

## ***Interactive comment on “Frequency of new particle formation events in the urban Mediterranean climate” by M. Brines et al.***

**Anonymous Referee #2**

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The paper presents results from 5 different measurement sites: 3 in the Mediterranean, one in Australia and one at west coast of the US. Analysis of number size distributions using statistical methods might be a valuable tool for such data sets. However, the present study needs improvement in data analysis and interpretation.

Comments in detail:

The five measurement sites are supposed to have similar climatic conditions but the sources for precursor gases and also aerosol particles might be very different. The 3 months of measurements from Los Angeles do not really fit into the study and should be excluded, because such a short period is not representative at all. All other sites have at least 1 year of measurements. One could also discuss if Brisbane fits into the

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study, but maybe it is a chance to find some differences.

My major criticism is the quantification of traffic related particles and new particle formation. I think it is difficult to distinguish between these groups, because also from traffic-emitted gases new particle formation takes place. These particles are typically measured at roadsites with mean diameters of 10 - 20 nm. This is the same size range as new particle formation in the present study. There are several studies published about measurements behind the car and at the roadsite.

What does new particle formation (NPF) mean here? Does it include only NPF from natural sources or also that from traffic-related gases? The first one is probably not possible to investigate in cities like Barcelona and Madrid. Thus, new particle formation in big cities is always connected to traffic emissions.

Case studies, Figure 5: Figure c) Rome: A burst of particles around 30 nm in size occurs in the afternoon. How do the authors conclude that this is NPF? Where have these particles been formed and when? Such a figure does not fit into the general understanding of new particle formation, because it starts at small sizes and includes also particle growth. If particles appear at larger sizes, they might have been formed somewhere else, but this has to be discussed!

A more detailed and specific review could be done with revised manuscript.

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