. The manuscript presents an interesting and synergetic approach analysing modern ice-core records. I have only a few minor comments as given below.

General Comments:

Section 2.5: You introduce the MSG SEVIRI AOD product (Brindley and Russell, 2009) here, but no results using this product are shown or discussed.

Section 3.3: What is the main controlling factor on the dust particle size distribution? Is this mainly due to the source type (e.g. source geomorphology) or due to the wind speed distribution during emission and transport?

Fig. 3 & 4 The parameter “sources/km²” and how it was retrieved remains unclear. Please explain in more detail.

Minor Comments:

P1625 L5-6 “c.” ?

P1625 L18 introduce abbreviation “a.s.l.”

P1627 L20 “snow samples, which did”

P1630 L13 What is meant by ‘sigma units’? Please clarify.

P1630 L25-28 Usually, radiances converted to brightness temperatures are used to compile the RGB images. I suppose you are using brightness temperatures here as well. Please clarify.

P1633 L23 “vary” ?

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P1636 L28 “the west, which”

P1638 L16 “This event was”

P1638 L23 “Mesopotamia, which”

P1643 Do you mean “Banks and Brindley, 2013” instead of “Brand and Brindley, 2012”? Otherwise, the reference for “Brand and Brindley, 2012” is missing.

Figures:

Fig. 7 The scale is somewhat arbitrary. Maybe change to a more intuitive scaling, e.g. 0.25 intervals.

Interactive comment on The Cryosphere Discuss., 7, 1621, 2013.

TCD

7, C618–C620, 2013

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