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Interactive comment on “Source areas and trajectories of nucleating air masses within and near the Carpathian Basin” by Z. Németh and I. Salma

Anonymous Referee #2

Received and published: 10 July 2014

The authors present a data analysis of in total two years of aerosol size distribution measurements in a urban and urban background station in Hungary in connection with air mass trajectory analysis to identify the areas in which particle formation is occurring. The method to identify the area of particle formation has been developed recently and can be used to map the area that a particular ground station can 'see' in terms of regional particle formation events. The method itself is in my opinion sound, and the present paper gives a compact overview of the spatial extent of particle formation in the studied sites. As such, the paper gives some new insights of particle formation observations and I recommend it for publication.

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However, I have a few comments that I suggest that the authors address before the paper is published. My main comment is regarding the terminology and interpretation of the nucleation mapping method that uses trajectories. If I understand the method correctly, the "tracks", as the authors call the results presented in Figs 4 and 5, represent the area in which the particles observed during a particular particle formation event have been formed. I think that this is not fully clear from the text in the manuscript. Particularly, I disagree with the use of "line source" in section 2.2; overall the whole section could be clarified in a way that it becomes clear that the "tracks" show a part (the part observable due to advection) of a possibly larger regional area in which nucleation is occurring. Connected to this, I do not fully follow the idea of 'source regions' presented in Fig. 6. In my opinion, the particle formation event does not start at a particular region, but rather occurs simultaneously over the whole region. Therefore, taking a rather arbitrarily chosen city-size area and projecting it to the furthest point in which the event was still observable does not represent useful information, and I would suggest removing this analysis from the manuscript. However, it may be that I have grossly misunderstood the analysis, so if its importance can be explained then I have no objections for its inclusion.

As a minor point, I am wondering on the difference between the directions of the nucleating areas and the prevailing wind directions identified in the wind rose analysis, especially for the background station. Is this only an effect of different wind speeds for the different directions (I assume the wind roses are averages weighed by the wind speed; this could be clarified), or is there another reason?

As a third minor point, I would suggest adding some measure of scale and/or some landmarks to the maps in Figs 4-6. As they are now, it is difficult to see the features described in the text from the figures.

Otherwise, I think the paper is well-written and a clear presentation of the data.

Interactive comment on Atmos. Chem. Phys. Discuss., 14, 9225, 2014.

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