

Interactive comment on “Mineralogy and geochemistry of Asian dust: Dependence on migration path, fractionation, and reactions with polluted air” by Gi Young Jeong

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Review of “Mineralogy and geochemistry of Asian dust: Dependence on migration path, fractionation, and reactions with polluted air” by Gi Young Jeong

The manuscript deals with the compositional properties of Asian dust outbreaks reaching the Korean peninsula. A time series reaching back more than a decade is analyzed in detail, proving a step towards a dust composition climatology, information highly useful for new generations of chemistry-aware aerosol and meteorology models. The author has done a careful and detailed analytical work of the samples, providing high-quality data set of dust geochemistry. Results are presented in a useful way, also for

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further usage e.g. in modeling. The paper is well-written and concise. References are given where meaningful. I suggest the publication after some minor clarifications.

Remarks

General: When abbreviating mineral names, I suggest using common symbols (Kretz 1983).

Fig. 2 / size distributions: The Size distributions in particular towards the larger particles can be considerably biased by the type of inlet used for measurement. Please give some more details here. Also, Serno et al. refer to deposited aerosol from a sediment core. In principle, airborne size distributions should differ from deposited ones based on the same aerosol due to increasing deposition velocity for larger particles, so I'm not sure whether an agreement should be expected here.

Fig. 4: Where is the La/Yb proxy information in the plot, which is referred to in the caption?

Fig. 6: Is the Fe and K enrichment of dust versus soil significant?

Page 6 / line 7: What means 'side packing'?

Page 8 / line 16-17 and P9 / 22-23 and P13 / 18-21: The apparent anticorrelation between relative compositions might be misleading. If a major component – clay minerals here – varies, the other components must anticorrelate, a property of the normalized system. Feldspar and quartz show a similar temporal behaviour here, so a variation in clay minerals might drive the apparent anticorrelation; however, there is not proof just by composition data.

Page 14 / line 7-8: As dust emission might take its material mainly from the topmost crust (millimetres), couldn't the depletion of zircon have already happened before the emission, i.e. a zircon depletion from these top millimetres? From which depth were the soil samples collected?

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Page 15 / line 24 onwards: What would happen actually to the dolomite in the acidic environment?

Page 16 / line 11-13: What could be the source of Sn?

Corrections

Page 2 / Line 5: Rephrase, maybe "Asia is one of the major mineral dust sources. . ."

P5 / 20: "shredded" -> "cut"

P11 / 21: "Taklamacan" -> "Taklamakan"

Is Section 5.4 a subsection of 5.3? Both are termed fractionation.

P15 / 5: Should that mean that the fractionation supposedly occurs on shorter distances? Please clarify the wording.

Kretz, R. (1983). "Symbols for rock-forming minerals." *Am. Mineral.* 68: 277-279.

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