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Interactive comment on "Twelve thousand years of dust: the Holocene global dust cycle constrained by natural archives" *by* S. Albani et al.

Anonymous Referee #1

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This paper presents a global synthesis of Holocene dust records in various archives and provides an updated dataset including the dust mass accumulation rate (DMAR) and particle-size distribution (PSD). The compiled DMAR record was also compared with the modeled variability of global DMAR record. This topic is quite ambitious since numerous dust records were available with great uncertainties. Nonetheless, this paper tried to select those high-to-medium quality data from land, ocean and ice based on several criteria and provided a global compilation of the Holocene DMAR records. Thus, I think that this work is suitable for publication in "Climate of the Past". However, based on the relatively concise content of the main text (e.g., section 4), It remains difficulty to reach some consensus regarding the Holocene dust cycles in different archives/regions, for example, the differences of the DMAR and PSD between Mid-Holocene (6ka) and late Holocene (PI), and between Mid-Holocene and LGM for

reference. Given the great authorship, the readers might expect to see a comprehensive review on the dust records on several representative archives (e.g., Antarctica ice cores, Tropical Atlantic marine sediments, and Chinese loess deposits). Unfortunately, the summary is relatively simple, for example only two paragraphs mentioned about Chinese loess and many references with good OSL dates for the Holocene soil were not fully cited (e.g., Holocene work with OSL dates by Lai and Wintle (2006), Lu et al (2007), Sun et al (2012), Kang et al (2013)). Besides, this paper tried to consider the dust PSD, but I cannot find any curves to show either the distribution pattern of dust particles or the time series of dust PSD variations. From Fig.6 to Fig.15, I wonder whether it's possible to add the age controls and errors of these MAR estimations. Based on these MAR curves, it's hard to judge the relationship between DMAR and climate changes. It might be perfect to incorporate the typical climate records from different region/archives in these curves, for example, d18O of ice core, benthic d18O of marine records, and magnetic susceptibility of loess deposits. Finally, Fig.17 displays the dust deposition flux variability from the CESM during different time slices, however, the corresponding external forcing and internal boundary conditions in these time slices were not clearly expressed in the text.

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