

## ***Interactive comment on “Trends in new particle formation in Eastern Lapland, Finland: effect of decreasing sulphur emissions from Kola Peninsula” by E.-M. Kyrö et al.***

### **Anonymous Referee #1**

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The manuscript by E. M. Kyroe et al. deals with long term field measurements performed in Eastern Lapland, Northern Europe. It shows a lot of convincing ambient data and presents thorough analysis of a vast amount of it. The observed connection between decreasing of new particle formation (NPF) during 12 years and simultaneous gradual decreasing of the SO<sub>2</sub> concentration levels, is very interesting. The authors find that while the removal of pollution decreases the frequency of NPF days, in single event the particle number on the nucleation more seems to be higher. This is understandable, since the decreasing of pollution, mostly sulfuric compounds that is, it also decreases condensation sink due to pre-existing particles. On the other hand, since

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pollution is less, leading to lower amount of condensable species, a smaller fraction of particles will grow to CCN size. All in all, since emissions are decreased, CCN formation tends to be less. The observed trend is linked with air trajectories arriving from Kola area, when compared with the fraction of days when the air trajectories arrive from elsewhere.

The manuscript shows large amount of field data and presents fair analysis and solid results. I think that the paper opens a discussion on what other effects the decreasing of emissions might have on our climate. The authors indicate that increasing ship emissions in certain areas might function in the opposite way than what is seen here. I'm in favor of publishing the manuscript as a full paper in the present form.

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Interactive comment on Atmos. Chem. Phys. Discuss., 13, 30721, 2013.

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