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Interactive comment on "Inverse modelling of the Chernobyl source term using atmospheric concentration and deposition measurements" *by* Nikolaos Evangeliou et al.

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This paper appears to be the next in a series by this research group to recreate the events associated with the Chernobyl disaster in an attempt to better understand the emissions produced and how they were dispersed and deposited across the landscape. A previous paper (or two) in the series attempted to reassemble the original deposition dataset used to generate the maps published by De Cort et al in 1998, and these data are now being used via an inversion process to model (predict) the source term (actual amounts) of radioactive materials that were released during the disaster. I was shocked to read that only a very small percentage of the original data was dis-

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Discussion paper

coverable by this research team which reaffirms the growing philosophy of requiring empirical data to at least be archived and accessible under some defined conditions. C1 This latest effort represents a highly innovative and creative approach to refine estimates of the source terms for the Chernobyl accident. Perhaps I am easily impressed, but I found this exercise to be nothing short of brilliant. Of particular note is the revised injection height profile suggested by the current modeling effort which may have broader relevance to other contamination systems that may be influenced by fire (e.g. Fukushima). Of course, what is equally interesting from this exercise is the fact that there is no substitute for good direct measurements – even the best models are approximations and usually miss many important features of the phenomenon under study. The physicist might suggest that the addition of other variables/factors might solve this problem but this may not be possible under most real-world situations. This exploration is as valuable as a revealer of what is not predictable as it is as a predictor. Overall, this is a very interesting and well-written paper that makes a substantial and original contribution to this literature. Studies of this sort are increasingly valuable as we face greater threats of nuclear incidents and other environmental hazards in the coming years. Response: We acknowledge the reviewer for his kind comments. Indeed, I was always fascinated by the Chernobyl disaster and its consequences since May 1986 that was young and listened all these terrifying statements about this “transparent nightmare” as they called in the news 30 years ago. My interest became much more intense as a scientist later, when I found out that there were >500,000 measurements all over Europe that somebody does not want to share for reasons that nobody explains!!! The funniest thing is that I officially contacted both the IAEA (official organization for accidental release issues) and the JRC (official organization for the measurements taken after the accident) and they both responded that these measurements have been lost. No one from these institutes has no idea about them blaming the Russians that they hide them. It is suspicious that nobody from the JRC has kept a copy of the data, since the JRC researchers processed all these 500k measurements to create the deposition map of Cesium after the accident, which was presented in the ATLAS (see relevant reference in the manuscript). So, since 2003, I started gathering measurements in an excel file. I feel really satisfied that I can now exploit all these measurements and define a more detailed source-term from the Chernobyl accident. In this direction, I have made these measurements publically available, exactly as the resulting posterior releases from the present paper, so anyone can perform any kind of analyses using these measurements and the resulting release ratios. Last but not least, whenever I find new measurements, I update the dataset.

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