We would like to thank reviewer #2 for the encouraging and positive evaluation of our paper.

1. *The authors discuss the possibility that early measurements may provide shorter residence times than the full data-set and its implication for estimate of the initial Cs/Xe relation (p. 12342-). Reference is made to high observed values in figures 3c and 4b. The authors avoid the tempting idea to follow these few data to the time zero intersection that would give a Cs/Xe ratio of roughly 1e-3, that then would be more into agreement with the assumptions in Stohl et al, 2012. I couldn't restrain myself for doing so but it is honorable to the authors not to try.*
   This idea also came up during our analysis process, but we decided that we did not have enough data (early measurements) to make any clear conclusions for this. However, it should be fairly easy for the reader to make such a judgement (like the reviewer has already done), that is to draw a line manually on the figure that would be a more or less best fit to the early measurements and take it back to time zero. It was also not clear if the exponential model curve is the best curve fit for these early measurements (i.e. they might not be exponentially decreasing, or there may be several different exponential time scales involved). We appreciate the reviewer's remark that it is possibly best to not make any direct attempts of this in the paper.

2. *In page 12342 last paragraph.*
   "The fact that our radionuclide ratios extrapolated to the time of the [missing word] are so much lower ..." I guess the missing word should be <release>, or <assumed release>
   Yes the reviewer is right; we have added "*initial release*" as the missing word.

3. *I was at first a bit confused at the notation <enhanced values> (p. 12336) that made me as a reader shortly a bit lost. Later on you use <enhancement over background>, that you may consider to use right through the paper. The same is then valid for Fig 2, the legend <Enhanced> may be replaced by e.g. <Over background>, that also comes closer to the figure caption.*
   We have checked carefully the paper and now use "enhanced over background" and also changed the legend of Fig. 2 as the reviewer suggests.

4. *On page 12334, last paragraph, you describe the nature of the CTBTO data (These measurements are unique ...). It could be of interest to attach a reference, if available, to the statements in this sentence.*
   We have added two references (Schulze et al, 2000; Werzi, 2009).

5. *You may add something about the motivation for the multi-box approach in page 12337, second paragraph ("The first approach uses a multi-box ..."), as I understand it related to that only 50% of the stations have co-located Cs, I and Xe measurements. But this may be obvious anyway*

   We added the following "This method uses all available measurements of ^{137}Cs, ^{131}I and ^{133}Xe from all stations (Fig. 1). This is contrary to our second approach which relies on co-located measurements of the three components. Such co-located measurements are only available for 11 of the stations". In the same paragraph we now also added a reference to the use of this box model in a study of the total release of 133Xe (Stohl et al, 2012b). This paper has a more extensive description of the box model and was only available after the initial submission of this paper. As it is now available it is a useful reference for the reader. The original Stohl et al. (2012) reference is thus renamed Stohl et al. (2012a).