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Atmospheric Measurement Techniques Discussions

Interactive comment on "Effect of thermodenuding on the structure of nascent flame soot aggregates" *by* Janarjan Bhandari et al.

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We thank the reviewer for the comments. We believe there was a misunderstanding on the goal and the scope of this study. We hope to clarify the misunderstanding with this reply. The purpose of the study was not to provide evidence (or lack of it) for a new pathway for atmospheric soot restructuring. The goal instead, was to study the potential bias introduced by a technique commonly used in atmospheric studies. In particular, we wanted to investigate the effect of thermodenuding on soot particles that, in purpose, had not been processed in the atmosphere yet (i.e., without any significant amount of coating). Thermodenuding is a technique used to study the effect that coating has on the optical properties of atmospheric soot. In fact, coating materials can have a substantial effect on the optical properties of soot particles; this aspect motivates our study – that is why we mentioned it in the introduction – but is not the

objective of the paper. Our sole purpose was to investigate whether the thermodenuding process itself changes the structure of soot or not. It is in fact, plausible that the thermodenuding process alone might restructure the refractory core of a mixed particle containing soot (a technique issue, not an atmospheric process). We agree with the reviewer that this process would not have a direct relevance to the atmosphere because this is an "artificial" manipulation of the particles. However, the process could be important for how data on thermodenuded particles, are interpreted. In other words, if thermodenuding is used to remove the coating material of atmospheric soot-containing particles, and if the denuding process artificially restructures the soot, then the measured effect would be a combination of the "natural" compaction due to the coating (either during condensation or evaporation) plus the "artificial" restructuring induced by the thermodenuder. This combination of factors would make the interpretation of atmospheric data complicated, at least. With this study, we wanted just to provide evidence that, fortunately, the thermodenuding process does not introduce this bias. This might seem as an insignificant result because it is, in a sense, a "null result". However, we feel it is a key information for the correct interpretation of ambient measurements. To conclude, we want to underline again, that this work does not address ambient processing at all but instead, it addresses the validity of a technique widely used in atmospheric studies. This is the reason why we submitted this manuscript to Atmospheric Measurement Techniques. We do believe this information can be very useful to those who routinely use a thermodenuder. However, because of the reviewer's comments, we feel that we might have failed to make this point completely clear in the manuscript. If given a chance, we will clarify the scope of the study in a revised version, after considering also the remaining reviewers' comments.

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