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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Atmospheric tar balls: aged primary droplets from biomass burning?" *by* A. Tóth et al.

Anonymous Referee #2

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General comments

This manuscript presents a novel approach to generating tar balls and examining their morphological and chemical properties. Tar balls constitute a unique type of carbonaceous particulate matter which may have significant contributions to direct climate forcing, yet have been investigated mainly during a few ambient studies.

The data presented in this manuscript are derived from laboratory experiments, which appear to resemble the proposed formation process fairly well. The authors claim the properties of the lab-generated tar ball particles to be similar to those of ambient particles measured in previous studies, while a more detailed and quantitative comparison is needed to support this claim.

In general, the manuscript is well written, logically structured and coherent for the most part. The results are interpreted reasonably well while in some cases a more thorough discussion is desired, as mentioned above and below. Therefore, prior to acceptance of this manuscript for publication in ACP, a few issues should be addressed by the authors, as listed in the specific comments below.

Specific comments

1. Page 33091, lines 15-17: Where does this estimate come from? A very recent study (Liu et al., GRL, doi:10.1002/2013GL058976, 2014) provides estimates of the direct forcing by brown carbon (in addition to in-situ measurement results), which should be mentioned and cited here.

2. Page 33094, section 2.2: This section would fit better in the beginning of the experimental part of the paper, at least in terms of chronological sequence.

3. Page 33097, lines 17-18: Please, provide evidence for this similarity, e.g., by showing some composition data from ambient tar ball particles, and discuss this comparison in more detail, including references to literature data.

Interactive comment on Atmos. Chem. Phys. Discuss., 13, 33089, 2013.