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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Long-term variability of dust events in Iceland (1949–2011)" *by* P. Dagsson-Waldhauserova et al.

Anonymous Referee #2

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REVIEW

General

The paper discusses dust events in Iceland in 1949 - 2011. It is a long period in any atmospheric observational data. The dust observations are compared with PM10, visibility, and weather conditions, and differences between north and south Iceland are discussed. The paper is definitely worth publishing in ACP.

I found some work to be done for a revised version, however. My correction suggestions are not very tedious. The most tedious is to rework the analysis between PM10 and visibility. In the present figure 8 and the related text in section 3.3 only the correlation coefficients are discussed even though the data would be suitable for more

interesting and quantitative analyses. Obviously the authors wanted to make a similar plot as Wang et al. ACP, 8, 545–553, 2008 but also their plots are not as informative as they could. First, visibility is reduced by particles so it is much more sensible to plot visibility as a function of PM10. But don't leave it there. The extinction coefficient can be estimated from PM10 by using some published mass scattering coefficients (e.g., Hand, J. L., and W. C. Malm (2007), Review of aerosol mass scattering efficiencies from ground-based measurements since 1990, J. Geophys. Res., 112, D16203, doi:10.1029/2007JD008484). Just one multiplication. Visibility can then be estimated from the Koschmieder formula (google for that) that gives visibility as a function of extinction coefficient, just one division. How well does the so calculated and actual observed visibility compare? Are they even in the same order of magnitude? Are the shapes of the functions (visibility(PM10)) similar? You may draw some interesting conclusions from this. In the plots use loglog scale because it shows better also the points in the low visibilities and low PM10.

Detailed comments P17334,L11-12 "The Hagavatn plume area is the source for frequent dust events towards Reykjavik and North America (the ocean southwest of Iceland)" The text in parentheses refers to North America which suggests that NA is the ocean SW of Iceland. I would do some rewording.

Section 2.1 Considering the significance of visibility data for the analyses in the present paper, the method should be explained more detailed. How was visibility measured? Wavelength? Uncertainties?

P17335, L10. Dust observations. How is dust observed? With some instrument?

P17336, L6-7. "We have not included these codes in this long-term study except that ww1 or ww2 was 3." I don't understand this sentence.

17337 "There is clear trend of having either the south or the north more active at a time." I would not say it is clear at all. For instance in the 1950's, 1970's and 1990's the peak years seem to be the same. A scatter plot and regression of the annual number

of dust days would possibly yield a slightly positive correlation. I would suggest the authors make such a plot, it would bring some more quantitativity to the analysis of the differences between the regions.

P17340, L3 “The DE wind velocity increased with the DE severity,” The DEs are induced by wind and not the other way round so I would rather write that the DE severity increased with the wind velocity.

Fig 2. Why are the time series of visibility and number of dust days so different? For visibility there is clearly an increasing trend through the decades. Discuss this also in the text.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 17331, 2014.