

## ***Interactive comment on “Emissions Relationships in Western Forest Fire Plumes: I. Reducing the Effect of Mixing Errors on Emission Factors” by Robert B. Chatfield et al.***

**Anonymous Referee #2**

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This is an interesting manuscript and the authors deserve credit for putting a great deal of effort into it. It presents some of the challenges in interpreting atmospheric observations of biomass burning emissions. The writing is not straightforward, but I believe the paper presents the following: To understand the impact of fires at local, regional and global scales, the emissions of various important atmospherically relevant species need to be known at the source. Emission ratios (ERs) provide a means for deriving emission factors. Often it is not possible to obtain ERs because the mixing ratios measured in aircraft studies are often not sampled near  $t=0$  so enhancement ratios (EnRs) obtained at some time from  $t=0$  can be useful for estimating ERs if the physical and chemical transformational history since emission is known. The MERET method is

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put forward and described as a means to extract more information from chemical data downwind of a fire with the ultimate goal of estimation of emission factors.

In my opinion, the manuscript needs a better organizational structure as it is quite difficult to follow. I found the conversational style of writing also distracting, and it requires a great deal of effort from the reader. The manuscript is very long and there is no clear payoff at the end. The authors should work on providing a more concise presentation of their work. For me, even after some effort I found it difficult to make sense of a lot of it. I am sure that there is a good deal of scientific merit embedded within the manuscript and I believe with some reformulation there is a forum somewhere for these concepts to be presented. I recommend rejecting this version of the manuscript.

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Interactive comment on Atmos. Meas. Tech. Discuss., doi:10.5194/amt-2019-235, 2019.

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