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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Change of the Asian dust source region deduced from the relationship between anthropogenic radionuclides in surface soil and precipitation in Mongolia" *by* Y. Igarashi et al.

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General comments: The raw data in the manuscript are great valuable, and one of useful approaches using the anthropogenic radionuclides is proposed to study on Asian dust sources. Asian dust researchers must take interest in this manuscript. I have also interest that the (137Cs/90Sr vs. 137Cs) slope of Takalimakan desert soil, China is very close to the slope of Mongolian soil, whereas the slope of Tsukuba soil, Japan is clearly distinguished. However, I have hard to understand that authors describe the relationship between annual precipitation and 90Sr, 137Cs composition and (137Cs/90Sr) at the each site, as I would like express the following my opinions.

Specific Comments: 1) On the basis that the elution of 90Sr is faster than that of 137Cs, authors explain the difference of the anthropogenic radionuclides (137Cs and 90Sr) composition as well as the ratio could be elucidated from annual average amounts of precipitation (section 3.1and 3.2). Is it reasonable to use annual average precipitation to explain for the weathering process concerning with 90Sr mobility? As far as see in figure 3 and 4, I cannot agree with the authors conclusion that the level of 90Sr and 137Cs in the surface soil had a notable straightforward correlation with precipitation. I suggest that the title may be consequently modified.

2) Figure 4 is cross plotted various soil data (Tsukuba soil, Japan; Taklimakan soil, China; Mongolian soil) and each wet event deposition, monthly total deposition. As authors mentioned that the Taklimalan soil samples also exhibit a linear curve with same slope as the Mongolian curve plus a positive intercept, I also recognize one of good information that the same slope is important to explain the long-range transport of Asian dust. Then, I checked/examined the plotted raw data and each event, taken from the references (Igarashi et al., 2005 and 2009). Each wet event, 2007, plotted by triangular mark ((137Cs/90Sr) : (137Sr)) and my examination of Asian dust event observed in Japan, 2007 are arranged: a) Obvious Asian dust were observed in Japan, just before/during each wet event: 2-4April(3.9ïijŽ30.6), 4-5April (5.4: 80.1), 10-11May (2.2 : 8.58) b) Asian dust was not observed in Japan, just before/during each wet event: 13-14April(>8.1: 24.3) c) Other: Monthly deposition, April (5.9:21.5)ãĂĂ Three events in the (a) are plotted near the linear curves of Taklimakan and Mongolia soil, others in (b) and (c) are plotted far apart from these linear curves in Figure 4. Although the number of each event data of anthropogenic radionuclides correlation with obvious Asian dust events is not sufficient, I think this is important to consider the change of the wet deposition of anthropogenic radionuclides, as authors exhibited the monitoring data of monthly deposition in Tsukuba, Japan. And, I also conclude that the difference between Taklimakan and Mongolian soils data of the anthropogenic radionuclides is not significant.

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